



UNIVERSITY OF
BIRMINGHAM

**Developing and evaluating a stroke training programme for
physiotherapists to improve the long-term care for patients with stroke in
Saudi Arabia through the identification of these patients' needs and gaps in
the current system.**

By

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Abstract

There are about 29 strokes per 100,000 people, annually, in Saudi Arabia (SA). These patients require long-term rehabilitation services to enhance their recovery and independence in the community. Views from both patients and physiotherapists on current practice in SA are essential to ensure that services are feasible and acceptable. Additionally, physiotherapists play an important role in meeting the complex clinical and social needs of stroke survivors. Ongoing training is necessary to meet their educational needs to enable them to provide effective long-term rehabilitation. Thus, the overarching aim of this research was to develop and evaluate a stroke training programme for physiotherapists in SA to enhance long-term care for stroke patients, through the identification of the specific needs of patients with stroke and physiotherapists' perspectives and training needs.

Stage 1: This review aimed to investigate the perceived needs of stroke survivors across various domains of care following their discharge from hospital. A meta-ethnographic review of qualitative studies was conducted. Twenty-seven studies were included. Two main issues were revealed concerning the unmet needs of stroke survivors: (1) a lack of information availability and suitability, and (2) inadequacy of care and services.

Stage 2: This stage aimed to explore stroke patients' needs after their discharge from rehabilitation centres in SA. An interpretive phenomenological analysis (IPA) study was undertaken using semi-structured interviews. Twenty-four patients with stroke were recruited from two hospitals in SA. The key findings suggested that patients experienced limited community rehabilitation services post-discharge unless they were financially able to pay for private therapy. Coping barriers, including medical, psychological, social, and financial factors; and facilitators, including faith, recovery, social support and leisure were identified. Participants suggested strategies to improve rehabilitation services, such as addressing the staff shortage and lack of expertise, access to services, and ongoing care.

Stage 3: This stage explored physiotherapists' perspectives on post-discharge stroke care in SA and gaps in their knowledge regarding the provision of long-term care. An exploratory qualitative study was conducted using semi-structured individual interviews and focus groups. Twenty-six physiotherapists participated in this study. The findings suggested that post-discharge services lacked structure and organisation. Physiotherapists perceived that the long-term approaches involved many barriers for patients and therapists, such as lack of education. The findings also indicated a need for training for physiotherapists involving assessment approaches, using outcome measures, setting goals, and providing effective education to patients to improve the level of care provided to patients with stroke.

Stage 4: Based on the previous three studies, a Stroke Training Programme (STP) was developed to meet the knowledge gaps for physiotherapists' training needs and to enable physiotherapists to deliver long-term care following the discharge of stroke patients. Then, an evaluation of the STP using a sequential explanatory mixed methods design was employed. The quantitative part was a 'pre-and post' design to assess the change in physiotherapists' knowledge, confidence and attitude, while the second part comprised qualitative interviews to assess physiotherapists' perceptions and the acceptability of the STP. Twenty-six participants completed the STP. The results demonstrated a significant increase in the physiotherapists' knowledge and confidence. Further, physiotherapists gave positive feedback about the STP. However, major applicability limitations were identified.

The care for stroke patients in SA can be improved by standardising care and enhancing the long-term care approaches including ongoing patients' education, self-management and telerehabilitation. Further, providing training programmes for physiotherapists to enhance their knowledge and skills in stroke rehabilitation. Future research should focus on establishing and implementing structured frameworks to guide the process of stroke rehabilitation and ensure consistency in patient care.

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Dedication

In loving memory of my father

Thesis Format

The alternative format for thesis guidance provided by the University of Birmingham was employed to write this thesis. The alternative format thesis style enables the researcher to integrate published work with thesis chapters. Thus, the chapters are a combination of standard chapters and published papers. The published papers (Chapters 3, 4, 5 and 7) are provided in appendix 1, 2, 3 and 4.

List of Papers and Conferences

Published Article

- Temehy, B. Rosewilliam, S. Alvey, G. and Soundy, A. (2022) ‘Exploring stroke patients’ needs after discharge from rehabilitation centres: meta-ethnography’, *Behavioral Sciences*, 12(10), pp. 1-19. (Appendix 1)
- Temehy, B. Soundy, A. Sahely, A. Palejwala, Y. Heath, J. and Rosewilliam, S. (2023) ‘Exploring the needs of stroke patients after discharge from rehabilitation centres in Saudi Arabian communities: An IPA qualitative exploratory study design’, *Plos one*, 18(9), pp. 1-17. (Appendix 2)

Article Under Review

- Temehy, B. Soundy, A. Sahely, A. and Rosewilliam, S. (2024) ‘Exploring physiotherapists’ perspectives and training needs for stroke patient care continuity in Saudi Arabia: A qualitative study’, (Appendix 3)
- Temehy, B. Soundy, A. and Rosewilliam, S. (2024) ‘Evaluating a Stroke Training Programme (STP) for physiotherapists to improve the delivery of long-term care for patients with stroke in Saudi Arabia: A pilot mixed methods design’, (Appendix 4).

Conferences and Presentation

Temehy, B. Soundy, A. Sahely, A. Palejwala, Y. Heath, J. and Rosewilliam, S. (2023)

Exploring the needs of stroke patients after discharge from rehabilitation centres in Saudi Arabian communities: An IPA qualitative exploratory study design. World Stroke Congress 2023, Virtual.

Temehy, B. Soundy, A. Sahely, A. Palejwala, Y. Heath, J. and Rosewilliam, S. (2023).

Exploring the needs of stroke patients after discharge from rehabilitation centres in Saudi Arabian communities: An IPA qualitative exploratory study design. Wales Stroke Conference 2023, Cardiff, UK, (Presentation).

Temehy, B. Soundy, A. Sahely, A. Palejwala, Y. Heath, J. and Rosewilliam, S. (2023).

Exploring the needs of stroke patients after discharge from rehabilitation centres in Saudi Arabian communities: An IPA qualitative exploratory study design. 8th World Physiotherapy Congress. 2023, Paris, France (Presentation).

Temehy, B. Soundy, A. Sahely, A. Palejwala, Y. Heath, J. and Rosewilliam, S. (2023).

Exploring the needs of stroke patients after discharge from rehabilitation centres in Saudi Arabian communities: An IPA qualitative exploratory study design. CSP Annual Conference 2023, Birmingham, UK, (Poster).

Temehy, B. Soundy, A. Sahely, A. Palejwala, Y. Heath, J. and Rosewilliam, S. (2023).

Exploring the needs of stroke patients after discharge from rehabilitation centres in Saudi Arabian communities: An IPA qualitative exploratory study design. UK Stroke Forum 2023, Birmingham, UK, (Poster).

Temehy, B. Soundy, A. Sahely, A. and Rosewilliam, S. (2024). Exploring physiotherapists' perspectives and training needs for stroke patient care continuity in Saudi Arabia: A qualitative study. 11th World Congress on Physiotherapy, Physical Rehabilitation & Sports Medicine 2024, November 18-19, Rome, Italy.

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Abbreviation

ADDIE	Analyse, Design, Develop, Implement, and Evaluate
BI	Barthel Index
CONSORT	Consolidated Standards of Reporting Trials
CPD	Continuing Professional Development
ERN	Ethics Review Manager
GAS	Goal Attainment Scale
G-AP	Goal-setting and Action-Planning
GRADE-CERQual	Grading of Recommendations Assessment, Development and Evaluation - Confidence in Evidence from Reviews of Qualitative research
GRASP	knowledge of Graded Repetitive Arm Supplementary Program
ICF	International Classification of Functioning, Disability, and Health
IDEAL	Include, Discuss, Educate, Assess, and Listen
IPA	Interpretive Phenomenological Analysis
JBI	Joanna Briggs Institute
SA	Saudi Arabia
MRC	Medical Research Council
MMSE	The Mini-Mental State Examination
MoH	Ministry of Health
NHS	National Health Services
NICE	National Institute of Health Care
PAM	Patient Activation Measure
PI	Principal Investigator
PICO	Population, Intervention, Comparison, and Outcome
PRISMA	Preferred Reporting Items for Systematic reviews and Meta-Analyses
PROSPERO	International Prospective Register of Systematic Reviews
RMI	Rivermead Mobility Index
SDL	Self-directed learning
STP	Stroke training programme
SPIDER	Sample, Phenomena of Interest, Design, Evaluation, and Research Type
SPSS	Statistical Package for Social Sciences
SSPS	Saudi Stroke Pathways Standard
SRQR	Standards for Reporting Qualitative Research
SSQoL	Stroke Specific Quality of Life Measure
STEM	Science, Technology, Engineering and Mathematics
UK	United Kingdom
UoB	University of Birmingham
US	United States
WHO	World Health Organisation
6SQuID	The six steps in quality intervention development

Context and overview of the thesis

Currently, the provision for stroke care within Saudi Arabia (SA) is limited, despite the high incidence of stroke in SA (29/100,000) compared to Qatar (11/100,000), Jordan (15/100.000) and Kuwait (27/100,000) (Streletz *et al.*, 2017). For instance, there are only three specialist units located in the capital city, an absence of community services, and a lack of standardised services across the country. Understanding the experiences of stroke patients in SA who have undergone post-stroke care services is crucial in this context, which offers limited support for recovery. Further, development of stroke services in SA is urgently needed and innovative and effective solutions that can capitalise on the current resources are essential. Hence, this PhD thesis was designed to address these needs and concerns through answering a series of questions:

Firstly, what are the needs of the stroke survivors across various domains of care following their discharge from the hospital from a global perspective? This helped in informing and providing context to the next stages by summarising the available evidence on stroke needs post-discharge globally.

Secondly, what do patients with strokes in SA need after their discharge? It was vital to recognise the problems patients encounter following their discharge from rehabilitation centres in SA. Being aware of patients' needs can help in understanding the impact of service deficiencies on different aspects of their lives and in establishing appropriate methods for reintegrating patients into their communities. The key findings that emerged at this stage suggested that patients experienced limited community rehabilitation services and that existing rehabilitation provision in SA does not address the long-term needs of stroke

survivors. For instance, rehabilitation post-hospitalisation is only available through outpatient clinics for a maximum of two sessions per week. Additionally, participants experienced a gap between inpatient and outpatient care. Thus, they sought private clinics or arranged for therapists to visit them at home to avoid the delay.

Thirdly, in order to meet patients' needs, it was essential to assess how existing stroke rehabilitation practices can effectively address these needs. It was vital to understand how to improve the delivery of stroke rehabilitation from the perspectives of physiotherapists, as key members of the rehabilitation team. This led to the next question: what are the gaps in physiotherapists' knowledge and training to provide effective long-term care for patients with stroke? The findings provided an overview of post-discharge services and physiotherapists' perceptions of long-term approaches. For example, planning services post-hospitalisation were not sufficient. Additionally, long-term approaches such as patients' education, self-management and telerehabilitation lacked standardisation across hospitals and training among physiotherapists. The findings also revealed a need for training for physiotherapists in various aspects to improve the level of care provided to individuals recovering from stroke.

Understanding the needs from the perspectives of patients as well as physiotherapists enabled the development of the Stroke Training Programme (STP) to deliver long-term care following discharge of stroke patients. Finally, this training programme was evaluated to assess its influence on physiotherapists' knowledge, attitude, and confidence in providing care for patients with stroke.

This thesis will consist of eight chapters, as below:

1. Chapter 1: Introduction

2. Chapter 2: Methodology
3. Chapter 3: Exploring stroke patients' needs after discharge from rehabilitation centres: a meta-ethnography review.
4. Chapter 4: Exploring the needs of stroke patients after discharge from rehabilitation centres in Saudi Arabian communities: an interpretive phenomenological analysis (IPA) qualitative exploratory study.
5. Chapter 5: Exploring physiotherapists' perspectives and training needs for stroke patient care continuity in SA: a qualitative exploratory design.
6. Chapter 6: Designing the STP to improve long-term care for patients with stroke in SA.
7. Chapter 7: Evaluating the STP for physiotherapists to improve the delivery of long-term care for patients with stroke in SA: a pilot mixed methods design.
8. Chapter 8: Discussion and Conclusion.

Chapter 1: Introduction

1.1. Overview of the chapter

This chapter provides an overview of the condition stroke, and describes stroke incidence in Saudi Arabia (SA), the burden of stroke, and stroke rehabilitation services in SA. Further, it presents a critical view of the gaps in services for stroke care in SA and its consequences, the gaps in understanding patients' needs, understanding physiotherapists' perspectives and needs to deliver effective services, the need for physiotherapy training programmes in SA, and the use of online platforms to deliver training. Finally, following the exploration of the need for this work, the chapter outlines the research questions and sub-questions.

1.2. Introduction to stroke

Stroke, a common cause of morbidity and mortality worldwide, is characterised by acute focal injury to the central nervous system, which is often attributable to vascular causes, such as cerebral infarction, intracerebral haemorrhage, or subarachnoid haemorrhage (Sacco *et al.*, 2013). The current definition of stroke, established by the World Health Organisation (WHO) in 1970 and still in use, describes the condition as “*rapidly developing clinical signs of focal (or global) disturbance of cerebral function, lasting more than 24 hours or leading to death, with no apparent cause other than that of vascular origin*” (Aho *et al.*, 1980, p. 114). Stroke is the third leading cause of death and the second leading cause of disability worldwide (Feigin, Norrving and Mensah, 2017). Around 6.7 million people each year die of a stroke (Feigin, Norrving and Mensah, 2017), and many others suffer from chronic effects on their physical, emotional, and social health (Stroke Association, 2021a).

1.3. Stroke in SA

Stroke is a rapidly expanding illness in SA. According to the WHO, it is currently the second leading cause of death in SA, with 14,400 deaths in 2012 (Al-Senani *et al.*, 2020) and a greater prevalence in men (68.4%) (Asirvatham and Marwan, 2014). The annual stroke incidence in SA is 29 per 100,000 individuals (Alqahtani *et al.*, 2020), which is comparatively lower than that in Western countries. For example, in the United Kingdom (UK), over 100,000 strokes occur each year, with a rate of 162 per 100,000 for 2020/21 (Public Health England, 2021), while in the United States (US), the stroke mortality rate was 41.1 per 100,000 people in 2021 (CDC, 2021). This discrepancy in incidence could be due to the younger age of the population in SA, as stroke affects the older population more widely. The median age of the population in SA in 2015 was 28.3 years, when compared to the US (38 years) and the UK (40 years), which is relatively young (Melorose, Perroy and Careas, 2015). Additionally, two-thirds of the population in SA is under the age of 35 (Statistics Times, 2021), whilst the most common age to experience a stroke is between the ages of 61 and 70 years (Asirvatham and Marwan, 2014).

Strokes have become one of SA's most pressing socioeconomic and medical challenges. According to Hersi *et al.* (2019), the acute care cost for stroke patients is around \$14,000 (USD) in SA. Furthermore, the total cost to SA of managing the condition for patients with stroke is 1.1 billion USD annually. Specifically, the cost of two weeks of acute care for patients with moderate haemorrhagic stroke in the SA is \$6,500, whereas long-term care costs \$160 per month. The current stroke care programme cost per patient in SA is \$48,029, whereas the average cost per patient was \$59,900 in the US, and \$37,550 in the UK. Thus, despite the lower incidence, the financial burden of stroke in SA is a pertinent issue for the kingdom.

1.4. Burden of stroke

The number of individuals facing consequences after a stroke, such as poor health, disability, or mortality, is expected to double by 2030 (Truelsen and Bonita, 2008). Approximately 80% of stroke survivors are discharged from the hospital to continue their recovery at home (Han and Haley, 1999). A growing number of individuals who have experienced a stroke continue to live with a disability after discharge, in 2013, there were 113 million disability-adjusted life-years around the world as a result of strokes (Feigin, Norrving, and Mensah, 2017). Strokes result in long-term disabilities, which significantly affect both patients and their families. These effects may include cognitive difficulties, issues with concentration and memory, psychological challenges, and significant physical disabilities (Jaracz *et al.*, 2014). Strokes also negatively affect caregivers, resulting in high levels of anxiety, frustration (Stroke Association, 2013), and fatigue (Andrew *et al.*, 2014). These challenges can greatly impact both patients and caregivers in managing daily activities and addressing ongoing care requirements (Lin *et al.*, 2019).

Individuals who experience a stroke undergo a challenging recovery process, as they often need to enhance their general functioning, which includes their speech and other physical and cognitive capabilities (Chen *et al.*, 2019). Consequently, there is an increasing demand for rehabilitation services to support the rising number of individuals who survive strokes. Stroke rehabilitation is a dynamic, goal-oriented process that helps people with stroke to achieve their highest levels of physical, cognitive, emotional, linguistic, social, and functional activity (Hebert *et al.*, 2016). This is particularly crucial, as evidence suggests that coordinated care for individuals with a stroke can promote independence (Langhorne and Dennis, 2008).

1.5. Rehabilitation of people with stroke in SA

Rehabilitation services in SA can be accessed either privately or for free through the public healthcare system. Sixty percent of healthcare services are distributed by the Ministry of Health (MoH), while the remaining 40% is allocated to various government entities, such as the Ministry of Defence, the National Guard, university institutions, and the private sector (Alatawi, Niessen and Khan, 2010). In SA, rehabilitation typically commences during the initial stages of stroke recovery within the hospital's inpatient unit. A recent study at a Saudi setting found that the average length of stay in the stroke rehabilitation programme was 45 days (Asirvatham and Marwan, 2014). Patients then undergo supervised rehabilitation exercise sessions in outpatient units. Various methods are employed to manage stroke patients in physiotherapy clinics in SA, including the Bobath approach, constraint-induced movement therapy, mirror therapy, and mental imagery (Alqahtani, Kashoo and Ahmad, 2018).

Most stroke rehabilitation programmes in SA typically involve groups of healthcare professionals that include physiotherapists, occupational therapists, speech therapists, orthotists, and prosthetists (Al Jadid, 2011). However, in many cases, these different specialists work separately rather than collaboratively in both inpatient and outpatient settings. Additionally, there is often a lack of multidisciplinary care meetings (Alsheikh *et al.*, 2024), as professionals commonly work across multiple sites and have heavy workloads, leading to a lack of coordinated care and ineffective communication with other team members (Almujadidi *et al.*, 2022). However, as SA enhances its e-health provision, all staff are able to access the electronic medical records for their patients (AlSadrah, 2020),

potentially facilitating improved communication among healthcare professionals and offering reductions in costs and time, as well as improving patient safety (AlSadrah, 2020).

Another limitation regarding the rehabilitation of patients after strokes is the scarcity of the necessary healthcare professionals, however. Occupational therapists, for example, are among the least represented healthcare professionals in SA (Al-Senani *et al.*, 2019), with only six universities having introduced occupational therapy bachelor's programmes by 2019 across the country (Aljabri, Bulkeley and Cusick, 2024). Similarly, speech therapy, as over half of the participants in a study by AlAwaji, Almudaiheem and Mortada (2021) reported a lack of available speech clinics in many areas. Gaining access to such services in SA is thus challenging.

1.6. The need for long-term stroke services in SA

Stroke has been acknowledged as a long-term condition: hence, continued support for individuals is required (Wolfe *et al.*, 2011). Long-term therapy should be provided to patients with ongoing rehabilitation requirements and goals, because recovery from a stroke can take years (Stroke Association, 2021b). The delivery of community-based rehabilitation services that prioritise personalisation, reablement, and self-management are essential to maximise patients' independence (NHS, 2023). This is because most stroke survivors who are discharged from the hospital to return home and live within their communities still have rehabilitation needs. Thus, rehabilitation is needed to prevent further deterioration and improve patients' outcomes (National Stroke Foundation, 2010).

Stroke rehabilitation is crucial in modifying and enhancing the neuronal plasticity (Hara, 2015) responsible for functional recovery, whether it happens naturally or through

interventions like rehabilitation and neuromodulation (Cramer, 2008). A previous review suggested that individuals with moderate hemiparesis reach a plateau in recovery approximately 6.5 weeks after a stroke, whereas those with severe hemiparesis reach a plateau after around 15 weeks (Hendricks *et al.*, 2002). However, studies indicated that the response to treatment extended beyond 12 months (Kuptniratsaikul *et al.*, 2017; Ballester *et al.*, 2019); and up to 24 months post-stroke (Borschmann and Hayward, 2020). In addition, studies have shown that in the chronic or long-term phase, the risk of future strokes increases to 5% at 6 months, 8.4% at 1 year and 19.8% at 4 years post-stroke, and functional deterioration (9%) increases as well (Lee, Somerford and Yau, 2004; Dhamoon *et al.*, 2009). These risks exist even in individuals who have achieved complete recovery through rehabilitation. Therefore, several stroke rehabilitation guidelines now advocate the continuation of rehabilitation services for as long as patients with stroke continue to experience positive outcomes (National Stroke Foundation, 2010; NICE, 2013). As a result, numerous stroke specialists believe that recovery is determined by the ability of patients to demonstrate functional progress, rather than the timeframe. Therefore, the International Classification of Functioning, Disability, and Health (ICF) model suggests that long-term rehabilitation should shift focus from just activities to promoting overall participation, where the goal is to improve patients' engagement in daily tasks, planning for community life, and returning to roles like driving and working (Aziz, 2010).

A major limitation in the provision of stroke care services in SA is that 95% of patients with stroke are treated in non-specialised hospitals (Al-Senani *et al.*, 2019). There are only three hospitals with specialised stroke teams and stroke units, and all of them are located in Riyadh (Alanazy *et al.*, 2018). The inadequate availability of stroke services in SA necessitates the expansion of specialised stroke rehabilitation services that include collaboration among

multidisciplinary teams, the establishment of dedicated stroke units, and specialised training programmes for healthcare professionals (Bindawas and Vennu, 2016). Moreover, patients often face a gap in community follow-up after completing their rehabilitation sessions at an outpatient clinic. Many of these individuals do not receive the suggested evaluations at six weeks and six months post-discharge, nor annual assessments (Stroke Association, 2019). Hence, they lose the opportunity to have their medical, physical, emotional, and social needs assessed, in addition to those of their caregivers (NHS, 2019). Consequently, patients may either seek private sector to continue their rehabilitation or discontinue professionally supported rehabilitation due to financial constraints.

Additionally, the continuity of care after completing hospital-based rehabilitation remains a challenge in SA, where community-based rehabilitation services are inadequate (Ullah *et al.*, 2021). Ultimately, there is insufficient evidence regarding long-term care strategies in developing countries, including SA (Aziz *et al.*, 2016). Longer-term rehabilitation after completing outpatient sessions is available only through private clinics, which is a challenge for those who have financial limitations and are unable to pay. Inadequate financial resources could make it difficult to access the essential services needed for health and well-being (Alshahrani, 2020). Thus, conducting research in Middle Eastern countries that lack community services is essential to gain a deeper understanding of the challenges faced by stroke survivors in their daily lives. This understanding can, in turn, inform policy development aimed at providing long-term support for stroke patients.

Further, the incidence and prevalence of stroke are projected to rise significantly in the coming years (67% in 10 years in SA) (Almosallam *et al.*, 2022). This is due to the ageing of the younger population, who represent two-thirds of the current population (Statistics Times,

2021). Additionally, there is an additional challenge posed by the increasing life expectancy in SA, with the elderly population rising from approximately 1 million to nearly 2.5 million people in 2020 (Barrage, Perillieux and Shediak, 2007). Further, in 2020, it was estimated that the population of SA would increase by 62.7% over a 10-year period, with a slight rise to 64.4% after this duration (Al-Senani *et al.*, 2020). Moreover, studies have shown that 24% of Saudis are diabetic, 30% are hypertensive, 37% are overweight, 40% have metabolic syndrome, 6% have coronary artery disease, and as many as 30% are smokers (Al-Nozha *et al.*, 2004, 2007), all of which are considered as risk factors for having a stroke. Ageing of the younger population and the rising prevalence of risk factors are thus likely to contribute to a significant rise in the prevalence of strokes in SA in the future (Al-Senani *et al.*, 2020). Thus, these factors will place significant strain on the existing infrastructure, and create a greater demand for healthcare services in SA in the future.

1.7. Consequences of the structural gaps in stroke services

Structured stroke care should consider several important factors, including the early initiation of rehabilitation, involving a qualified multidisciplinary team, and the quality of the rehabilitation process. These factors have been identified as crucial contributors to better overall outcomes in stroke patients (Bindawas and Vennu, 2016). There are no standardised care approaches for stroke in SA yet (Alqahtani, Kashoo and Ahmad, 2018). Neurologists in SA believed that the existing treatment protocols for stroke survivors are insufficient, as more than 90% of surveyed neurologists expressed concerns about stroke care in SA. Of them, around 71% rated care for stroke patients at 6 or below on a scale of 1 to 10. Further, neurologists identified deficiencies across all areas of stroke care, from community-level prevention and education for post-stroke rehabilitation (Al Khathaami *et al.*, 2011).

Due to the lack of specialised services, patients with stroke have poorer outcomes, such as a lower quality of life (Asirvatham and Marwan, 2014; Alshahrani, 2020) and higher incidence of mental health issues. The findings from Al-Busaidi and Alamri's (2016) study suggested that psychological disorders after stroke, such as anxiety and depression, are relatively common in SA, with 28.9% of patients scoring sufficiently highly on the Hospital Anxiety and Depression Scale. Furthermore, Saudi stroke survivors treated in government hospitals have a low perception of their physical, psychological, social, and environmental domains (Alshahrani, 2020) affecting their overall quality of life. Reduced participation in activities, limited interactions with friends, poor physical health, and inadequate financial resources are generally contributing factors to low quality of life in the SA community (Alshahrani, 2020).

1.8. Patients' needs

The literature on this topic presents various definitions of the needs of patients with stroke. Stevens and Gillam (1998), refer to patients' needs as their capacity to benefit from healthcare services. McKevitt *et al.* (2011) described unmet needs as areas where certain requirements remain unaddressed. Likewise, Rothwell *et al.* (2013) defined unmet needs as elements that are either poorly addressed or insufficiently managed. However, these limited definitions overlook other important needs of patients with stroke, including physical care, rehabilitation, emotional, and educational support (Lin *et al.*, 2019). Furthermore, assessing needs may involve complex personal and subjective evaluations (Godfrey and Callaghan, 2000). Thus, this study will define unmet needs based on the interpretation given by Heinemann *et al.* (2002) as “*expressed needs not satisfied by current service provision*” (p. 1052).

1.9. Gaps in understanding patients' needs

To create an effective rehabilitation service that meets patients' needs, the initial step is to comprehend these needs beyond inpatient care (Perry and Middleton, 2011). Unmet needs have been associated with decreased satisfaction with the services and information provided, as well as a limited understanding of life after a stroke (Greenwood *et al.*, 2009).

Additionally, evaluating needs is crucial for assessing the efficiency of rehabilitation services (Keith, 1998). Therefore, in a situation where follow-up services for patients after discharge are limited, it is essential to further investigate the areas where needs remain unmet (McKevitt *et al.*, 2011).

Investigating unmet needs is a critical research priority. For example, approximately half of patients with stroke in the UK have reported that their needs have not been addressed (McKevitt *et al.*, 2011). Likewise, about 96% of stroke survivors in Australia indicated that at least one of their needs was not fully met (Andrew *et al.*, 2014). Needs should be assessed regularly to ensure that interventions are effective, and support remains suitable to patients (Zawawi *et al.*, 2020), and professionals should make rehabilitation procedures more responsive to patients based on their reviewed needs. However, in SA, there is limited research available regarding the unmet needs of stroke patients.

1.10. Physiotherapy education in SA

Although physiotherapy education was introduced in SA thirty years ago, the number of programmes has only increased from six to 16 in the last decade (Alghadir *et al.*, 2015).

Further, only one doctoral physiotherapy programme is currently available, with the others being capped at undergraduate degree level (Bindawas, 2014). The entry requirement for all

of the latter programmes is a general certificate from a higher secondary school with a focus on science subjects. Prospective students must then take an entrance exam to seek admission to a preparatory school of medical science. The students' performance on the exam determines their eligibility for admission into a physiotherapy degree programme (Alghadir *et al.*, 2015).

An undergraduate physiotherapy programme involves four years of full-time study, initiated with a unified preparatory year shared across all applied health science programmes that focuses on humanities and basic life sciences. In the second year, students transition into specific physiotherapy education, starting with core medical sciences modules including anatomy, physiology, and foundational physical therapy courses such as basic assessment skills, therapeutic exercises, electrotherapy, and biomechanics. The third year emphasises theoretical and clinical physical therapy modules such as cardiopulmonary and geriatric work and musculoskeletal disorders, while the fourth year focuses on obstetrics and gynaecology, sports physiotherapy, paediatrics, and neurological cases (Jazan University, 2024). Once the initial four years are completed a further year of internship is required (Al Maghraby and Alshami, 2013). This internship year involves various rotations to allow students to develop skills in rehabilitation for orthopaedic, neurologic, paediatric, geriatric, and cardiopulmonary conditions. After completing their internship year, each physiotherapy graduate must then register with the Saudi Commission for Health Specialties, the national licensing authority for healthcare professionals in SA.

The newly developed doctoral programme involves six years of study and focuses on preparing students with advanced clinical expertise. Students thus acquire foundational knowledge in biomedical and rehabilitation sciences, enabling them to evaluate, diagnose, and design treatment plans for diverse medical conditions (Qassim University, 2025).

1.11. Importance of exploring physiotherapists' perspectives and needs

After gaining an understanding of the needs of Saudi Arabian stroke patients, it is also important that research considers how the existing stroke rehabilitation practices can effectively address those needs. Physiotherapy plays a crucial role in stroke care through aiding recovery of movement by enhancing strength and mobility and enables independence post-stroke (Stroke Association, 2022). Hence, stroke patients' needs must additionally be comprehended and addressed from the perspective of physiotherapists. This is because physiotherapists are involved in daily care and interact closely with stroke patients. They observe the effects of stroke on the physical, cognitive, emotional, and social well-being of patients. Thus, their insights are particularly valuable in the development of programmes relevant to the current practice. Additionally, it is particularly important to explore physiotherapists' perspectives in SA, as there are many social, familial, and religious factors influencing rehabilitation. Moreover, to introduce new approaches to physiotherapy practice in SA, it is essential to first explore how these methods would align with the local context, culture, and healthcare infrastructure. This involves understanding how physiotherapists perceive these interventions and how they can be effectively implemented within the existing system. Ultimately this enables physiotherapists in SA to be equipped with the necessary skills to provide effective care to stroke patients. The data can be used to create a training programme that can improve the delivery of long-term rehabilitation services to patients with stroke.

Physiotherapists in SA faces challenges such as a lack of training, lack of postgraduate physiotherapy programmes (Alghadir *et al.*, 2015) and lack of emphasis on the need to implement evidence-based practices (Alshehri *et al.*, 2017). Education programmes to enhance physiotherapists' knowledge of stroke prevention, management, and rehabilitation

(Bindawas and Vennu, 2016) are needed to meet service gaps. Yet no previous research has explored the training needs of physiotherapists in SA (details of their backgrounds are given in Chapter 5). Therefore, it is essential to conduct this research to explore physiotherapists' perspectives and training needs in relation to the continuity of care post-discharge for patients with stroke in SA.

1.12. Importance of providing training to physiotherapists in SA

Training has been recognised as a crucial factor influencing the success of implementation (Wandersman, Chien and Katz, 2012). Physiotherapists are required to regularly update their skills and knowledge to meet the demands of their profession and stay updated with changes in practice (French *et al.*, 2008). Healthcare practitioners must undergo proper training to acquire the information and skills necessary to effectively deliver interventions (Friberg, Granum and Bergh, 2012).

Despite the above requirement, a lack of training provided to physiotherapists has been highlighted in SA. One study investigated physiotherapists' behaviour, attitudes, awareness, and knowledge of implementing evidence-based practice (Alshehri *et al.*, 2017). The study demonstrated insufficient implementation due to lack of training, as most physiotherapists had poor basic knowledge of evidence-based practice, with 89.9% unaware of its definition and 80.6% not understanding its aim. Additionally, 32.9% were unfamiliar with basic terms, and 70.2% had no formal training (Alshehri *et al.*, 2017). Another study found that the limited availability of educational workshops in SA may have contributed to the difficulty in understanding and using outcome measures (Al-Muqiren *et al.*, 2017). Additionally, Alshehri *et al.* (2019) indicated that insufficient education (45%) was the most significant barrier to

implementing evidence-based practice in SA, while 42.7% identified insufficient resources and funding and 38.2% identified a lack of skills and research knowledge. Another recent study indicated that 51% of physiotherapists lacked knowledge of the essential principles of evidence-based practice, 60.4% did not participate in any training sessions on research, and 74.9% expressed a lack of confidence in their ability to analyse literature (Abdel-Azim *et al.*, 2024).

The MoH in SA has made efforts to enhance the competencies of its workforce through training and skill development initiatives (MoH, 2017). Nevertheless, in comparison to other countries, the allocation of funds for workforce training in SA is relatively limited. For instance, the UK and Malaysia allocate 5% of their total budget towards training; however, SA allocates just 0.4% of its total budget (MoH, 2010).

Inadequately trained healthcare professionals and a heavy reliance on foreign labour are further significant issues that must be addressed by policymakers in SA (Al-Hanawi, Khan and Al-Borie, 2019). The McKinsey Global Institute report in 2015 emphasised the significance of increasing labour participation in SA. It strongly advised the expansion of educational possibilities and vocational training to provide Saudi employees with essential skills. Training health care providers and collaboration are essential and urgent requirements in SA (Asirvatham and Marwan, 2014). However, studies on stroke care training for physiotherapists in SA are limited. In the Asian context, studies that have evaluated training for physiotherapists have shown significant increase in the physiotherapists' knowledge and skills post-training (Dizon, Grimmer-Somers and Kumar, 2014; Tunpattu *et al.*, 2018).

1.13. The use of online platforms to deliver training.

With the growth of the internet, e-learning has become a popular method of delivering education (Preston *et al.*, 2012). Online platforms have been utilised to deliver training for physiotherapists in many previous studies (Harvey *et al.*, 2014; Gardner *et al.*, 2016; Soundy *et al.*, 2021). Several studies have compared the two modes of training and argued that the quality of online learning matches that of traditional face-to-face training (Nicklen *et al.*, 2016; Ichikura *et al.*, 2024). However, utilising an online format has several advantages, including effective interaction, accessibility, and cost-effectiveness (Quadri *et al.*, 2017). Further, online training reduces the time spent on travel between home, work, and training sites. Additionally, it provides physiotherapists with the convenience and flexibility to learn in their own time (Al-Asmari and Rabb Khan, 2014). This flexibility allows physiotherapists to integrate their training seamlessly with their clinical practice.

1.14. Summary of need for the work

There is a lack of specialised services such as stroke units, which has resulted in a low quality of life and poor overall outcomes for stroke patients in SA. The absence of community-based rehabilitation is another significant challenge to continuity of care. Furthermore, patients are not given the appropriate follow-ups at six weeks, six months, or annual reviews after discharge to assess their needs. Therefore, exploring the unmet needs of patients with stroke where such services are lacking is crucial. This research will provide an overview of the challenges faced by stroke survivors and inform policy and service development to better support them after discharge.

Research to explore how existing stroke rehabilitation practices can meet the needs of stroke patients from physiotherapists' perspectives in SA is essential. This is because therapists directly observe the impacts of stroke on patients. Additionally, local therapists are aware of the unique facilitatory and limiting factors that may influence the rehabilitation process in SA. Ultimately, to overcome service gaps in long-term rehabilitation for patients with stroke, it is important to understand therapists' training needs to equip them with skills to meet service-users' needs.

1.15. Research questions

The main research questions are as follows:

1. What are the specific long-term needs of stroke patients and physiotherapists' perspectives around fulfilling the long-term care needs for patients with stroke after their discharge?
2. How can we develop and evaluate a training programme for physiotherapists to deliver effective long-term care to meet patients' needs following a stroke?

These questions will be addressed via four aims:

Stage 1: To systematically search for and evaluate the evidence on needs perceived by patients with stroke post-discharge.

Stage 2: To explore the needs of stroke patients after their discharge from rehabilitation centres in SA.

Stage 3: To investigate physiotherapists' perspectives and training needs regarding continuity of care post-discharge for patients with stroke in SA.

Stage 4: To develop and evaluate an online training programme that will enable physiotherapists to enhance delivery of long-term care following discharge of stroke patients.

1.16. Summary of the chapter

In this chapter, an introduction to stroke and its rehabilitation were provided, along with a description of current practice in SA. The need for structural services in SA was discussed. Then, the importance of incorporating physiotherapists' views to understand the current practice and the need for training were highlighted. The next chapter details the research questions, researcher's philosophical stance and methods adopted to conduct the various research stages to meet the research objectives.

Chapter 2: Methodology

2.1. Chapter overview

This chapter provides a description of the questions, aims and objectives of each stage of the research. It discusses the selected research paradigms and provides justification for the methods used to collect data for the stages that were set up to meet the research objectives. Finally, the chapter concludes by discussing the ethical considerations that were taken prior to conducting the research.

This chapter provides justification of the key methodological approaches that were adopted. However, other details, such as inclusion criteria, sampling, and the data collection procedure, are discussed in greater depth in the following chapters.

2.2. Research stages

This thesis was developed in four stages, which evolved through the research process, with each relying on findings from earlier stages. Initially, the focus in stages 1 and 2 was on exploring the needs of and challenges faced by stroke patients, particularly those due to limitations in healthcare practices and the lack of community services in SA. However, as the study progressed, it became clear that addressing these unmet needs for patients required a focus toward improving services to effectively support patients with stroke outcomes through empowering physiotherapists. This made it necessary to assess the physiotherapists' training needs and knowledge gap in order to design more effective training programmes, with any such programme then being evaluated in terms of the physiotherapists' knowledge, attitudes, and confidence as determined in stages 3 and 4. This shift in focus from patient needs to the

empowerment of physiotherapists offered a strategy to plug the service gap and, in fact, to meet patient needs more effectively.

The first stage aimed to explore the needs of stroke survivors across various domains of care. To achieve this aim, a meta-ethnographic review of published qualitative studies that explored the experiences of stroke survivors regarding their post-discharge needs was conducted. This stage provided an understanding of stroke needs post-discharge from a global viewpoint, which offered valuable insights and context to the next stage.

The second stage aimed to identify the needs of stroke survivors after their hospital discharge in SA. To achieve this aim, Interpretive Phenomenological Analysis (IPA) methodology was used. An IPA qualitative research approach was adopted to understand how people make sense of their experiences and construct meaning in their lives. This stage focused on collecting data from SA using semi-structured individual interviews with patients with stroke.

In the third stage, physiotherapists' perspectives on training needs and continuity of care for stroke patients post-discharge in SA were investigated through a qualitative exploratory approach. To collect data, the study used individual interviews and focus groups with physiotherapists working with patients with stroke in SA.

The findings from the above three stages informed the development of the Stroke Training Programme (STP). This programme aimed to improve continuity of care for stroke survivors following discharge from hospital by providing training to physiotherapists. The STP involved four modules: Introduction to Stroke, Education and Transition, Outpatients' Stroke Care, and Self-management and Telerehabilitation.

Finally, the fourth stage involved evaluation of the STP. This study was a pilot sequential explanatory mixed methods design. The study had two phases: a quantitative pre- and post-test design to assess the change in physiotherapists' knowledge, attitude, and confidence, followed by qualitative interviews one month after training to evaluate their perceptions and the acceptability of the STP. Figure 2.1 provides a summary of the stages within this research study. Table 2.1 gives a summary of the aim with key components of the methods of each study, followed by a detailed description of the aims and methods and justification of the choices.

Figure 2. 1: Flow diagram of the study stages.

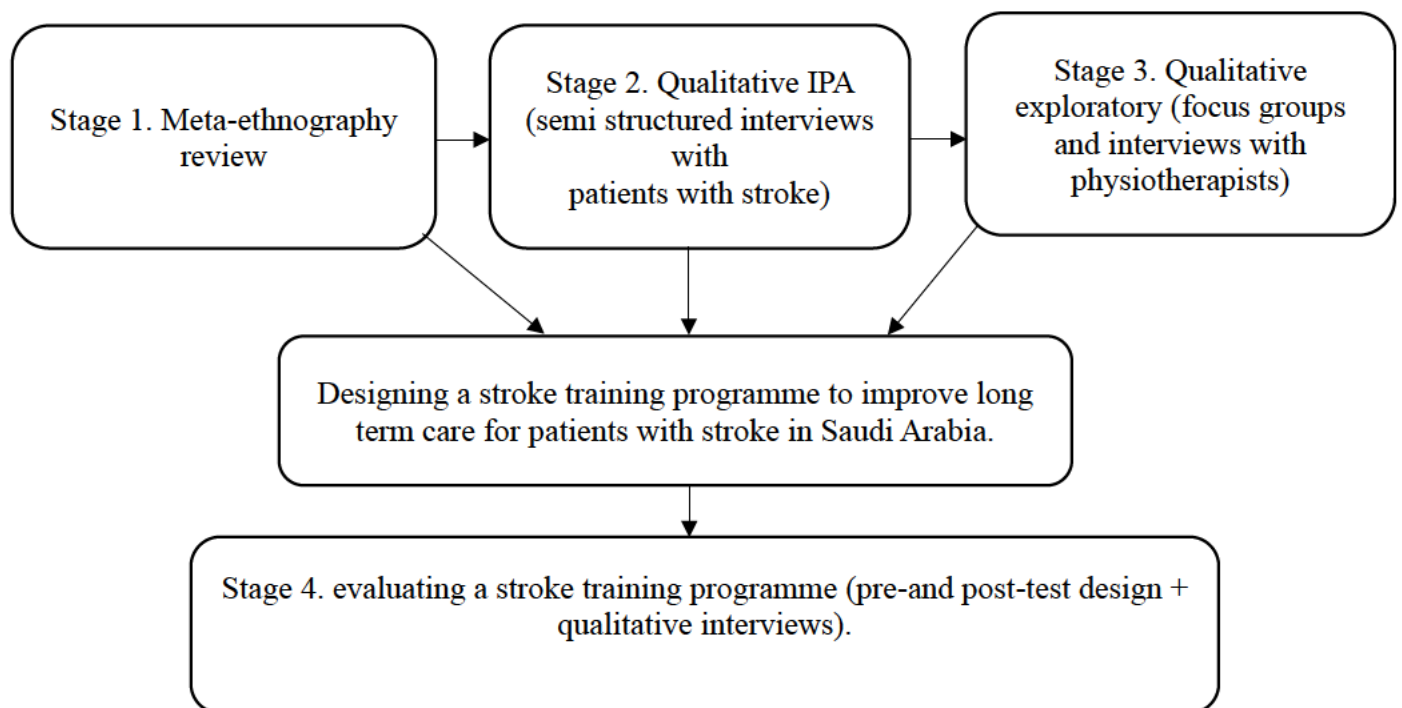


Table 2. 1: Summary of the study stages

	Stage 1	Stage 2	Stage 3	Stage 4
Aim	To explore the needs of stroke survivors post-discharge from the hospital in aspects across various domains of care from the perspectives of the patients and professionals globally.	To explore stroke patients' needs after their discharge from rehabilitation centres in SA. Objectives include: <ul style="list-style-type: none"> • To identify problems that impact stroke survivors' adaptation to daily life in the community after discharge from hospital. • To identify the factors that influence their adaptation. • To identify patients' needs after their discharge from rehabilitation services in SA. • To make recommendations and help identify strategies to build new services supporting patients' needs following their discharge. 	To explore physiotherapists' perspectives and training needs on continuity of care post-discharge for patients with stroke in SA. Objectives include: <ul style="list-style-type: none"> • To explore the perspectives of physiotherapists on gaps in their knowledge and skills for providing continuity in care following discharge. • To identify what strategies can be applied in the local context to improve this transition from hospital and for rehabilitation in the community. 	To design and evaluate the STP that will enable therapists to deliver long-term care following discharge of stroke patients. Objectives were: <ul style="list-style-type: none"> • To evaluate the STP on physiotherapists' knowledge, attitude and confidence. • To assess the perceptions of usefulness and acceptability of the STP • To understand and relate reasons for improvement or lack of it in the knowledge, skills and confidence aspects using qualitative data through opinions and perceptions of the physiotherapists.
Study design and approach	A meta-ethnographic review situated within subtle realism.	IPA qualitative exploratory study design within minimal hermeneutics realism.	A qualitative exploratory approach situated within critical realism.	A pilot sequential explanatory mixed methods design with a pragmatic stance.

Data collection methods	Main searches were conducted on the following electronic databases: Ovid Medline (1946 to 2021), CINAHL plus (EBSCO), AMED (EBSCO), PsycINFO (1967 to 2021), the Cochrane Library, and PubMed in June 2022.	Semi-structured individual interviews.	Semi-structured individual interviews and focus groups.	Quantitative study: Pre- and post-test questionnaires were used to assess the knowledge, attitude and confidence. Qualitative study: Semi-structured telephone interview to explore physiotherapists' experiences of the STP.
Sample	(a) Studies using all types of qualitative methodology, (b) Mixed methods studies that included a clearly identifiable qualitative phase and reported that phase in a way that represented a form of qualitative design were included.	(a) Adults (> 18 years of age) who had experienced a stroke (ischaemic strokes and haemorrhagic strokes), (b) had been discharged from the hospitals within the past three years to minimise recall bias and to be relevant to current practice and (c) had completed their rehabilitation sessions in an outpatient clinic.	(a) Male or female physiotherapists, (b) providing therapy to stroke patients.	(a) Male or female, physiotherapists (b) currently providing therapy to stroke patients, and (c) has access to the necessary technology to participate remotely.
Setting	Studies were included if they represented people with strokes; adults who had been discharged from hospitals after a stroke, ischaemic stroke, or haemorrhagic stroke, who had finished rehabilitation (either at a rehabilitation	Recruitment was conducted at two hospitals in SA. One is located in central SA and the second is in the Southern region.	The project was carried out in SA. Recruitment was conducted in seven hospitals in one city in the Southern region.	The project was carried out in SA. Recruitment was conducted in seven hospitals in one city in the Southern region.

	service or in the community).			
Sampling	Two independent reviewers screened the articles and compared their results. Quality appraisal was undertaken using Joanna Briggs Institute (JBI) qualitative critical appraisal checklist by two independent reviewers.	The study adopted purposive stratified sampling.	Purposive sampling	Purposive sampling for both phases
Sample size	Twenty-seven articles were included in the final analysis.	There were 24 patients with stroke: (15 males and 9 females).	Twenty-six physiotherapists: (14 females and 12 males), and three focus groups (5, 6 and 6 participants) and 9 individual interviews.	Twenty-six physiotherapists: (17 females and 9 males).
Data analysis	Meta-ethnographic synthesis (Noblit and Hare 1988).	IPA analysis tool of qualitative studies (Smith and Osborn, 2008).	Reflexive thematic analysis (Braun and Clarke, 2019).	Quantitative data: Chi-Square test and Wilcoxon test. Qualitative data: Reflexive thematic analysis (Braun and Clarke, 2019).

2.3. Research questions, aims and objectives of the four stages:

The key research questions that were raised in the previous chapter were broken down into the following four questions to design each study in 4 stages:

Research question 1: Following their discharge from the hospital, what are the needs of stroke survivors across various domains of care perceived by patients and healthcare professionals globally?

Research question 2: What are the needs of stroke survivors after their discharge from the hospital setting in SA?

Research question 3: What are physiotherapists' perspectives and training needs regarding the continuity of care post-discharge for patients with stroke in SA?

Research question 4: How can we develop and evaluate a STP to improve physiotherapists' knowledge, attitude, and confidence in delivering long-term care after stroke?

The overarching aim of the research was: To identify the long-term care needs of patients with stroke and physiotherapists' perspectives and needs around fulfilling these patients long-term care needs post-discharge. This knowledge then fed into developing and evaluating a stroke training programme for physiotherapists to enable them to deliver effective long-term care to meet patients' needs.

The various stages of the research linked to the research objectives are set out below.

Stage 1: Exploring stroke patients' needs after discharge from rehabilitation centres: Meta-Ethnography.

Objective:

- 1- To identify the needs of stroke survivors after their discharge from rehabilitation centres globally.

A meta-ethnographic review was conducted to explore the needs of stroke survivors post-discharge from the hospital in aspects across various domains of care from the perspectives of the patients and professionals.

Stage 2: Exploring the needs of stroke patients after discharge from rehabilitation centres in Saudi Arabian communities: An IPA qualitative exploratory study design.

Objectives:

1. To identify problems that impact stroke survivors' adaptation to daily life in the community after discharge from hospital.
2. To identify the factors that influence the process of adaptation and rehabilitation.
3. To identify patients' needs after their discharge from rehabilitation services.
4. To make recommendations on how to prepare stroke survivors before discharge.
5. To help identify strategies to build new services to support patients' needs following their discharge.

An IPA qualitative exploratory study was conducted to gain greater insight into stroke patients' needs after their discharge from rehabilitation centres in SA, involving semi-structured interviews with patients with stroke.

Stage 3: Exploring physiotherapists' perspectives and their training needs for long-term care post-stroke in Saudi Arabia: a qualitative exploratory design.

Objectives:

1. To explore the perspectives of physiotherapists on gaps in their knowledge and skills for providing continuity in care following discharge.
2. To identify what strategies can be applied in the local context to improve this transition from hospital and rehabilitation in the community.

A qualitative exploratory study was conducted to explore the perspectives and needs of physiotherapists who provide stroke care in SA to build a training programme that will enable them to deliver long-term care following discharge after a stroke. This stage involved individual interviews or focus groups with physiotherapists who work with stroke patients.

Stage 4: Developing and evaluating a Stroke Training Programme (STP) for physiotherapists to improve their skills and knowledge in delivering long-term care for patients with stroke in Saudi Arabia: a pilot mixed methods design.

Objectives:

- 1- To evaluate the STP's effectiveness in improving physiotherapists' knowledge, attitudes, and confidence.

- 2- To assess physiotherapists' perceptions of the usefulness and acceptability of the STP.
- 3- To understand and relate reasons for improvement or lack thereof in the knowledge, skills and confidence aspects through the opinions and perceptions of the physiotherapists.

A mixed methods study was conducted to evaluate the STP using two phases: pre- and post-training questionnaires to assess the change in the participants' knowledge, attitudes, and confidence. Semi-structured individual interviews were conducted one-month post-training to assess their perceptions of the STP.

2.4. Researcher's stance

When conducting research, it is essential to take a stance, since every researcher has specific assumptions about how knowledge and truth are constructed (Chilisa and Kawulich, 2012). These assumptions shape the way researchers perceive themselves, others, and the world (Schwandt, 2001). Additionally, in qualitative research, the researchers play a dominant role in conceptualising, designing, and conducting the study, and interpreting the underlying meanings. Therefore, it is crucial for them to actively engage in a reflexive process to reveal their own beliefs about knowledge and truth and how those beliefs have influenced the study (Ravitch and Carl, 2019).

Patton (2014) summarised the main inquiry frameworks, including post-positivism, realism, constructivism, narrative inquiry, symbolic interaction, hermeneutics, and pragmatism. Positivism

and interpretivism can be viewed as opposite ends of a spectrum. The aim of this research was to develop and evaluate a training programme for physiotherapists in SA to enhance long-term care for stroke patients, through the identification of the specific needs of these patients after their discharge and the existing gaps within the current healthcare system. Positivism does not align with this aim. Positivists argue that reality is “*objectively given and measurable*” or “*objective and quantifiable*” (Antwi and Hamza, 2015, p. 218). This approach is frequently associated with quantitative research, as it employs techniques such as surveys, questionnaires, and experiments in order to control, generalise, and establish principles (Kamal, 2019). Further, concepts within this study, such as patients’ needs, are difficult to define, observe and measure.

In contrast, interpretivism aims to capture a wide range of valuable insights, rather than seeking to establish definitive and universally applicable laws that can be generalised to all individuals, irrespective of certain variables and factors (Myers, 2008). Interpretivism holds that truth and knowledge are subjective and shaped by individuals’ experiences, cultural, and historical perspectives, reflecting their interpretations and understandings of reality (Ryan, 2018). For this work, adopting the interpretivist paradigm, which is established on individual contributions and consideration of various variables, would result in the generation of data with a high degree of validity (Myers, 2008), most notably its capacity to examine events at the micro and individual levels. This approach could be valuable for understanding the subjective experiences of stroke patients post-discharge (stage 2). Thus, during stage 2, IPA was adopted, which broadly follows a realist approach (Reid, Flowers and Larkin, 2005, p. 21). However, the focus of interpretivism on individual contexts may not fully address the aim of designing and evaluating a training programme for physiotherapists and it may limit the generalisability and transferability of

findings. Interpretivists assert that due to the existence of various subjective realities, it is fundamentally difficult to make generalisations (Tsang, 2014). In addition, the work sought to design a training programme that has a broader applicability in improving physiotherapy practice in SA. Hence, an interpretivist approach was seen to be partly congruent with the aim of stage 2.

Realism aligns better with this study. Realism in general was defined by Phillips (1987, p. 205) as “*the view that entities exist independently of being perceived, or independently of our theories about them*”. Unlike interpretivists, who argue that reality does not exist objectively but is co-constructed with the participants, the aim of realism is to uncover objective reality (Jeong and Othman, 2016). Seale (1999) argued that qualitative researchers aim to utilise language to reference, describe, or explain aspects of the social world, which necessitates a modified version of realism. The complexity of the world makes it impossible to achieve absolute rigour and accuracy in replicating a study. However, realists recognise that there will always be several valid descriptions and explanations for the same phenomenon (Hammersley, 2004). Realists consider the mind and meaning to be just as real as physical objects and processes (Maxwell, 2012).

In this work, the researcher adopted multiple frameworks within realism, as it provides flexibility in interpretation, allowing for a more in-depth analysis of the data rather than being limited to a single worldview. Hence, multiple approaches were adopted. *Subtle realism* was adopted in the first stage to inform the interpretation within the meta-ethnography, transitioning to the next stage which adopted *minimal hermeneutic realism*. *Critical realism* was employed for the third stage.

Pragmatism was embraced in the final stage. The next step involves justifying the selection of each approach to address specific aspects of each stage.

2.4.1. Stage 1: Subtle realism

From a social science perspective, qualitative research synthesis aligns most closely with the concept of a subtle realist stance (Kirk and Miller, 1986; Hammersley, 1992). Philosophical positions that incorporate a degree of realism are suggested and supported in meta-ethnography (Soundy and Heneghan, 2022). Subtle realists hold that all research incorporates subjective views and observations, and they recognise that employing different approaches will yield diverse depictions of the participant(s) under study (Duncan and Nicol, 2004). This means that there are multiple descriptions of the same phenomenon, but every description depends on the question the researcher asks. This approach was selected for the review, as qualitative studies were to be evaluated to reflect a relevant reality (Mays and Pope, 2000).

Subtle realism acknowledges the existence of an external reality, which is conveyed through shared understanding or relatable experiences (Soundy and Heneghan, 2022). Therefore, the researcher in this study intended to interpret the qualitative studies included in the meta-ethnography with the aim of identifying the shared reality in terms of stroke patients' needs.

These needs represent the external reality that is mediated through participants' experiences and language and which already exists independently from the researcher. The focus of the researcher was to recognise it and to be aware of it by identifying patterns and shared experiences.

Additionally, since the overall aim of this work was to develop a training programme to enhance the care of patients with stroke based on their needs, subtle realism was beneficial to identify

these needs not only from a theoretical perspective but also in a way that was practically relevant to healthcare practices (Duncan and Nicol, 2004).

2.4.2. Stage 2: Minimal hermeneutic realism

IPA seeks to understand the real, lived experiences of individuals and adopts a minimal hermeneutic realist approach towards studying these experiences (Larkin, Watts and Clifton, 2006). Hermeneutics refers to the understanding that psychological subject matter is primarily concerned with meaning rather than physical objects. Realism, on the other hand, suggests that these meanings are based on the reality of the world (Slife and Christensen, 2013). According to Ginev (2016, p. 24) “*the hermeneutic realist holds that there is but a meaningful reality*”. These interpretations carry equal validity and potential truthfulness compared to concrete objects or facts (Richardson, 1998; Browning, 2003). Thus, the focus of the researcher was to immerse herself in analysing the meanings and symbols.

The aim of adopting a hermeneutic realist perspective when exploring the needs of patients with stroke was to find an objective reality within their experiences by first, deeply interpreting the subjective text and meanings of participants through a hermeneutic lens. However, IPA acknowledges that there is no direct way to this experience (Smith, 2011). Phenomenological methodology encompasses three interlocking steps: (1) phenomenological reduction, (2) description, and (3) search for essences (Giorgi, 1997). The reduction technique aims to reveal the underlying reasons and motivations behind actions and strives to uncover objective truth

(Ginev, 2016). By employing reduction as a method of analysis, the researcher can explore the underlying reasons for stroke survivors' needs, thus identifying valid representation of their lived realities while maintaining the unique needs of each participant. Therefore, it is essential to ask appropriate questions that are responsive and sensitive to reveal the pure experience of the participants in a particular subject matter (Ginev, 2016).

IPA proposes that although participants' and researchers' experiences are still subjective, objectivity can be attained by perceiving and cognising the same world. This can result in the universality and generalisability of their knowledge and experiences (Jeong and Othman, 2016). Realism asserts that stroke patients' experiences are not merely opinions, but are based on actual and real experiences. Identifying the reality of these experiences can be reached through finding essential and core meanings when conducting the interpretation of text. Further, reality was essential at this stage to develop a valid training programme based on the real needs of the patients, which in turn would facilitate the ability to generalise and transfer the findings to a broader context. Additionally, hermeneutic realism emphasises the importance of cultural context, which was crucial to develop the STP, as many cultural factors in SA can influence the rehabilitation process, such as religious factors.

2.4.3. Stage 3: Critical realism

Critical realism originated with the contributions of Bhaskar during the 1970s and 1980s.

Critical realism holds that "*a real world exists independently of human knowledge and experience and that this reality is knowable, although only partially and imperfectly*" (Bhaskar, 1975, in Brunson *et al.*, 2023, p. 4). This paradigm rejects both constructivism, which posits that reality is

solely a construct of human perception and limits the study to individualised realities, and the inflexibility of radical empiricism, which asserts that any knowledge claims not directly supported by agreed-upon observations are meaningless (Ackroyd and Fleetwood, 2000; Mingers, 2000).

Taking on a critical realist perspective was deemed appropriate for stage 3. Critical realism posits that the primary aim of research should be to explain events by examining the processes and mechanisms that lead to their occurrence under particular conditions (Gorski, 2013). Further, understanding causality through causal processes that may or may not be explicitly observable or generalisable is an additional fundamental element of critical realism (Brunson *et al.*, 2023). This conception of causation facilitates a more adequate understanding of how physiotherapists are influenced by other factors, such as institutional, cultural or social factors. Further, by conducting explanatory and causal analysis within a critical realist framework, researchers can generate actionable insights that inform policy and practice aimed to improve the continuity of care for stroke patients in the SA. Further, it could greatly inform the development of a training programme that is tailored to these patients' needs but also grounded on common principles. Hence, this could help to generate theories and explanations that have broader applicability and relevance beyond the specific setting (Fairclough, 2005).

2.4.4. Stage 4: Pragmatism

Historically, positivism/post-positivism and constructivism/interpretivism are the primary paradigms in the research literature (Creswell and Clark, 2007). However, mixed methods research aims to combine quantitative and qualitative research methodologies, making it difficult to categorise this approach strictly within a particular paradigm (Feilzer, 2010). Mixed methods researchers aim to maximise the strengths and minimise the limitations of a single methodology (Mitchell and Education, 2018). The pragmatic position among mixed methods researchers has garnered significant support (Feilzer, 2010). Pragmatism posits that knowledge does not provide an exact representation of reality, but rather what we are obligated to believe considering our objectives, or what we tend to believe (Morgan, 2014).

The adoption of this paradigm at stage four aligned with the primary goal, which was to develop a training programme that is effective in improving physiotherapists' skills and ultimately enhancing the quality of care for stroke patients and evaluating its effectiveness. This is because pragmatism permits the researcher to be free of the conceptual and practical restraints imposed by the "*forced choice dichotomy between post-positivism and constructivism*" (Creswell and Clark, 2007, p. 27). Researchers do not have to be the prisoners of a single method or technique (Robson, 1993). In designing the STP, this flexibility allowed the researcher to iteratively refine programme components and prioritise outcomes that have practical significance for physiotherapists, patients, and the healthcare system. In addition, pragmatists take an antirepresentational view of knowledge, asserting that research should no longer try to precisely depict reality or provide an objective account of how things truly are. Instead, the focus should be on usefulness and aiming for utility for ourselves (Rorty, 1999). This was relevant in the context

of designing the STP, which required interventions that would be practical, actionable, and effective in improving physiotherapists' skills and patient outcomes rather than aiming for theoretical perfection or absolute truth. By prioritising utility, the researcher can ensure that the STP meets the needs and priorities of stakeholders and has a meaningful impact on healthcare practice.

2.5. Justification for the selection of methodologies at each stage.

2.5.1. Stage 1: Exploring stroke patients' needs after discharge from rehabilitation centres:

Meta-Ethnography.

Conducting a review of stroke needs post-discharge from a global perspective helped to inform and provide context to this study in SA by summarising the available evidence on stroke needs post-discharge globally. The review aimed to conduct an in-depth examination of stroke survivors' needs: therefore, a qualitative approach was the most suitable to meet the aims and objectives of the research (this will be justified in detail in stage 2).

A number of possible strategies that could be utilised for synthesis of qualitative data are available (Sandelowski and Barroso, 2007). However, there is no unifying agreed framework that exists for the synthesis of evidence which exhibits this degree of heterogeneity. Ward and Reed (1983, p.11) described synthesis as "*a process for accumulating knowledge relevant to a given topic, question, or issue and for showing interrelationships among the pieces of knowledge and the question or issue*". Currently, there are 13 methods suitable for synthesising multiple qualitative research, as highlighted by Sutton *et al.* (2019). The common synthesis types include

meta-ethnography (Noblit and Hare, 1988), grounded theory synthesis (Kearney, 2001), meta-study (Paterson *et al.*, 2001), critical interpretive synthesis (Dixon-Woods *et al.*, 2006), and thematic synthesis (Thomas and Harding, 2008).

Grounded theory is characterised by an inductive approach to analysis where theories emerge from the data (Barnett-Page and Thomas, 2009). This approach may not be suitable for the study aim, which focuses on synthesising existing qualitative research rather than generating new theories. Meta-study is a suitable approach for studies with heterogeneous literature (Paterson *et al.*, 2001), whereas the studies included in the present study's review were homogenous. Lucas *et al.* (2007) showed that textual narrative synthesis has limitations in identifying common themes, as narrative reviews tend to provide a more descriptive representation (Dixon-Woods *et al.*, 2006), while this study's aim was to develop deeper insights into stroke survivors' needs.

Thematic synthesis, however, effectively addresses questions concerning the appropriateness, acceptability and effectiveness of interventions without compromising the fundamental principles established in systematic reviews (Barnett-Page and Thomas, 2009). This approach may not fully capture the complexity and richness of patients' needs.

Unlike other qualitative synthesis methods, meta-ethnography provides a systematic and rigorous method for synthesising qualitative data, enabling identification of themes and patterns across included studies (Noblit and Hare, 1988). Meta-ethnography is directed towards the construction of hypotheses and establishing theory from the study data. It enables the content of relevant papers to undergo further analysis to gain new interpretation (Mays, Pope and Popay, 2005).

“Meta-ethnography is a seven phase, theory-based and potentially theory-generating, interpretive

methodology for qualitative evidence synthesis developed by sociologists Noblit and Hare in the field of education” (France *et al.*, 2019, p. 2). Its aim is to create new interpretations and conceptual innovations about the phenomenon under study (Malpass *et al.*, 2009). This approach is appropriate for understanding the complex and subjective nature of stroke patients’ needs and allows researchers to explore in depth these patients’ experiences and perspectives.

The purpose of synthesis is to go beyond narrative and systematic literature studies, and it requires some level of conceptual innovation. Meta-ethnography offers a different type of syntheses which involve induction and interpretation, resembling the qualitative methods of the studies it seeks to synthesise. The outcome of this synthesis is the transformation of studies into each other, facilitating the researcher’s comprehension and transfer of ideas, concepts, and metaphors across various studies (Britten *et al.*, 2002).

On one hand, meta-ethnography offers a conceptual framework that extends beyond merely combining primary findings, making it an especially effective method for gaining new insights into the needs of stroke survivors. To the best of the researcher’s knowledge, no meta-ethnographic study has summarised the literature in this area. On the other hand, the transferability of these findings to the SA context could be limited by cultural, political, and social differences. Therefore, a localised study was needed to provide a comprehensive understanding of the needs of stroke survivors in SA, and hence the second study was set up.

Importance of conducting a study in the SA context

Studies in Western countries have recognised the importance of assessing patients' needs (Reed *et al.*, 2010; Shipley *et al.*, 2020). However, it is challenging to apply patients' needs from the West to the SA context due to cultural, political, and social differences. Although a needs assessment is critical, to the best of the author's knowledge, there is limited research that has investigated the requirements of individuals with stroke in SA (details in Chapter 4).

2.5.2. Stage 2: Exploring the needs of stroke patients after discharge from rehabilitation centres in Saudi Arabian communities: An IPA qualitative exploratory study design.

1- Methods to explore the needs of stroke patients

Determining the needs of patients with stroke after hospital discharge is a complex process, since it involves exploring subjective and personal judgements (Shannon, Forster and Hawkins, 2016).

This may include the patient's age, gender, ethnicity and socioeconomic status (Campbell, Ramsay and Green, 2001). Clinical outcome measures can be used to examine these needs (Oczkowski and Barreca, 1993). However, the needs assessments that are undertaken using clinical outcome measures are mostly focused on specific needs such as physical function (McKevitt *et al.*, 2004), and may not be effective in evaluating holistic needs after discharge (Murray, Young and Forster, 2009). Further, there is currently no comprehensive measure that incorporates the applicability of multiple outcome domains in the context of long-term stroke care (Murray, Young and Forster, 2009).

For a more accurate evaluation of stroke survivors' needs post-discharge, it is preferable to consider patients' perspective of whether they have received any or sufficient assistance with a particular condition (Guo *et al.*, 2021). The aim of this study was to explore the needs of stroke

patients following their discharge from rehabilitation clinics in SA, not to establish a cause–effect relationship between factors; further, evaluation of needs is complex because they differ from one patient to another. Thus, a qualitative approach was most suitable to assess these needs, as it provides detailed and comprehensive descriptions and considers the context and factors surrounding the phenomenon (Sofaer, 1999). Further, qualitative approaches are useful for gaining knowledge in poorly understood or complex areas of healthcare such as needs assessment in SA (Fossey *et al.*, 2002). Numerous researchers in health services and health policy have employed qualitative methodologies, either solely or alongside quantitative approaches. A review of 23 qualitative studies on stroke rehabilitation in primary care by Murray *et al.* (2003) suggested that findings from qualitative studies can be used to develop and improve user-focused, long-term stroke services. Moreover, because rehabilitation outcomes rely heavily on patients’ attitudes, beliefs, and motivation towards rehabilitation, and since rehabilitation is centred around social interactions, utilising qualitative studies can be valuable in enhancing rehabilitation. Additionally, qualitative design deals with poorly understood areas, allows the researcher to explore a topic that is not explored in the literature and enables study participants to play a role in generating new knowledge in that field (Reid-Searl and Happell, 2012).

2- Qualitative methodological approach

Ethnography, grounded theory, phenomenology and their variants are important methodological techniques that are covered in qualitative methodology handbooks. Ethnography concentrates on examining common beliefs and behaviours within a specific culture (Brewer, 2000). This approach was not appropriate for this study because the goal was to explore people’s experiences

rather than how they interact with one another. On the other hand, grounded theory gives insights into people's behaviours and beliefs regarding a phenomenon (Annells, 2006). Grounded theory seeks to explain social processes and formulate a theory (Willig, 2013), whereas the objective of this study was to capture the essence of participation and find similarities and differences in experiences of patients after a stroke. This is different from grounded theory, which aims to develop theories by identifying key ideas and how they are related through the process of constant comparative analysis (Wimpenny and Gass, 2000). This made phenomenology relevant for this study, as it involves interpreting personal lived experiences (Pietkiewicz and Smith, 2014).

Phenomenology, as defined by Spinelli (1989), is the exploration of subjective experience. It aims to explore the complex world of lived experiences from the perspective of those who experience it (Qutoshi, 2018). The name "phenomenology" is derived from the Greek word "phenomenon", which means "that which shows itself", emphasising the distinction between appearance and reality. The experience of a stroke can be life-changing; it can suddenly and drastically alter a person's role in life and their identity. Phenomenology could be used to analyse the effects and meaning of such change to an individual. The main focus of phenomenology is to describe and analyse experience as it is subjectively perceived and lived by the individual (Smith, 2004).

As phenomenology is an approach that was strongly relevant to the aim of this research, it raised the potential for IPA to be used as a methodology for qualitative data collection, drawing on the principles of phenomenology. Smith, Flowers and Larkin (2009, p. 1) stated that "*Interpretative*

Phenomenological Analysis is a qualitative research approach committed to the examination of how people make sense of their major life experiences". They also noted that the purpose of IPA is the detailed and extensive investigation of lived experience which allows it to be expressed in its own terms, rather than through a pre-defined categorisation system. As a methodology, IPA is relatively new, being originally devised in the 1990s. IPA incorporates ideas and concepts which have been in existence for a much longer period, including (A) phenomenology itself (B) hermeneutics, and (C) ideography (Smith, Flowers and Larkin, 2009).

Using IPA to assess stroke patients' needs would aid in the collection of individual experiences in a comprehensive way, without the loss of the individual details which are vital to understanding a participant's experience. Further, IPA is a methodology that can be utilised to monitor and improve the holistic experiences that patients have within the context of their healthcare system (Carel, 2011). Conducting a needs assessment for patients through the IPA lens can reveal limitations in the rehabilitation process in SA, in addition to identifying problems that impact stroke survivors' adaptations to daily life, which are unique to each patient. Gaining full understanding of the peoples' experiences can enable the development of rehabilitation practices or policies that are of substantial relevance to enhancing people's experiences (Dahlgren, Emmelin and Winkvist, 2007) and will aid in identifying strategies to build new services in SA to support patients' needs following their discharge. Thus, IPA was employed at this stage to gather and analyse stroke patients' needs.

3- Adopting a research method to accompany the IPA methodological approach: individual interviews

Interviews are the most dominant method of data collection when attempting to comprehend participants' experiences. They provide an in-depth understanding of the perspectives, thoughts, and opinions of the participants (Bevan, 2014).

In terms of IPA, semi-structured interviews are the most widely utilised method for data collection in IPA studies; however, other methods such as diaries, focus groups, and online methods have also been used (Clarke, 2009). IPA researchers are primarily concerned with providing rich, thorough, and first-person narratives of the phenomena under investigation. Eatough and Smith (2017) emphasised that semi-structured interviews provide a flexible approach to collecting data for IPA and prioritise comprehending the individual's experiences and interpretations while also taking into account the situational factors during the interview. Primarily, semi-structured questions are useful for investigating perceptions and opinions on complex and sensitive topics, such as stroke patients' needs post-discharge, and can allow for further clarification (Barriball and While, 1994). Semi-structured interviews are better in terms of their potential for knowledge production, as the interview approach is characterised by an open, flexible, and informal style that encourages conversation (Henriksen, Englander and Nordgaard, 2022). Secondly, a diverse sample with varying backgrounds and different needs may require a flexible interview schedule, as a standardised one may not be suitable to capture the whole picture (Barriball and While, 1994). Finally, an important advantage of individual interviews is the privacy they afford. The fact that some participants might be concerned about confidentiality, as they may be identified by others, is an issue in focus groups (Sim and Waterfield, 2019).

Some previous studies that explored the needs of stroke patients have utilised questionnaires as a method to assess patients' needs after they have been discharged from hospital (Kersten *et al.*, 2002; Moreland *et al.*, 2009; McKevitt *et al.*, 2011). While surveys are important for gathering responses from a large number of people, they do not provide comprehensive knowledge of the phenomena of patients' post-discharge needs without taking the patients' personal perspectives into account. Furthermore, standardising survey questions may not capture all elements of patients' lives after discharge (Adams *et al.*, 2007), and provides a limited picture of what factors influence their responses. For instance, a study might aspire to examine the challenges that affect patients' adaptation and the coping mechanisms that have helped them. These factors are intricate and differ from one person to another, and cannot be captured via questionnaires: utilising questionnaire surveys may restrict the comprehensive understanding of the situation and limit discovery of the whole picture.

Furthermore, current stroke instruments that assess unmet needs, such as those measuring self-reported long-term needs after a stroke and long-term unmet needs, either concentrate on a limited number of clinical areas or fail to evaluate other significant aspects, like environmental needs. Additionally, instruments that address multiple aspects tend to be very lengthy and require a long time to complete; for example, the Greater Manchester Stroke Assessment Tool takes 74 minutes to finish (Chen *et al.*, 2019). Furthermore, Chen *et al.* (2019) indicated that survey studies examining the unmet needs of stroke survivors are limited by factors such as low response rates, missing or ambiguous data, and biases that can result in the underestimation or

overestimation of these needs. Therefore, in order to obtain in-depth and comprehensive understanding of their needs, it is vital to directly engage with stroke patients to collect direct information from them using methods such as focus groups or interviews.

Focus groups can be an effective method for assessing patients' needs. However, it is important to consider the potential limitations of this method at this stage. Focus groups can facilitate discussions that cover a broad range of perspectives. However, they may reduce the in-depth discussion of the data. Further, according to Kidd and Parshall (2000), the findings may be limited, biased, or unrepresentative if one or two people dominate the conversation with strong viewpoints, or if other participants are unwilling to share their opinions because they are uncomfortable. Further, depending on the group circumstances, participants may or may not share certain information. Individuals may feel pressure to maintain a certain image or reputation in order to maintain their social status, which is relevant to the Saudi population. This cultural trait is influenced by various factors, including religious beliefs, social norms, and the emphasis on preserving honour and dignity. Hence, this might result in reluctance to share certain needs or difficulties in front of the group, as this may be interpreted as a sign of weakness or a danger to them. There may be a fear of being judged or stigmatised for particular needs or difficulties, especially if they are related to mental health or other sensitive topics. Further, the participants may not feel adequately reassured by the research team's guarantees of anonymity and confidentiality (Kitzinger, 1994). This is due to the fact that the interactions that take place within the focus group sessions are visible to other individuals, which can potentially increase the tensions and perpetuation of established norms (Smithson, 2000). These limitations can impact

the comprehensiveness and accuracy in assessing individuals' personal needs and make interviews a more suitable approach.

Importance of exploring physiotherapists' perspectives and needs:

As discussed in Chapter 1, physiotherapists are closely engaged in care for patients with stroke. Therefore, assessing their needs was vital to (1) explore approaches that can address the needs of stroke patients; and (2) develop tailored training programme based on physiotherapists' knowledge gaps. Hence, conducting research on physiotherapists' perspectives and training needs in post-discharge care for stroke patients in SA was crucial.

2.5.3. Stage 3: Exploring physiotherapists' perspectives and training needs for stroke patient care continuity in Saudi Arabia: a qualitative exploratory design.

1- Methods to explore physiotherapists' perspectives

The objective of this study was to investigate comprehensively the gaps in physiotherapists' understanding, knowledge, and skills for meeting stroke patients' needs for community rehabilitation. Therefore, a qualitative exploratory approach situated within a critical realist paradigm with a reflexive thematic analysis was the most appropriate method for achieving this objective. As discussed above, qualitative approaches are useful for providing detailed descriptions, providing context of situations and factors that affect a phenomenon under study, as well as gaining knowledge in poorly understood or complex areas of healthcare.

2- Methods for data collection: focus groups and individual interviews

According to Kitzinger (1994), the interaction between participants is the key process in focus groups, as through this interaction, the researcher can uncover participants' perspectives and linguistic expressions regarding a specific topic. The dynamics of focus groups, where participants may freely articulate opinions that are both supported and opposed by other group members, provide valuable insights into how controversial issues are debated and events and experiences interpreted (Secor, 2010). Further, the exchange of ideas within the group also means that participants' perspectives can be determined relatively quickly (Morgan, 1996). Nevertheless, interviews are more suitable for obtaining richer, more personal, and less rapid data about individual experiences, as they offer insight into feelings and thoughts that may not be accessed in focus groups (Knodel, 1993). Therefore, focus groups may produce data that is more superficial in nature than that obtained through individual data collection methods (Burns, 1989).

In stage 3, both approaches were employed. This enabled a comprehensive assessment of the physiotherapists' perspectives to be determined in the focus groups, while exploring those of most significance at a deeper level during the interviews (Crabtree *et al.*, 1993). An advantage of using both approaches was that this enabled methodological triangulation and validation of the data (Lambert and Loiselle, 2008). The interaction and exchange of information in the focus groups allowed similarities and differences in beliefs and experiences to be discovered, which enabled a comparative assessment that individual interviews cannot achieve. This improved the trustworthiness and dependability of the study by allowing data acquired using one approach to be evaluated and confirmed by the other (Lambert and Loiselle, 2008).

Furthermore, individual interviews can protect privacy and address confidentiality concerns that may occur in focus groups. Therefore, some physiotherapists might have felt less inhibited and expressed themselves more openly in a private context, especially when relating personal experiences or controversial opinions about sensitive subjects. Furthermore, how comfortable people feel about taking part in group discussions is highly culture-specific, and differences in gender in focus groups might affect the interaction and outcome (Fern, 2001). Due to the unique culture in SA, there might have been some discomfort between men and women: thus, by providing both individual interviews and focus groups, participants were able to select the method that best correlated with their cultural preferences and level of comfort. Finally, this approach was also important to allow flexibility in scheduling to accommodate the unexpected events or appointments that physiotherapists might need to keep, and thus minimised the potential risk of dropouts.

3- Remote focus groups and interviews

This study used virtual methods to collect the data, which aligns with the growing popularity of online focus groups (Hennink, 2013). Focus groups and interviews were conducted online for many reasons. Firstly, the virtual mode allowed the researcher to reach participants across diverse geographical locations. This was essential to link participants from different hospitals in the focus groups to discuss the variation in practice, given the busy schedules of physiotherapists.

Additionally, virtual focus groups offered cost savings by eliminating the need for travel and renting of physical venues. Moreover, as highlighted by Stewart and Shamdasani (2017), virtual focus groups provide increased comfort and convenience for participants, allowing them to

actively engage in discussions from their own residences or workplaces. In addition, virtual groups provide participants with a degree of anonymity because they cannot see one another. This can create a less intimidating environment than physical groups, potentially resulting in more active participant participation (Smith, Flowers and Larkin, 2009). Participants in this study had the option to participate without activating their cameras. Thus, discussions could become more comfortable and private. Additionally, the online approach minimises the transfer of health risks that are associated with in-person meetings.

4- Analysis methods: reflexive thematic analysis

Thematic analysis is a popular method utilised in analysing qualitative data (Terry *et al.*, 2017), which has become well-established during the past fifteen years. It is widely used in numerous applied and theoretical domains and is popular among both new and experienced researchers. This is because thematic analysis is considered an analytical tool rather than a methodological framework and it does not align with any particular theoretical or epistemological position. Consequently, it can incorporate a broad range of philosophical stances, including realist/essentialist perspectives as well as symbolic interactionism and social constructionism (Boyatzis, 1998; Vaismoradi, Turunen and Bondas, 2013). Thematic analysis involves the identification of patterns, themes, and associations within data, which can subsequently be organised into broader categories (Braun and Clarke, 2006). The analysis conducted may differ based on the theoretical and disciplinary perspectives of the researchers. Nevertheless, there are certain fundamental methodological skills that every analyst must accomplish during the analysis (Joffe, 2012).

Thematic analysis was originally developed in 2006 by Braun and Clarke. It was categorised into three methods: coding reliability approaches, reflexive thematic analysis, and codebook approaches (Braun *et al.*, 2019). Unlike other approaches, which try to minimise or neutralise the role of the researcher in qualitative interpretation, researcher subjectivity is one core assumption of reflexive thematic analysis. In the reflexive thematic approach, conducting a high-quality reflexive theme analysis does not require the following sequence of stages, with themes arising from the researcher's active involvement with the data and shaped by their experience and expertise (Braun and Clarke, 2021). Further, reflexive thematic analysis does not solely drive themes directly from the data. In contrast, reliability thematic analysis considers themes as summaries of participants' statements.

The reflexive thematic analysis approach was chosen to analyse physiotherapists' perspectives and training needs regarding long-term approaches for people with stroke due to its independence as an analytical method (Vaismoradi, Turunen and Bondas, 2013). This independence provided the researcher with the flexibility to incorporate perspectives of critical realism. Furthermore, the flexibility of reflexive thematic analysis enables researchers to triangulate the findings with previous stages of the research process. The researcher's input was another reason for selecting reflexive thematic analysis. Themes in reflexive thematic analysis are influenced by the researcher's analytical input and interpretation, giving researchers a greater level of involvement in generating themes (Braun and Clarke, 2019). This approach helped in integrating insights obtained at earlier stages of the study process to enhance the overall comprehension of physiotherapists' perspectives.

Designing the STP to improve long-term care for patients with stroke in SA:

The findings from the three stages set out above informed the development of the STP. The six steps in the quality intervention development (6SQuID) framework were used to develop the STP (Wight *et al.*, 2016). The framework was adopted for many reasons. Firstly, it provides a systematic, flexible, and simple approach to developing an intervention. Secondly, this framework covers all aspects of intervention development, from identifying the problem to the implementation phase. The framework consists of six steps that can be followed to ensure that the intervention is thoroughly planned and implemented. These steps were used to combine the main data and the findings revealed a lack of aspects such as delivering education, discharge care and planning, intensity and continuity of care, and long-term approaches such as self-management and telerehabilitation. Thus, the programme consisted of four modules that addressed important topics: an introduction to stroke, carer education and care transition, outpatient stroke care, and self-management and telerehabilitation. The development and content of the STP will be discussed in detail in Chapter 6.

2.5.4. Stage 4: Evaluating the STP.

1- Methodological approach

Assessing change is a fundamental objective of any training programme. However, one of the main challenges facing programme coordinators is measuring the effectiveness of their programmes and demonstrating their impact on the desired outcomes. This is mainly because employee behaviour is difficult to measure (Spector, 2021). Despite this, evaluating a training programme provides numerous advantages, including the ability to use it as a diagnostic tool that

allows for adjustment of the programme to align with various goals and objectives. Consequently, this information can inform the selection or modification of programmes (Phillips and Phillips, 2016). Additionally, Kirkpatrick and Kirkpatrick (2006) argued that evaluating a training programme is essential to decide whether the training should continue or discontinue based on the results and to gain information on how to improve the training programme in the future.

Various methods exist for evaluating the effectiveness of a programme, such as post-training quizzes, one-to-one discussions, surveys, participant case studies, official certification exams, and constrained processing tasks. However, for the purpose of the present work, a mixed-methods sequential explanatory design was adopted, comprising two phases – quantitative (phase 1) followed by qualitative (phase 2) – situated within a pragmatic paradigm. Mixed methods research involves the utilisation of both quantitative and qualitative methodologies within a single research project for data collection or analysis (Fetters, Curry and Creswell, 2013).

Greene, Caracelli and Graham (1989) identified five objectives for utilising mixed methods research, namely triangulation, complementarity, development, initiation, and expansion. This approach of combining quantitative evaluation with qualitative analysis allowed for deep understanding of the impact of the STP. Further, it enabled the researcher not only to measure changes in knowledge, confidence and attitude, but also to explore how participants applied that knowledge in clinical settings. Mixed methods can be parallel or sequential. In a sequential method, either quantitative or qualitative data collection forms the foundation for the subsequent stage of data collection and analysis (Creswell, Fetters and Ivankova, 2004). This strategy was

ideal for the present study's aim, with the quantitative phase serving as a foundation for the qualitative phase. This form of mixed methods design is called the sequential explanatory design. In this form, quantitative data (phase 1) should be collected and analysed. Then, qualitative data (phase 2) are collected subsequently to explain and elaborate the results of the initial quantitative phase (Ivankova, Creswell and Stick, 2006).

2- Methods for data collection: pre- and post-questionnaire and individual interviews

The aim of this study was to assess the effectiveness of the STP in terms of its impact on enhancing physiotherapists' knowledge, attitudes, and confidence levels. A pre- and post-test design was ideal for this aim. This design comprises a set of measurements performed at baseline with certain respondents, who are then subjected to an experimental variable and are measured again, and the difference between the pre- and post-tests is calculated (Oppenheim, 2000). This approach is widely used to assess online training programmes (Pelayo-Alvarez, Perez-Hoyos and Agra-Varela, 2013; Maguire *et al.*, 2019; Kim, Park and O'Rourke, 2017). It is especially prevalent in educational research, where researchers frequently investigate how changes to the learning process impact changes in educational outcomes (Dugard and Todman, 1995).

The primary advantages of utilising approaches that include questionnaires are that they are easy to complete, cost-effective, and easy to analyse (Adams and Cox, 2008). Another benefit associated with employing a pre-test and post-test study design is the establishment of research directionality. This entails examining a dependent variable (such as knowledge) both before and after an intervention involving an independent variable (such as information in the presentation or

training) (Stratton, 2019), which helps to determine whether the intervention has caused any changes in the outcome.

Although the quantitative data from pre-test/post-test provided numerical measures of knowledge, attitude and confidence changes in the present study, it did not offer deeper insights into participants' perceptions and the usefulness of the acquired knowledge. It was necessary to gain a deeper understanding regarding the impact of the training for many reasons, including that participants might face challenges when trying to apply the knowledge gained from the training in clinical settings. Further, participant feedback could inform improvements in future training programme design, content, delivery methods, and resources. Therefore, qualitative interviews were suitable to investigate participants' insights and perceptions regarding the impact of the STP. The qualitative element was built upon the quantitative findings to provide a more comprehensive understanding of the STP's effectiveness.

To sum up, the mixed methods design combining quantitative and qualitative approaches offered a comprehensive understanding of the effectiveness of the STP. The pre-and post-training questionnaires provided quantitative data to measure changes in participants' knowledge, attitude and confidence (phase 1), while qualitative interviews allowed for a deeper exploration of participants' experiences and perceptions of the usefulness of the programme (phase 2). This methodology ensured a comprehensive evaluation by triangulating the data and thus increasing the validity and reliability of findings (Fielding, 2012). The primary aim of triangulation is to enhance and strengthen the conclusion of a study (Schoonenboom and Johnson, 2017). Thus,

triangulating the pre-and post-raining data with the qualitative data provided an overall conclusion of the effectiveness of the STP.

3- Analysis methods

The questionnaire data (phase 1) were analysed using Statistical Package for Social Sciences (SPSS) version 26 to examine whether there were any significant differences between the pre-training and post-training questionnaire results. The Chi-square test was selected to examine the relationship between categorical variables, each of which had two or more categories (Pallant, 2011). This test is a non-parametric tool used to analyse differences between groups when the dependent variable is measured on a nominal or ordinal scale. The Chi-square test is a common test and has been used by several studies similar to the present work to compare the categorical variables' results between pre- and post-training (Qureshi *et al.*, 2006; Dizon, Grimmer-Somers and Kumar, 2014; Tunpattu *et al.*, 2018). These studies explored the change in knowledge using a pre-and post-test design to measure the effectiveness of their training programmes.

Further, the Wilcoxon rank-sum test, also known as the Wilcoxon–Mann–Whitney test, is commonly used to compare the means or medians of two independent groups. The test is non-parametric and is employed to compare variables, both normally distributed and skewed (Fagerland and Sandvik, 2009). The test is appropriate for repeated measures designs with two conditions, as it can be implemented when the same participants participate in both conditions of the study. It is used to detect differences in means between two samples. Additionally, similar studies have adopted the same method of analysis (Zanotti, Sartor and Canova, 2015; Wei *et al.*, 2019; Houwelingen *et al.*, 2021). Thus, the Chi-Square test was used to compare categorical data

items between groups (pre and post). The Wilcoxon rank-sum test was used to compare nominal data items between groups (pre and post).

For the data from the phase 2, reflexive thematic analysis was applied to analyse the qualitative data, as outlined by Braun and Clarke (2019). The reflexive thematic analysis involved six stages and was described previously in stage 3.

4- Data integration

Data integration of mixed methods is an essential component. This stage aims to enhance the value of mixed methods by integrating quantitative and qualitative findings (Ivankova, Creswell and Stick, 2006). Four questions were raised by Clark (2019) to achieve a meaningful integration: (1) why to integrate, (2) what to integrate, (3) when to integrate, and (4) how to integrate?

Firstly, Othman, Steen and Fleet (2020) highlighted that the primary goals of data integration are (1) providing illustration, (2) ensuring convergent validation, and (3) enhancing the depth and comprehensiveness of the data. Integration in this study aimed to assess the validity of quantitative data by using qualitative data. Confirmation arises when the conclusions derived from both forms of data validate the results obtained from the other type. Validation occurs when the two conclusions drawn from both qualitative and quantitative data support each other's findings.

Additionally, the integration aimed to understand and relate reasons for improvement (or lack of it) in the knowledge, attitudes, and confidence aspects using qualitative findings. The integration allowed the researcher to look for agreement and disagreement across the findings. Exploring discrepancies could reveal potential limitations of the study and uncover new insights. Integration of mixed methods occurs not only in the interpretation stage but also in other stages, such as design, methods, and interpretation and reporting levels (Fetters, Curry and Creswell, 2013). Integration at the design level was ensured by adopting the explanatory sequential design. Integration of methods was ensured by the participants continuing from phase 1 into phase 2, as phase 2 was built based on phase 1, merging the analysis (Fetters, Curry and Creswell, 2013). For interpretation and reporting of integration, three methods can be used: (1) integration through narrative, (2) integration through transformation, and (3) integration through joint display. The third method was adopted. In this approach, data is combined visually in the form of tables or figures to reveal new insights by organising related data (Fetters, Curry and Creswell, 2013).

2.6. Reflexivity

The purpose of integrating reflexivity in qualitative research is to observe and assess the influence of the researcher's personal experiences, and hence the accuracy and credibility of the research findings (Palaganas *et al.*, 2017). In this study, the intention was to develop a training programme for physiotherapists in SA to help them provide effective and long-term care for people with stroke. I have had some experience as a teaching assistant who assisted in teaching a neurology module at SA. Additionally, I have had some experience of working and engaging with stroke patients, and my experience during those two years influenced my perspective and understanding of stroke care. During this work, I noticed several limitations within the realm of

stroke care in SA. Firstly, there were limitations regarding physiotherapists' education and training. The content of the module was inadequate to provide the physiotherapists with the requisite knowledge and skills. For example, crucial topics regarding training on outcome measures for stroke, self-management, and virtual care were absent from the curriculum. Further, physiotherapists were not allowed to treat any patients until they reached the internship year (fifth year). This limited their opportunities to gain the practical experiences and skills that are required to effectively treat people with stroke. The curriculum lacked basic skills and information on research and how to implement evidence-based practice. Moreover, I observed that physiotherapy was a relatively new subject at the university, which presented challenges in terms of expert supervision for interns in hospitals during their internship period. The internship period primarily consisted of self-directed learning, adding more challenges of insufficiently acquiring the necessary skills and knowledge.

There were also limitations regarding the rehabilitation practice in SA. I noticed a lack of standardisation of rehabilitation protocols among institutions in SA, suggesting potential gaps in the quality of care. The availability of community centres is very limited and the choice is to receive rehabilitation post-stroke either through outpatients' clinics (which offer very limited sessions) or privately through private centres. Thus, families may experience increased stress, isolation, and many challenges. There is a lack of groups that support patients with stroke or their carers, which limits their opportunities to exchange information with peers. Personally, I have not had any family members who have experienced a stroke.

To reduce the bias in the studies, several approaches were employed. The approaches applied were (1) Audit trails (stages 1, 2, 3, and 4); (2) Triangulation of findings (stages 1, 2, and 3); (3) Analyst triangulation (stages 2 and 3); (4) Clear reporting of the findings (stages 1, 2, 3, and 4); (5) Peer review (stages 1, 2, 3, and 4); and (6) Member checking (stages 2 and 3). The approaches that were applied to ensure rigour and trustworthiness in each stage are discussed separately in detail in each chapter (Chapters 3, 4, 5, 7).

2.7. Ethical considerations

1- Ethical Approvals

Stage 1: The review was registered in PROSPERO (PROSPERO 2021 CRD42021256405) (Appendix 5)

Stage 2: Ethical approval was provided by two hospitals' ethics committees, one in the central of SA, King Fahad Medical City (Institutional Review Board at King Fahad Medical City, Ref: 21-309E) on 10/08/2021, and the other in the south, King Fahad Central Hospital (Jazan Health Ethics Committee, Ref: 2167) on 21/09/2021. Additional approval was obtained from the University of Birmingham (UoB) (Science, Technology, Engineering and Mathematics (STEM) ethics committee, Ref: ERN_20-1836) on 19/10/2021 (Appendix 6).

Stage 3: Ethical approval was sought from MoH (Jazan Health Ethics Committee, Ref: 2377) on 31/08/2023 and UoB (STEM ethics committee, Ref: ERN_1527) on 25/09/2023. (Appendix 7)

Stage 4: Ethical approval was obtained from MoH (Jazan Health Ethics Committee, Ref: 2416) on 31/1/2024 and UoB (STEM ethics committee, Ref: ERN_2179-Feb2024) on 29/2/2024. (Appendix 8).

2- Informed consent

Information sheets were shared with interested individuals for all studies. The sheets detailed the study objectives, risks, and benefits, methods of data collection, recording requirement, and data storage. The participant information sheets were read to those who were unable to read. A 48-hour time period was provided for potential participants to consider the research information and raise any queries that they might have with the principal investigator (PI). Potential participants were given the PI's contact information should they have any questions or require information about the study. After that, individuals who agreed to participate were asked to provide written informed consent. If they could not sign, a relative or carer could sign on their behalf.

3- Right to withdrawal

The information sheets clearly stated the participants' rights to ask questions and their ability to change their decision to participate at any point during their interview. Participants were informed that they had the right to stop their participation at any time during the study period. They were asked to inform the researcher if they wished to withdraw within two weeks after data collection, as the data would undergo analysis after this period. It was specified that if they notified the PI before the analysis began, their data would be erased and not included in the analyses. However, if they chose to withdraw after the anonymous data had been analysed, their data could not be removed. None of the participants withdrew.

4- Confidentiality and anonymity

To maintain ethical rigor, participants' anonymity and confidentiality were assured (Wiles *et al.*, 2006). Pseudonyms (numbers) were used in the studies, and any personally identifiable information, such as the participant's name, occupation, or organisation, was removed. Data protection was ensured through adherence to the Data Protection Act (2018). Paper-recorded data from the point of recruiting was protected in a secured cabinet. Electronic data was protected via password-encrypted digital files, with only the researchers having access. The digital data were sent and saved on the UoB one drive to ensure security. The paper data were destroyed once they have been transferred into digital format. According to the UoB's retention policies, the data will be stored for ten years.

2.8. Chapter conclusion

The selection of different approaches used to address the study aims were identified and justified in this chapter, starting with a meta-ethnographic review to review the needs of stroke survivors within the subtle realism paradigm. The needs of stroke patients in SA were then investigated using an IPA qualitative exploratory study within the minimal hermeneutic realism stance. Further, the views and training needs of physiotherapists regarding continuity of care for stroke patients in SA were investigated using a qualitative exploratory method within the critical realist paradigm. Finally, an online training programme was developed and then evaluated using a sequential explanatory mixed methods design within the pragmatic paradigm. These methodological strategies provided a strong and appropriate framework for meeting the research aims and objectives of this thesis. The next chapters will describe each of the studies, including further methodological information, findings, and analysis of the findings in greater detail.

Chapter 3: Exploring Stroke Patients' Needs after Discharge from Rehabilitation Centres: Meta-Ethnography.

Publication

Temehy, B. Rosewilliam, S. Alvey, G. and Soundy, A. (2022) 'Exploring stroke patients' needs after discharge from rehabilitation centres: meta-ethnography', *Behavioral Sciences*, 12(10), pp. 1-19. (Appendix 1).

3.1. Overview of the chapter

This chapter consists of a previously published paper (Temehy *et al.*, 2022) with minor changes made for the purpose of this thesis. It starts with an introduction, followed by the research question, methods used to identify relevant literature, how studies were selected and analysed, the findings of this review, discussion and conclusion.

3.2. Introduction

The rationale for conducting a meta-ethnography to review the needs of patients with stroke was discussed previously (Chapter 2). Qualitative research is well-positioned to detail such needs (Chapter 2), and there are large-scale qualitative studies that have explored the needs of people with post-discharge strokes. Qualitative studies which address stroke needs vary in the period explored, from one month (Lui and Mackenzie, 1999) to ten years post-stroke (Davoody *et al.*,

2016). The needs addressed are across various domains of care, such as rehabilitation needs (Talbot *et al.*, 2004), psychological and emotional needs (Harrison *et al.*, 2016), or perceived information needs (Davoody *et al.*, 2016; Eames *et al.*, 2010). A broader understanding of stroke survivors' needs has not been reviewed after they are discharged from healthcare services from the perspective of both patients and professionals. Existing systematic reviews have focused mainly on specific types of needs that are perceived by both stroke survivors and carers. Examples of perceived needs include educational needs and rehabilitation needs (Hafsteinsdóttir *et al.*, 2011; Pindus *et al.*, 2018). Other reviews have been limited by their inclusion of design types or focusing on one specific group of participants. For instance, past reviews have included survey studies involving just stroke patients (Chen *et al.*, 2019) or have included quantitative studies only of community-dwelling stroke survivors (Lin *et al.*, 2021). Existing syntheses (Guo *et al.*, 2021) of qualitative evidence have not corroborated the needs of stroke survivors with the professionals' perspectives, and this review focused purely on participants from community settings only. Hence, there is a need for review research to triangulate the experiences of different stroke patients.

3.3. Review question

Following their discharge from the hospital, what are the needs of the stroke survivors across various domains of care perceived by patients and healthcare professionals?

3.4. Methodology

3.4.1. Study design

This review was previously registered (PROSPERO 2021 CRD42021256405). Meta-ethnographic guidelines have supported the methodological reporting of this review. This includes the original guidance from Noblit and Hare (1988) as well as considerations from recent guidelines (France *et al.*, 2019; Soundy and Heneghan, 2022). Meta-ethnography is a systematic comparison of conceptual data found in primary qualitative research in order to establish and develop ideas, concepts, theories, and models. Cahill *et al.* (2018) explain that a new generation of concepts is needed to explain the relationships between findings as opposed to just describing the data. To perform this, the researcher can keep a diary of questions to answer. This type of research was intended to retain the meanings and contexts in the original studies, yet create conceptual models and theories in the realm of study (Noblit and Hare, 1988).

3.4.2. Search strategy

The literature review search comprised three parts. The first part was to clarify the focus area of the study. To perform so, a scoping search was undertaken. Following this, the primary searches were carried out in June 2022 on the following electronic databases: Ovid Medline (1946 to 2021), CINAHL plus (EBSCO), AMED (EBSCO), PsycINFO (1967 to 2021), the Cochrane Library, and PubMed. The keywords used within the databases were identified using the Population, Intervention, Comparison, and Outcome (PICOS) strategy, with alternative spellings

and synonyms also searched for (Table 3.1). Boolean terms ‘OR’ and ‘AND’ were utilised, along with subject headings (for example, MeSH). A librarian supported the process, and this was checked. Following retrieval of the papers, reference lists and bibliographies were searched manually to find any further studies of interest. The grey literature of PhD dissertations and conference papers were considered. Main search terms were searched for in Google Scholar and the Science Direct website, and the first 20 pages of the results were screened. For the included studies, the researchers sought the profiles of study authors on ResearchGate and Academia.edu. Table (3.1) in the contains an example of the search carried out in Medline.

Table 3. 1: Example of search carried out in Ovid Medline (1946 to 2021).

	keywords	result
1	Stroke/	107629
2	Cerebrovascular Disease*.mp.	19677
3	Cerebrovascular Disorders/	46868
4	Cerebrovascular accident.mp.	4075
5	brain hemorrhage.mp.	1077
6	Brain Ischemia/	54329
7	CVA.mp.	2530
8	#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7	198648
9	limit 8 to (abstracts and english language and humans)	116937
10	Needs Assessment/	31185
11	needs.mp.	343294
12	"Health Services Needs and Demand"/	53907
13	Support.mp.	9569657
14	concern*.mp.	545360
15	demand*.mp.	232715
16	Experience*.mp.	963895
17	wants.mp.	3881
18	Requirement*.mp.	267841
19	Expectation*.mp.	75654
20	#10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17 OR #18 OR #19	10872856
21	limit 20 to (abstracts and english language and humans)	5923259
22	Patient Discharge/	31700
23	Discharge.mp.	173477
24	home.mp.	226767
25	Long term.mp.	736793
26	long-term.mp.	736793

27	post-stroke.mp.	8065
28	poststroke.mp.	4775
29	Community.mp.	510621
30	#22 OR #23 OR #24 OR #25 OR #26 OR #27 OR #28 OR #29	1552737
31	limit 30 to (abstracts and english language and humans)	1037599
32	Qualitative Research/	61289
33	Qualitative.mp.	215650
34	Interview/	28779
35	interviews.mp.	186431
36	Focus Groups/	31616
37	focus group.mp.	21348
38	mixed method*.mp.	18138
39	case studies/	2032032
40	#32 OR #33 OR #34 OR #35 OR #36 OR #37 OR #38 OR #39	2407668
41	limit 40 to (abstracts and english language and humans)	1225101
42	#9 AND #21 AND #31 AND #41	1245

3.4.3. Inclusion and exclusion criteria

Eligibility criteria are presented according to the SPIDER (Sample, Phenomena of Interest, Design, Evaluation, and Research Type) acronym as presented in Table 3.2.

Table 3. 2: Eligibility criteria.

Sample	Studies were included if they represented people with strokes. The target population for the study was adults who had been discharged from hospitals after a stroke, ischaemic stroke, or haemorrhagic stroke, who had finished rehabilitation (either at a rehabilitation service or in the community). Studies that involved a mixed sample, such as patients with traumatic brain injury and stroke, were included if the data for stroke survivors could be extracted. Studies were also included that considered post-discharge needs of people with strokes from the perspective of caregivers and health professionals.
Phenomena of Interest	Studies were included if they were able to consider the needs of stroke survivors after they had been discharged from rehabilitation. Studies could focus on

	exploring various needs, for instance physical, psychological, social, political, cultural, environmental, or rehabilitation. Needs had to be reported by the stroke patients themselves and during the post-discharge, subacute, or chronic phases. Mixed method studies were included if the qualitative data could be extracted. Studies that were excluded were those where stroke patients had their needs assessed prior to discharge, those that assessed patient satisfaction rather than perceived needs, those studies which solely assessed carers' needs, and mixed studies where the qualitative data could not be extracted.
Design	All types of qualitative methodology were considered; for instance, this included types of grounded theory, types of phenomenology, types of narrative research, and descriptive or interpretive designs. A mixed methods study that included a clearly identifiable qualitative phase and reported that phase in a way that represented a form of qualitative design were included. Case studies were excluded.
Evaluation	All types of methods used in qualitative studies were acceptable; for instance, this could include interviews, observations, field diaries, vignettes, or surveys with open questions. Studies that quantised data or restricted reporting of experiences were excluded.
Research Type	Qualitative or mixed methods designs were included.
Other	Studies that were conducted in hospitals, nursing homes, or the community. There was no limitation on dates of publishing. Only articles in English were considered and studies had to be related to humans and have an abstract.

3.4.4. Study selection

Two independent reviewers carried out the study selection process. The titles and abstracts were identified following a search and screening process, where any duplicates were removed. The eligible papers were saved on EndNote. Following the creation of the abstract shortlist, the two independent reviewers (BT and GA) screened the articles using the inclusion and exclusion criteria and compared their results. Disagreements were resolved by a third reviewer. The full text of the papers were read to shortlist the relevant articles.

3.4.5. Quality appraisal and certainty assessment

Quality appraisal was undertaken using the Joanna Briggs Institute (JBI) qualitative critical appraisal checklist. The quality of each paper was assessed using two independent reviewers (BT and GA) and a third reviewer (SR) in the case of any disagreements.

The certainty assessment was carried out by using the GRADE-CERQual assessment tool. The GRADE-CERQual assessment was initially conducted by the PI (BT), who systematically evaluated each review finding across the GRADE-CERQual components. To enhance the rigour of this process, a detailed assessment file for each theme was shared with the supervisory team for feedback and validation. The team reviewed the assessments and provided input on the overall confidence ratings. There were no disagreements, and all final decisions on ratings were reached collaboratively. Detailed documentation was maintained throughout the process to ensure transparency. The results of the JBI assessment can be seen in Table 3.3. The quality assessment is included within the GRADE-CERQual assessment can be seen in Table 3.5

Table 3. 3: JBI qualitative critical appraisal checklist.

	Abrahams on and Wilson, 2019	Chen, Xiao and Bellis, 2016	Dalvandi <i>et al.</i> 2010	Danzl <i>et al.</i> 2016	Davoody <i>et al.</i> 2016	Eames <i>et al.</i> 2010	Gard <i>et al.</i> 2019	Garrett and Cowdell, 2005	Hare <i>et al.</i> 2006	Harrison <i>et al.</i> 2016
Is there congruity between the stated philosophical perspective and the research methodology?	Y	Y	Y	Y	N	N	N	Y	N	Y
Is there congruity between the research methodology and the research question or objectives?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Is there congruity between the research methodology and the methods used to collect data?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Is there congruity between the research methodology and the representation and analysis of data?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Is there congruity between the research methodology and the interpretation of results?	Y	Y	Y	Y	U	U	U	Y	U	Y
Is there a statement locating the researcher culturally or theoretically?	Y	U	Y	N	N	N	Y	N	Y	Y
Is the influence of the researcher on the research, and vice-versa, addressed?	Y	Y	Y	Y	Y	Y	Y	U	Y	Y
Are participants, and their voices, adequately represented?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Is the research ethical according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body?	Y	Y	Y	U	Y	Y	Y	Y	Y	Y
Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Total	10	9	10	8	7	7	8	8	8	10

Table 3.3: JBI qualitative critical appraisal checklist.

	Hartford, Lear and Nimmon, 2019	Jones <i>et al.</i> 2008	Kamalakanann <i>et al.</i> 2016	Lamontagne <i>et al.</i> 2019	Liddle <i>et al.</i> 2009	Lui and Mackenzie, 1999	Martinsen, Kirkevold and Sveen, 2015	McLean <i>et al.</i> 1991	Nordin <i>et al.</i> 2014	Poulin <i>et al.</i> 2019
Is there congruity between the stated philosophical perspective and the research methodology?	Y	Y	N	Y	Y	Y	Y	N	N	Y
Is there congruity between the research methodology and the research question or objectives?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Is there congruity between the research methodology and the methods used to collect data?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Is there congruity between the research methodology and the representation and analysis of data?	Y	Y	Y	Y	Y	Y	Y	N	Y	Y
Is there congruity between the research methodology and the interpretation of results?	Y	Y	U	Y	Y	Y	Y	U	U	Y
Is there a statement locating the researcher culturally or theoretically?	Y	Y	N	Y	Y	N	N	Y	Y	Y
Is the influence of the researcher on the research, and vice-versa, addressed?	Y	Y	N	Y	Y	Y	Y	N	Y	Y
Are participants, and their voices, adequately represented?	Y	Y	Y	Y	Y	Y	Y	N	Y	Y
Is the research ethical according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body?	Y	Y	Y	Y	Y	Y	Y	N	Y	Y
Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Total	10	10	6	10	10	9	9	4	8	10

Table 3.3: JBI qualitative critical appraisal checklist.

	Reed <i>et al.</i> 2010	Sadler <i>et al.</i> 2014	Schmitz and Finkelstein, 2010	Shipley <i>et al.</i> 2020	Shook and Stanton, 2016	Sumathi pala <i>et al.</i> 2012	Talbot <i>et al.</i> 2004	Vince nt <i>et al.</i> 2007	White, Magin and Pollack, 2009	Wiles <i>et al.</i> 1998	Yeung <i>et al.</i> 2015
Is there congruity between the stated philosophical perspective and the research methodology?	Y	N	Y	Y	Y	N	Y	Y	Y	Y	N
Is there congruity between the research methodology and the research question or objectives?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Is there congruity between the research methodology and the methods used to collect data?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Is there congruity between the research methodology and the representation and analysis of data?	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
Is there congruity between the research methodology and the interpretation of results?	Y	U	U	Y	Y	U	Y	Y	Y	Y	U
Is there a statement locating the researcher culturally or theoretically?	Y	N	Y	Y	N	N	N	N	Y	Y	N
Is the influence of the researcher on the research, and vice- versa, addressed?	Y	Y	Y	Y	Y	Y	Y	Y	Y	U	Y
Are participants, and their voices, adequately represented?	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y
Is the research ethical according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body?	Y	Y	Y	Y	Y	Y	Y	U	Y	U	Y
Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Total	10	7	9	10	9	7	7	7	10	8	7

3.4.6. Data extraction

A pilot data extraction was conducted on two papers (JBI, 2019). Following this, the data were extracted by two independent reviewers (BT, GA), and any discrepancies were ratified by a third reviewer (SR). The following data were extracted from the papers studied: author, publication date, country of study, aim, features of the sample (such as sample size, age, gender, and length of time since discharge), study setting, design, and results. Similarly extracted was information regarding patient needs in terms of the physical, psychological, social, rehabilitation, financial, and other aspects. Data were documented in Microsoft Word tables. Authors of studies were contacted in the case of missing or unclear information in the included papers. A blank copy of the JBI data extraction form can be found in (Appendix 9).

3.4.7. Data analysis

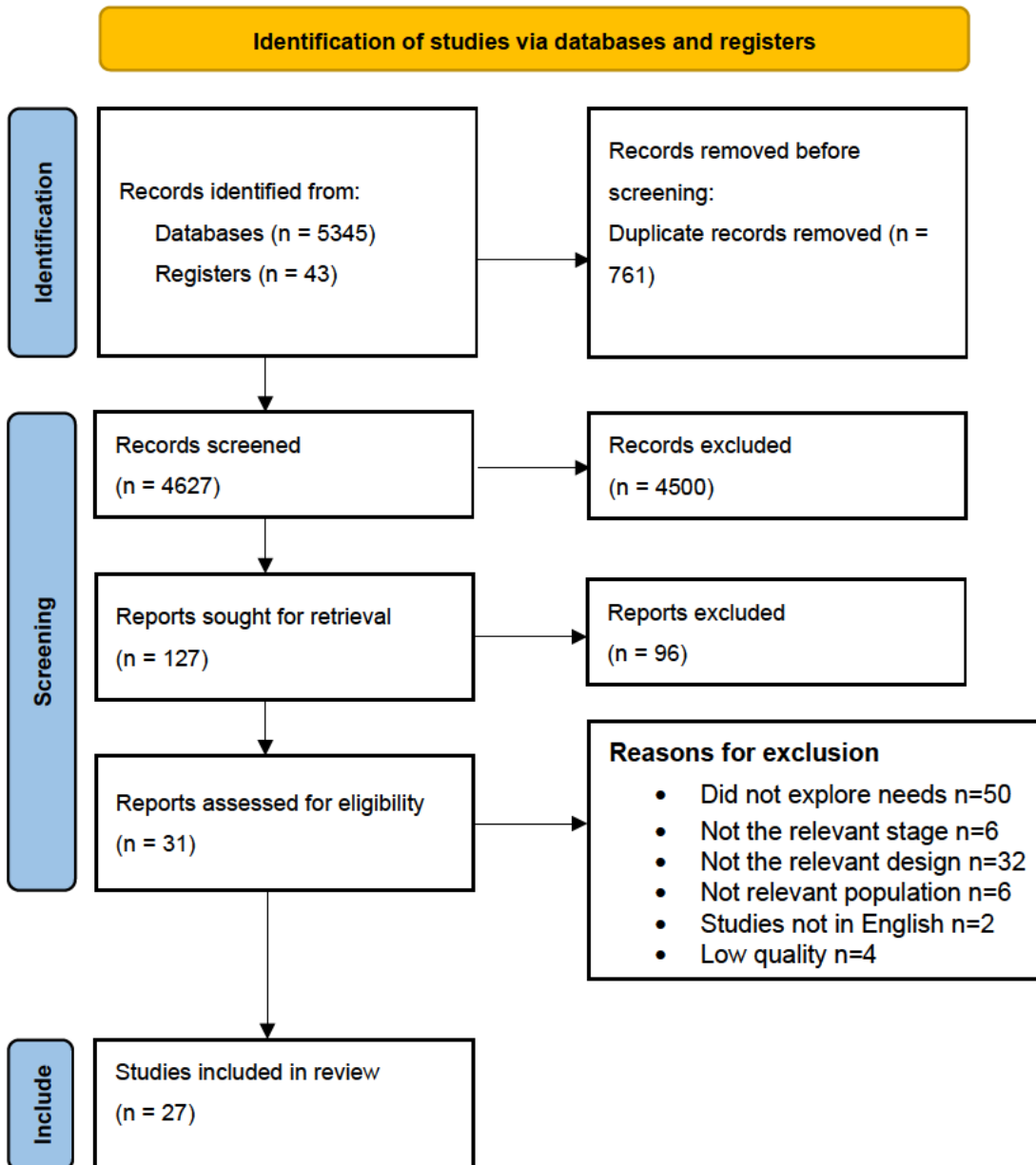
An independent reviewer undertook the meta-ethnographic synthesis according to recommended guidelines for synthesising the data (Noblit and Hare, 1988; France *et al.*, 2019). Studies were read multiple times in chronological order by the researchers, who determined the relationship between the studies by addressing the studies' design, aims, setting, and sample characteristics, for example, age, socioeconomic status, gender, ethnicity, and the length of time since stroke event. Following this, new concepts and metaphors were identified. In this stage, line by line coding of all findings of primary studies was the technique that was used. Then, these codes were juxtaposed and brought together to create clusters and themes by grouping the interpretation

of first order construct (participants' views and interpretations reported in the included studies) and second order constructs (authors' interpretations of participants' views in these studies). The relationships between second order constructs were then used to create the third order constructs. These associations between the studies occurred in two ways—reciprocal, for overlapping studies, and refutational, for conflicting studies. Tables and grids have been utilised for this purpose. A senior reviewer reviewed the findings of data synthesis (BT). An audit trail can be seen in (Appendix 10).

3.5. Results

In total, 5345 records were identified from the database search. Forty-three further records were identified from searching references. Following the removal of duplicates, there were 4627 articles, of which, 127 articles were assessed for eligibility. Ninety were excluded and thirty-one were included in the critical appraisal stage. Reason for rejection can be found in (Appendix 11). Four studies were excluded due to low quality. Twenty-seven articles were included in the final analysis. The results of the search and screening process are presented in Figure 3.1.

Figure 3. 1: The PRISMA flow diagram.



3.5.1. Study characteristics

Of the twenty-seven included studies, eleven were conducted in the UK, six in Canada, five in Australia, two in the US, and one in each of China, Iran, Malaysia, and Norway. The sample size of included studies ranged from six participants (Shook and Stanton, 2016) to one hundred twenty-five participants (Harrison *et al.*, 2016). Among these studies, thirteen articles (Lui and Mackenzie, 1999; Jones *et al.*, 2008; Reed *et al.*, 2009; White *et al.*, 2009; Dalvandi *et al.*, 2010; Sumathipala *et al.*, 2012; Sadler *et al.*, 2014; Martinsen, Kirkevold and Sveen, 2015; Davoody *et al.*, 2016; Gard *et al.*, 2019; Shipley *et al.*, 2020; Poulin *et al.*, 2019 and Liddle *et al.*, 2021) recruited stroke participants only. Mixed participants of stroke survivors and carers were recruited in nine studies (Wiles *et al.*, 1998; Hare *et al.*, 2006; Eames *et al.*, 2010; Schmitz and Finkelstein, 2010; Chen, Xiao and Bellis, 2015; Danzl *et al.*, 2016; Yeung *et al.*, 2015; Shook and Stanton, 2016; Lamontagne *et al.*, 2019). Three studies (Talbot *et al.*, 2004; Harrison *et al.*, 2016; Hartford, Lear and Nimmon, 2019) included health professionals as well as stroke survivors and carers. Nordin *et al.* (2014) and Abrahamson and Wilson (2019) recruited health professionals and patients. The characteristics of studies and patients can be found in Table 3.4.

Table 3. 4: Characteristics of studies.

Authors	Geographical Location	Aim	Methodology	Participant	Time Since Stroke
Lui and Mackenzie, 1999	China	To identify the rehabilitation needs of Chinese elderly patients following a stroke	Qualitative ethnographic approach. Semi-structured interview.	Total of 15 stroke survivors Nine females Six males	One week before discharge from the rehabilitation ward and one month after discharge.
Davoody <i>et al.</i> , 2016	Sweden	To use patient journey mapping to explore post-discharge stroke patients' information needs to propose eHealth services that meet their needs throughout their care and rehabilitation processes.	Qualitative research. Focus groups.	Total of 12: Young (<65 years) and old (≥65 years) stroke patients Female: seven Male: five	One focus group included patients with strokes more than 10 years ago. Two groups included patients with strokes less than 10 years
Talbot <i>et al.</i> , 2004	Canada	To examine the rehabilitation needs of this clientele from their hospitalisation to their reintegration into the community.	Qualitative research tool was selected. The method of focus group discussion.	Total of 25: The patients (n = 4) Caregivers (n = 5) Healthcare providers (n = 9) Administrators (n = 7) Gender: not provided	Three patients with strokes from 2 to 3 years. One patient had a stroke from 4 to 8 years.
Harrison <i>et al.</i> , 2016	UK	To explore patients', carers', and health professionals' experiences of psychological need, assessment, and support post-stroke while in hospital and immediately post-discharge.	Exploratory study. Qualitative semi-structured interviews and focus groups.	Total of 125: Thirty-one stroke patients, twenty-eight carers, and sixty-six health professionals. Male: eighteen patients, nine carers Female: thirteen patients nineteen carers Health professionals' genders were not provided.	Mean length of 171.23 days between discharge and interview.
Eames <i>et al.</i> , 2010	Australia	To identify patients' and carers' perceived barriers to accessing and understanding information about strokes.	Semi-structured interviews at two points in time.	Total of 52: Initial interviews were conducted with 34 stroke patients and 18 carers, and follow-up interviews were completed with 27 patients and 16 carers. Fourteen female patients	Prior to and 3 months following discharge from an acute stroke unit.

				Thirteen female carers	
Shook and Stanton, 2016	Canada	To explore the stroke education perspectives in a Canadian rehabilitation centre to illustrate one approach for addressing this problem.	Qualitative description study was overlaid by phenomenology. Face-to-face semi-structured interview.	Total of 6: Three patients and three caregivers. Three male patients Three female caregivers	Not identified.
Reed <i>et al.</i> , 2010	UK	To explore stroke survivors' needs and their perceptions of whether a community stroke scheme met these needs.	A qualitative study using a phenomenological approach. Semi-structured face-to-face interviews.	Total of 12 stroke survivors. Female: five Male: seven	Mean of 26 months post-stroke.
White <i>et al.</i> , 2009	Australia	To explore the experiences of community-dwelling stroke survivors at one, three, and five years using a community-based, cross-sectional study.	A modified, grounded theory approach. Semi-structured interview.	Total of ninety-one stroke survivors at one, three, and five years after stroke. Forty-seven males Forty-four females	Cohort One: People who had had a stroke 1 year prior to recruitment. Cohort Three: People who had had a stroke 3 years prior to recruitment. Cohort Five: People who had had a stroke 5 years prior to recruitment.
Dalvandi <i>et al.</i> , 2010	Iran	To illuminate how stroke survivors experience and perceive life after strokes.	Grounded theory approach using semi-structured interviews.	Ten stroke survivors. Male: six Female: four	Patients had strokes within the past 3–6 months.
Sumathipala <i>et al.</i> , 2012	UK	To investigate how contextual factors, as described by the World Health Organisation's ICF, impact stroke survivors' functioning and how needs are perceived in the long-term after strokes.	Semi-structured, in-depth interviews.	Thirty-five stroke survivors. Males: 49% Females: 51%	Total of 49% had strokes within 1 to 2 years. Total of 31% had strokes within 3 to 5 years. Total of 6% had strokes within 6 to 8 years. Total of 14% had stroke more than 9 years.
Sadler <i>et al.</i> , 2014	UK	To investigate how younger stroke survivors' experiences of care are shaped by the field of stroke and how, in navigating stroke care, individuals seek to draw on different forms of capital in adjusting to life after strokes.	One-to-one, semi-structured interviews.	Thirty-one stroke survivors were interviewed. In ten interviews, carers also took part. Nineteen males Twelve females	Patient had stroke within 6 weeks and 28 months.
Martinsen, Kirkevold and Sveen, 2015	Norway	To explore young and midlife stroke survivors' experiences with the health services and to identify long-term follow-up needs.	This qualitative study applied a hermeneutic phenomenological approach. Two cohort, in-depth interviews.	Sixteen stroke survivors. Five females Eleven males	Patient had stroke within 1.5 to 10 years after stroke onset.

Gard <i>et al.</i> , 2019	Sweden	To explore stroke survivors' experiences of healthcare-related facilitators and barriers concerning return to work after stroke.	Qualitative study. Focus groups.	Twenty stroke survivors. Seven females Thirteen males	Patient had been referred to stroke rehabilitation within 180 days after stroke onset.
Shiple <i>et al.</i> , 2020	Australia	To examine the unmet needs of younger stroke survivors in inpatient and outpatient healthcare settings and identify opportunities for improved service delivery.	Qualitative descriptive approach. In-depth, semi-structured interviews.	Nineteen young stroke survivors. Ten females and nine males.	Patients had stroke within 6 months to 24 years.
Poulin <i>et al.</i> , 2019	Canada	To identify the educational needs of older adults who have had a stroke in order to support their participation in leisure activities that promote cognitive health.	A descriptive study. Mixed-methods design was used with an emphasis on qualitative data and involving semi-structured interviews.	Twenty people. Fourteen males Six females	Mean of 8 months post-stroke. Mean of 5.9 months post-discharge.
Liddle <i>et al.</i> , 2009	Australia	To explore the needs and experiences of people who cease driving following a stroke with the aim of informing clinical practice.	Qualitative phenomenological approach. Semi-structured interviews.	Twenty-four stroke participants. Seventeen males Seven females	Mean of 5 years post-stroke.
Jones <i>et al.</i> , 2008	UK	To develop local stroke services by involving, in a meaningful way, those affected by stroke in identifying and prioritising service development issues.	An action research framework. A combination of semi-structured interviews and focus groups with both patients and carers.	Total of 35: Patients recruited from hospitals (n = 30) Females: 53% Patients recruited from community (n = 5) Females: 52%	Not identified.
Wiles <i>et al.</i> , 1998	UK	To identify the information needs of patients and their informal carers at various stages post-stroke with the aim of developing a database from which individualised information packages could be provided.	Grounded theory approach. In-depth, qualitative, semi-structured interviews.	Total of 31: Nine were interviews with patients, ten were interviews with patients and carers together, and two were interviews with carers only (totalling thirty-one people in all). Eleven were male and ten were female.	Seven interviews were carried out with patients and/or carers immediately post-stroke. Five immediately post-discharge. Nine between 2 months and 1 year post-discharge.
Hare <i>et al.</i> , 2006	UK	To identify the long-term support needs of patients with prevalent stroke, and their carers identified from practice stroke registers.	Qualitative study. Focus groups.	Total of 33: Twenty-seven patients and six carers subsequently participated	Median of 4 years post first stroke. Median of 2.5 years since last stroke.

				in the focus groups/interviews. Nineteen females Fourteen males	
Schmitz and Finkelstein, 2010	US	To study the perspectives and experiences of stroke survivors and partners of stroke survivors regarding sexual issues and perceived rehabilitation needs.	Qualitative, exploratory, Individual, semi-structured interviews	Total of 29: Fifteen stroke survivors and fourteen partners of stroke survivors. Sixteen males Thirteen females	Patients: median of 45 months post-stroke. Partners: median of 51.5 months post-stroke.
Danzl <i>et al.</i> , 2016	USA	To examine rural Appalachian Kentucky stroke survivors' and caregivers' experiences of receiving education from healthcare providers with the long-term goal of optimizing educational interactions and interventions for an underserved population.	Qualitative descriptive study. Semi-structured interviews.	Total of 25: Thirteen stroke survivors and twelve caregivers. Sixteen females Nine males	Mean of 3.6 years post-stroke.
Yeung <i>et al.</i> , 2015	Canada	To explore the experiences and needs of Chinese stroke survivors and family caregivers as they return to community living using the Timing it Right Framework as a conceptual guide.	Qualitative interviews In person or telephone interviews depending on the participant's preference.	Eighteen participants including five stroke survivors and thirteen caregivers. Nine females Nine males	Patients: median of 6 months post-discharge. Caregivers: median of 8 months post-discharge.
Lamontagne <i>et al.</i> , 2019	Canada	To report the experiences and perceptions of people with stroke and their caregivers in the existing continuum of stroke care, social services, and rehabilitation in the province of Québec (Canada).	Phenomenological qualitative study. Focus groups.	Sixty-eight participants were recruited and attended the ten focus groups. Thirty-seven stroke patients and thirty-one carers. Twenty-nine males Thirty-nine females	Mean of 2.6 years post-discharge.
Chen, Xiao and De Bellis, 2016	Australia	To explore community-dwelling first-time stroke survivors and family caregivers' perceptions of being engaged in stroke rehabilitation.	An interpretive study design. Face-to-face using a semi-structured interview.	Twelve stroke patients and ten caregivers. Twelve males Ten females	Not identified.
Hartford, Lear and Nimmon, 2019	Canada	To gain insight into healthcare and social structures from the perspective of patients and caregivers that can better support long-term stroke recovery.	Qualitative descriptive design. Semi-structured interview.	A total of 24 participants were recruited: sixteen stroke survivors (female = five, male = eleven, aged 48–87), four spouses,	Mean of 8.74 years since stroke.

				(females aged 62–80), three stroke recovery group coordinators (female), and one speech pathologist (female).	
Nordin <i>et al.</i> , 2014	Malaysia	To explore the perception of rehabilitation professionals and people with stroke towards long-term stroke rehabilitation services and potential approaches to enable provision of these services.	Qualitative study using focus groups.	Total of 23: Fifteen rehabilitation professionals. Eight stroke survivors. Fourteen females Nine males	Patients had stroke from 1 to 2 years.
Abrahamson and Wilson, 2019	UK	This study explored needs identified by patients, how they were addressed by the six-month review (6MR), and whether or not policy aspirations for the review were substantiated by the data.	Philosophy: critical realism. Design: multiple case study design. Methods: interviews.	Forty-six patients and twenty-eight professionals. Gender was not provided.	Patients and carers were interviewed at about six weeks post-discharge after their 6MR and, where possible, after their annual review.

Table 3. 4: Characteristics of studies.

Authors	Findings
Lui and Mackenzie, 1999	Five themes: informational needs; psychological needs; physical needs; social needs; spiritual needs.
Davoody <i>et al.</i> , 2016	Five themes: a holistic view of the care process; understanding the illness; collaboration with care providers; tracking the rehabilitation process; practical guidance through healthcare and community services.
Talbot <i>et al.</i> , 2004	Nutrition; body condition; personal care; communication; housing; mobility; responsibilities; interpersonal relationships including sexuality; community living; leisure activities; psychological; cognitive.
Harrison <i>et al.</i> , 2016	Two themes: minding the gap and psychological expertise.

Eames <i>et al.</i> , 2010	Three themes: limited availability and suitability of information; the hospital environment; patient and carer factors.
Shook and Stanton, 2016	Five themes: secondary prevention; rate of recovery; knowledge collection; transition to home; adherence to home programme.
Reed <i>et al.</i> , 2010	Three themes: creating a social self; provision of 'responsive services' in the community; informal support network.
White <i>et al.</i> , 2009	Three themes: knowledge about stroke; communication with the health system; influences on transition home.
Dalvandi <i>et al.</i> , 2010	Two themes: functional disturbance and lack of social support.
Sumathipala <i>et al.</i> , 2012	Environmental factors; support and relationships; products and technology; services, systems, and policies; attitude; personal factors; life experiences; social position; personal attitude.
Sadler <i>et al.</i> , 2014	Four themes: healthcare professional as expert; expectation of involvement in care; social capital; variations in economic capital.
Martinsen, Kirkevold and Sveen, 2015	Two themes: difficulties accessing health services and lack of tailored follow-up services.
Gard <i>et al.</i> , 2019	Two themes: requesting rehabilitation planning, healthcare information, and coordination and increased support in daily life would facilitate return to work.
Shipley <i>et al.</i> , 2020	Three themes: inadequately addressed psycho-emotional and cognitive needs after young stroke; isolation from lack of information and structured support; failure to deliver age-relevant patient-centred care.
Poulin <i>et al.</i> , 2019	Three themes: activities perceived to be beneficial in promoting cognitive health; continuity versus changes in participation post-stroke; factors influencing leisure participation.
Liddle <i>et al.</i> , 2009	Four themes: life without driving; key times of need; alternatives and other ways; carer support and assistance.
Jones <i>et al.</i> , 2008	Four themes: prevention; immediate care; early and continuing rehabilitation; transfer of care and long-term support.
Wiles <i>et al.</i> , 1998	Three themes: clinical information; practical information; information on continuing care and resources in the community.
Hare <i>et al.</i> , 2006	Three themes: psychological and emotional problems; information needs; contact with services.

Schmitz and Finkelstein, 2010	Seven themes: sense of loss and functional changes affect sexuality; relationship changes affect sexual functioning; difficult to talk about sex; little or no discussion of post-stroke sexuality by rehabilitation professionals; need to tailor education about sex to the individual/ couple; timing is key in presenting information about sex after stroke; provider rapport and competence is vital to discussing sexual issues.
Danzl <i>et al.</i> , 2016	Five themes: providers of education; receivers of education; content of education; delivery of education; timing of education.
Yeung <i>et al.</i> , 2015	Two themes: information and training needs of stroke survivors and caregivers change over time, and Chinese resources are needed across care environments.
Lamontagne <i>et al.</i> , 2019	Four themes: accessibility of care; appropriateness of care; expertise of the healthcare workers and continuity of care
Chen, Xiao and De Bellis, 2016	These themes: readiness to return home; coping with care transition; dealing with fragmented rehabilitation services and uncertainty about ongoing rehabilitation.
Hartford, Lear and Nimmon, 2019	Two themes: experiences of managing stroke and resources for support.
Nordin <i>et al.</i> , 2014	Four themes: the needs for continuity of care; beliefs about long-term rehabilitation; perceived barriers to long-term stroke rehabilitation; approaches to long-term rehabilitation.
Abrahamson and Wilson, 2019	Two themes: perceived needs for community stroke rehabilitation and perceived need for information, education, and support.

3.5.2. Themes

Two major themes related to the needs of stroke survivors emerged from the data. These included: (1) limited availability and suitability of information, (2) Adequacy of care and services.

Major Theme 1: Limited availability and suitability of information

This theme contained three subthemes including:

Subtheme 1: Information needs related to stroke pathology.

This includes stroke definition, symptoms, signs, causes, treatment, complication, and stroke recurrence.

The finding in this review revealed a lack of pre stroke information of stroke-risk factors and warning signs (Hare *et al.*, 2006; Jones *et al.*, 2008; White *et al.*, 2009; Yueng *et al.*, 2015). Poor pre stroke information leads to failure of participants to respond to their stroke symptoms (White *et al.*, 2009). Yueng *et al.* (2015) described educational resources can help stroke survivors and families learn about stroke including TV, radio, flyers, and newspapers.

I cannot understand what caused it to happen ... I did not know what a stroke was (White *et al.*, 2009, p. 85).

After stroke, detailed information on prevention of stroke recurrence was desired (Wiles *et al.*, 1998; Jones *et al.*, 2008; Abrahamson and Wilson, 2019; Gard *et al.*, 2019).

That [information] was fairly zero, actually! I would have liked more information about how to prevent another stroke and also ... any alarm signals (Abrahamson and Wilson, 2019, p. 5).

Subtheme 2: Information needs regarding stroke recovery.

Participants need information on stroke treatment including information related to emergency intervention, medication, medication side effects, treatment plan, recovery rate, recovery facilitators, and guidance on available health services.

Participants in the included studies explained that, during the immediate post-stroke phase, they needed a great deal of information regarding the subsequent course of action and details of those who can be contacted for help (Jones *et al.*, 2008; Danzl *et al.*, 2016).

“I would like to know what services were available, you know” (White *et al.*, 2009, p. 87).

Subtheme 3: The means of information delivery, including, a) the amount, b) relevance, c) time, d) format, and e) language of information.

a) Amount: One study revealed that healthcare professionals provided insufficient amount of information to stroke patients. Although some information is provided, it was often vague or lacked information specific to the nature of their health status (Eames *et al.*, 2010).

b) Relevance: In terms of information content, participants indicated that the standard information packs that they were given had limited relevance, with some patients being given information about acquired brain injuries or all-age stroke groups. Most participants reported a need to receive information that was more relevant to their age group and health diagnosis (Reed *et al.*, 2009; Eames *et al.*, 2010; Shipley *et al.*, 2020).

“didn’t have relevant brochures ... not a lot of detail” (Eames *et al.*, 2010, P. 72).

c) Timing: Participants expressed needs for receiving information multiple times across the continuum as information can be difficult to absorb immediately post-stroke due to the stroke

side effects, feeling overwhelmed, a chaotic environment, rehabilitation commitments, and memory deficiencies (Eames *et al.*, 2010; Abrahamson and Wilson, 2019; Liddle *et al.*, 2021).

“Participants described the need for multiple repetitions of education over time, across the continuum of care, and into the chronic phase of stroke” (Danzl *et al.*, 2016, p. 20).

d) Format: There was a need for different types of education resources, such as written information (pamphlets, brochures, and binders), verbal information using group discussion and guest speakers, and visual teaching using videos and technology. Verbal delivery was the favoured mode for information delivery as it was suggested as easy to remember (Danzl *et al.*, 2016).

e) Language: The information needs to be simple and presented clearly without using medical terms (Eames *et al.*, 2010). Further, stroke survivors expressed their needs to have access to their health records; patients wanted access to information post-discharge including the diagnosis, treatments, medications, lab results, referrals, appointments, and home visits (Davoody *et al.*, 2016).

‘I need to learn, sometimes on radio and television they have programs about stroke recovery. I listen and use the information. Some guidelines are very important and can help us to improve our life style after stroke’ (Dalvandi *et al.*, 2010, p. 251).

Subtheme 4: Challenges for information delivery

After accounting for the need to tailor information, further factors that influenced stroke patients’ experience of care were reported. These factors can be divided into patient factors and staff factors. Participants preferred healthcare providers who were proactive in their initiation of education. Participants did not seek information because they do not know what to ask, forgot to

ask, felt they did not need information, or assumed that information would be given to them (Eames *et al.*, 2010; Danzl *et al.*, 2016; Abrahamson and Wilson, 2019).

Poor health and stroke-related impairment also led patients not to seek information (Eames *et al.*, 2010). A lack of knowledge on behalf of staff and staff time constraints were the most reported barriers to deliver information (Eames *et al.*, 2010; Chen, Xiao and De Bellis, 2016; Davoody *et al.*, 2016; Harrison *et al.*, 2016).

“You were lucky to get a doctor to come and speak with [you]” (Eames *et al.*, 2010, p. 74)

“The doctors always said ... please feel free to ring up ... But it’s like all these things, you don’t know the questions to ask. You’ve no idea” (Abrahamson and Wilson, 2019, p. 5)

“The physicians here at the hospital did not agree with the stroke rehab physicians about when I was going to start working” (Gard *et al.*, 2019, p. 745).

Major Theme 2: Adequacy of care and services

Subtheme1: Rehabilitation experience: In order to return to motor activity as well as a better quality of life, rehabilitation is critical. Several patients indicated that they felt anxious and distressed about the therapy processes that they went through during rehabilitation. In general, they seemed to perceive that rehabilitation services were fragmented and disorganised (Chen, Xiao and De Bellis, 2016; Davoody *et al.*, 2016; Shipley *et al.*, 2020).

“They don’t really help you get back into life, do they? They just sort of, you have a stroke, you have physio and that’s it” (Sadler *et al.*, 2014, p. 1915).

Transition experience at discharge: It was found in the papers that the transition in care from hospital to home was poor, disorganised, and fragmented (White *et al.*, 2009; Shook *et al.*, 2015;

Chen, Xiao and De Bellis, 2016). Patients worried about coping, receiving support, and about whether they were ready to be discharged from the hospital (Jones *et al.*, 2008). To communicate their needs regarding education, patients needed to conduct a trial stay at home. This enabled them to resolve any issues, including with equipment (Shook and Stanton, 2016). In the study by Chen, Xiao and De Bellis, (2016), it was revealed that patients were exposed to a potential lack or breakdown of care as a result of ineffective handover among clinical providers/staff (Chen, Xiao and De Bellis, 2016). Patients feared that interrupted rehabilitation would thwart their recovery and stop them from becoming rehabilitated (Chen, Xiao and De Bellis, 2016).

“What they did was they sent me home a couple of weeks before time and they figured that ... I would realise, you know, exactly what I would need so and that’s why they did it” (Shook and Stanton, 2016, p. 283).

Participants had coping issues when transferred back into the community including physical restriction, cognitive issues, and feelings of abandonment and being a burden on others (Lui and Mackenzie, 1999; Dalvandi *et al.*, 2010; Chen, Xiao and De Bellis, 2016; Lamontagne *et al.*, 2019). Participants were frequently unsatisfied due to various unmet needs.

Subtheme 2: Intervention needs

It was reported that rehabilitation programmes need to be more frequent, intensive, long-term, and flexible to meet participants’ goals and be appropriate for their age and health situation.

Participants wanted return to work preparation, driving assessment, individualised sex intervention, and resources to support social participation.

“there’s no way [the] one hour a week that the government gives you is going to fix people” (Shiple *et al.*, 2020, p. 1701).

Further, there was a reported shortage in cognitive and psychological support. A lack of psychological support was reported in many of the papers (Lui and Mackenzie, 1999; Talbot *et al.*, 2004; Dalvandi *et al.*, 2010; Sadler *et al.*, 2014; Martinsen, Kirkevold and Sveen, 2015; Chen, Xiao and De Bellis, 2016; Harrison *et al.*, 2016; Gard *et al.*, 2019; Lamontagne *et al.*, 2019; Shipley *et al.*, 2020).

Participants expressed the need for early and formal cognitive support, with rehabilitation not solely being focused on physical performance. In Harrison *et al.*'s (2016) study, participants commented that a lack of formal psychological support early on could influence how much patients are rehabilitated and consequently recover.

“it should have been a formal process to gain access to a psychologist” and it would have been beneficial from an earlier time point, such as from the acute hospital” (Shipley *et al.*, 2020, p. 1700).

Subtheme 3: Social needs

Most stroke survivors indicated that they had unmet social needs. Specific social needs after discharge included a) motivation, b) income support, and c) travel support.

a) Motivation: Several participants asserted that they looked for hope in their situations. They also highlighted the need for more positive discourse from healthcare professionals to help them recover as much as possible (Dalvandi *et al.*, 2010; Martinsen, Kirkevold and Sveen, 2015; Hartford, Lear and Nimmon, 2019; Shipley *et al.*, 2020; Liddle *et al.*, 2021). Many participants explained that, as their stroke became chronic, their motivation to carry out their previously learned exercises at home decreased (Nordin *et al.*, 2014).

“Initially, I was motivated. After several months, I don’t feel that excited anymore” (Nordin *et al.*, 2014, p. 6).

a.1) Family support: A key part was played by participants’ families, who participated in caring roles, rehabilitation, and advocacy for improved services (Reed *et al.*, 2009). Carer training was one of the most reported needs (Wiles *et al.*, 1998; Nordin *et al.*, 2014; Chen, Xiao and De Bellis, 2016). However, difficulty identifying the main carer and being busy with their lives were barriers to caregivers’ training (Nordin *et al.*, 2014).

“it was almost like [being] throwing in the deep end. I’ve never showered anyone in my life before ... we just sort of muddled through ... maybe like when you’re leaving rehab inpatient, someone probably should go through with the partner of the person about showering, medications” (Chen, Xiao and De Bellis, 2016, p. 78).

a.2) Peer support: Stroke survivors stated that stroke recovery groups were an important factor for stroke recovery. Peer groups helped with psychological and emotional factors by having someone to talk to, sharing, understanding, learning from each other, and setting goals (Hartford, Lear and Nimmon, 2019; Shipley *et al.*, 2020). In spite of the advantages offered to patients by stroke recovery groups, survivors found that they had trouble accessing such groups after they had been discharged (Hartford, Lear and Nimmon, 2019). There are specific needs regarding stroke peer groups including age relevance and peers with similar conditions and interests.

“I wish that there would be a therapy group for people who are in the same situation... how we can help each other; what kind of demands can I make at work. I would be open to that after 4 months, when I have come to terms with my situation a bit and it would’ve been OK to share it with others” (Gard *et al.*, 2019, p. 744).

b) Income support: Many stroke patients lacked stability as a result of poor support from insurance or a lack of financial help (Dalvandi *et al.*, 2010). The reported financial needs were divided into two. In terms of health insurance, stroke rehabilitation costs are high and not all patients were able to pay for the stroke rehabilitation aspects that they felt were required (Hartford, Lear and Nimmon, 2019). In addition, stroke survivors had financial needs in terms of mobility aids and house adaptations (wheelchairs, scooters, walking sticks, and frames).

“Definitely, one of the most important necessities for every human being in the world is social insurance that supports people with stroke so they have a stable community” (Dalvandi *et al.*, 2010, p. 251).

c) Travel support: Another important issue highlighted by participants was a lack of transport; survivors lacked access to public transport to different locations or experienced long waiting times for public transport and often the seats were full (Liddle *et al.*, 2021). Alternative transport options were found to be inconvenient due to high costs. Of those with their own transport, there were few parking spots at hospitals and the disabled spaces were often full (Nordin *et al.*, 2014; Liddle *et al.*, 2021).

“Often the seats on trains and buses were full, disabled parking spots were often taken and that there was increased waiting time associated with public transport” (Liddle *et al.*, 2021, p. 277).

Subtheme 4: Planning

Patients reported needing a clear treatment plan. These plans need to be individualised and relevant to their age and personal history. Further, participants want to be involved in planning and setting goals.

“It would have been good to get a plan earlier. To receive [a rehabilitation] contact earlier”

(Gard *et al.*, 2019, p. 744).

Subtheme 5: Care continuity

a) Ongoing care: One of the most reported needs was continuity of care—participants expected care to be continued post-discharge. However, long waits for rehabilitation to commence post-discharge were reported in a number of the studies (Hare *et al.*, 2006; Reed *et al.*, 2009; Dalvandi *et al.*, 2010; Sumathipala *et al.*, 2012; Nordin *et al.*, 2014; Sadler *et al.*, 2014; Martinsen, Kirkevold and Sveen, 2015; Chen, Xiao and De Bellis, 2016; Davoody *et al.*, 2016; Abrahamson and Wilson 2019; Lamontagne *et al.*, 2019; Shipley *et al.*, 2020). A primary barrier to continued care was seen as the inadequacy or lack of equipment/preparedness in rehabilitation wards and community rehabilitation (Nordin *et al.*, 2014).

“It’s a long time to wait before they came round, I wanted to get moving because the physio was so good in hospital ... but then when you come home there’s nothing ... I wanted to just get going and build on what I was doing in the hospital” (Abrahamson and Wilson, 2019, p. 3).

b) Follow-up: Post-discharge follow-up was one of the most reported needs. Patients needed follow-up services to have feedback on their progress, to be closely assessed, and receive guidance on performing activities appropriately and safely (Martinsen, Kirkevold and Sveen, 2015; Poulin *et al.*, 2019). Although some participants received follow-up services, the quality of the follow-up was not as expected; some regular meetings did not occur, there was a delay in replying, questions were not being addressed due to lack of expertise, and the follow-up was not tailored to their specific needs (Martinsen, Kirkevold and Sveen, 2015).

c) Communication: Stroke survivors have difficulty in contacting healthcare professionals to obtain support. Participants felt it would benefit their rehabilitation outside of the hospital setting if they had a coordinator they could discuss services and concerns with (Chen, Xiao and De Bellis, 2016). In addition, there was a need for trained healthcare professionals to deliver their diagnoses in a sensitive manner, as well as perform psychological assessments, sex assessments, and active listening, and respect the patients and their word choices. There was a lack of congruity between different healthcare actors (White *et al.*, 2009; Gard *et al.*, 2019).

“You should get some kind of contact person... someone who calls and checks on you “how is it now, are you experiencing any problems?” could refer you to, well, here or there” (Gard *et al.*, 2019, p. 744).

“No automatic follow up on what I am doing. That’s the biggest problem. You’ve got to have some input...There is no follow up unless you do it yourself” (Chen, Xiao and De Bellis, 2016, p. 80).

Subtheme 6: Needs of younger patients and carers:

a) Younger patients’ needs: the needs of patients who were younger (40yrs-50yrs range) and patients’ carers overlapped in many aspects with the overall population of focus in these studies. However, these needs have been separated out in this analysis to highlight key issues and gaps pertinent to these groups to maintain authentic reporting and support future work specific to these groups.

Regarding younger participants’ rehabilitation needs, three studies (Sadler *et al.*, 2014; Martinsen, Kirkevold and Sveen, 2015; Shipley *et al.*, 2020) recruited younger participants (mean

ages 46, 48, and 41). In these three studies, participants express needs for psychological and emotional support, care continuity, return to work, and follow-up. Younger stroke survivors found rehabilitation care irrelevant to their individual goals and to be generic, fragmented, and designed for old patients (Shiple *et al.*, 2020). Those participating in the study indicated the requirement for rehabilitation services that were age-relevant. In addition, some participants were not able to receive outpatient rehabilitation because their deficits were mild, or the majority of participants had to wait three to six months for an outpatient clinic appointment (Shiple *et al.*, 2020).

“they just treated me like I was 70 years old but I’m actually 35” and “it’s like they put you into a box; you had a stroke, so this is how we deal with people that had a stroke” (Shiple *et al.*, 2020, p. 1701).

b) Carer needs

Three studies (Talbot *et al.*, 2004; Shook and Stanton, 2016; Lamontagne *et al.*, 2019) separated the needs for patients and carers. Although strokes have an impact on caregivers’ personal lives, they had difficulty in expressing their needs (Lamontagne *et al.*, 2019). Most carer needs were equivalent to patients’ needs. However, training courses and psychological support were needs repeated by carers.

Table 3. 5: CERQual assessment.

Review finding			CERQual Confidence	Explanation of CERQual assessment.
Limited availability and suitability of information	Needs for information on stroke pathology	Pre stroke information	High confidence	12 studies contribute to this theme. No concern about coherence and adequacy of studies, moderate methodological limitations of 5 studies, moderate relevance. Studies largely contribute to this theme with good details have minor to moderate methodological limitations. There is a clear need for education on stroke in previous reviews.
		After stroke information		
	Needs for information on stroke recovery	Need for information on stroke rehabilitation	High confidence	13 studies contribute to this theme. No concern about coherence and adequacy. Minor methodological limitation and moderate relevance. Studies largely contribute to this theme with good details have minor to moderate methodological limitations.
		The need for guidance on health services	Moderate	14 studies contribute to this theme. No concern about coherence. Moderate concern about adequacy. Moderate methodological limitation and moderate relevance. Studies largely contribute to this theme with good details have moderate methodological limitations and only three studies have sufficient details.
	Adequate information delivery	Amount	Moderate	6 studies contribute to this theme. Minor concern about coherence. Moderate concern about adequacy. Minor methodological limitation and moderate relevance. Number of studies contribute to this finding are not many and only one study had moderate details.
		Relevance	Low confidence	4 studies contribute to this theme. Minor concern about coherence. Major concern about adequacy due to that number of studies contribute to this theme are not many and only one study with sufficient details. Moderate methodological limitation and moderate relevance.
		Time	Moderate	6 studies contribute to this theme. Minor concern about coherence. Minor concern about adequacy. Moderate methodological limitation and moderate relevance. There was a clear need for repeating information across continuum in previous literature. However, studies contributed to this theme are not many and without sufficient details.
		format	High confidence	9 studies contribute to this theme. No concern about coherence. Minor concern about adequacy. Very minor concern about methodological limitation and moderate

				relevance. There are sufficient number of studies supports this finding with low methodological limitation and sufficient details.	
Adequate care and services	Intervention needs	Programme Intensity		Low	4 studies contribute to this theme. Minor concern about coherence. Moderate concern about adequacy. Moderate methodological limitation and moderate relevance. Number of studies contribute to this theme are not many and only one study had sufficient details on this theme.
		Return to work		Low	4 studies contribute to this theme. Minor concern about coherence. Major concern about adequacy due to only one study had sufficient details and the number of contributing studies is not many. Moderate methodological limitation and moderate relevance.
		Driving rehabilitation		Low	1 study contributed to this theme. Minor about coherence. Major concern about adequacy and moderate relevance. Study contributed to this finding had minor methodological limitations. Although study contributed to this theme had very good details, there was no other studies supporting this theme.
		Sex rehabilitation		Low	2 studies contribute to this theme. Minor about coherence. Major about adequacy and moderate relevance. Studies contribute to this finding had moderate methodological limitations. Only one study with sufficient details contribute to this finding.
		Leisure activities		Low	1 study contributed to this theme. Minor about coherence. Major concern about adequacy and moderate relevance. Study contributed to this finding had minor methodological limitations. Although study contributed to this theme had very good details, there was no other studies supporting this theme.
		Psychological support.		High confidence	8 studies contribute to this theme. No concern about coherence. Minor concern about adequacy and moderate relevance. Studies with good details contribute to this finding had moderate methodological limitations. There was a clear need for psychological support in previous reviews and retrieved studies.
	Social needs	motivati on	Peer support	Moderate	5 studies contribute to this theme. No concern about coherence. Major concern about adequacy and moderate relevance. Studies with good details contribute to this finding had minor to moderate methodological limitations. However, only two studies had sufficient details.

			Family support	High confidence	7 studies contribute to this theme. No concern about coherence. Minor concern about adequacy and moderate relevance. Studies contribute to this finding had minor methodological limitations.
		Income support		High confidence	8 studies contribute to this theme. Minor concern about coherence. Minor concern about adequacy and moderate relevance. Studies contribute to this finding had minor methodological limitations.
		Travel support		High confidence	6 studies contribute to this theme. Minor concern about coherence. Minor concern about adequacy and moderate relevance. Studies contribute to this finding had minor methodological limitations.
	Engagement in goal-setting	Clear plan		Low	5 studies contribute to this theme. Minor concern about coherence. Major concern about adequacy and moderate relevance. Studies contribute to this finding had minor methodological limitations. None of the studies provided sufficient details regarding this theme.
		Individualised plan		Low	6 studies contribute to this theme. Minor concern about coherence. Major concern about adequacy and moderate relevance. Studies contribute to this finding had minor methodological limitations. Only one study had sufficient details and were explored young stroke patients' unmet needs.
	Care continuity	Ongoing care		High confidence	9 studies contribute to this theme. Minor concern about coherence. Minor concern about adequacy and moderate relevance. Studies with sufficient details contribute to this finding had very minor methodological limitations and there was a clear need for ongoing care in previous reviews.
		Follow up services		High confidence	7 studies contribute to this theme. No concern about coherence. Moderate concern about adequacy and moderate relevance. Studies contribute to this finding had minor methodological limitations. However, the need for follow up services were clear by participants in retrieved studies and in literature.
		Communication	Contact with health services	High confidence	7 studies contribute to this theme. No concern about coherence. Minor concern about adequacy and moderate relevance. Studies contribute to this finding had minor methodological limitations. Studies supporting this theme had sufficient details.
			Coordinator	Low	5 studies contribute to this theme. Moderate concern about coherence. Major concern about adequacy. Very minor methodological limitation and moderate

					relevance. Studies supporting this theme were not many, all of the studies did not have sufficient details.
			Trained professionals	Moderate	8 studies contribute to this theme. Moderate concern about coherence. Minor concern about adequacy. Moderate methodological limitation and moderate relevance.

3.6. Discussion

In order to enhance post-stroke care, many researchers have turned their attention towards understanding the needs of stroke survivors and caregivers mostly in the western countries. Thus, the key objective of this review was to investigate the unmet needs of stroke survivors after discharge from the hospital. Throughout this review, two key themes emerged: (1) limited availability and suitability of information; (2) adequacy of care and services.

The findings of the present review indicate that stroke survivors have a number of diverse educational needs, and many of these needs are currently being unmet. The findings are very much in line with those revealed in Hafsteinsdóttir *et al.*'s (2011) study. Patients who have suffered a stroke must be educated carefully because strokes can cause ischaemic injuries that have a significant impact on learning. A Cochrane review suggested that active information delivery enhances stroke survivors' understanding of their condition and available services, while moderately improving satisfaction, anxiety, depression, and quality of life (Crocker *et al.*, 2021). Moreover, the importance of presenting information in an appropriate way is well-recognised in the literature (Eames *et al.*, 2010). The results of our review indicate that combining different methods of patient education can be very effective. In the review, participants highlighted the importance of obtaining information both verbally and in written form. Written teaching methods were found to be a beneficial resource for stroke patients during the chronic stroke phase (Danzl *et al.*, 2016). If the patient identifies their favourable learning styles, professionals can educate them in a suitable manner. They can also supplement this by incorporating other types of educational materials such as online resources.

Education is paramount in ensuring effective communication. In the present study, participants reported difficulty in finding channels to contact the health services to acquire relevant information on how to manage their lives after suffering a stroke (Martinsen, Kirkevold and Sveen, 2015). The participants highlighted dissatisfaction with healthcare providers' communication skills in terms of clarity and effectiveness. Such communication issues can cause patients to feel uncertain and anxious. To address this, Smith *et al.* (2008) recommend that patients and caregivers should be actively involved in the care process and should be given sufficient opportunities and follow-up to provide feedback and clarify information. Additionally, the findings indicated that long-term services, such as monitoring, assessment, and therapy, are required to improve the patients' physical and psychosocial functioning. Martinsen, Kirkevold and Sveen (2015) thus suggest that follow-up services should be intensified and adapted to suit the needs of the individual patient. Moreover, as health services for stroke patients continue to be developed around the world, information and communication technology and mobile technologies can be used to create suitable eHealth services that can ensure that patients' care and rehabilitation needs are met (Davoody *et al.*, 2016).

Long-term care is generally considered to be more fragmented than acute stroke care (Party, 2012). Several participants have explained that, although rehabilitation services should address physical impairments, psychosocial, and social participation needs, they generally only address biomedical needs for a limited period of time (Sadler *et al.*, 2014). A lack of healthcare resources was identified by participants as a key issue impacting the discontinuity of therapy (Nordin *et al.*, 2014). Most participants reported that, when returning to life in the community, they found it difficult to access services, including rehabilitation services. They, thus, indicated feeling a sense of abandonment (Lamontagne *et al.*, 2019). Moreover, a lack of staff was highlighted as a key factor influencing the lack of long-term care and

rehabilitation options for stroke patients; the intensity of therapy programmes is directly affected by staff shortages. Moreover, the amount of time that a therapist spends with each patient ultimately determines the outcome of stroke rehabilitation. Telerehabilitation may be an alternative for stroke survivors who want to continue treatment and improve their quality of life (Huijbregts, McEwen and Taylor, 2009). Furthermore, self- management treatments, which differ from simple patient education or skills training because they are designed to motivate those with chronic conditions to take an active role in their own health management (Foster *et al.*, 2007), can be employed. Specialised training courses for formal and informal carers are also required to enable stroke survivors and their relatives to live a healthy life (Dalvandi *et al.*, 2010). In this study, stroke recovery groups in the community were identified as important and equitable resources as they give stroke survivors an opportunity to create new social networks and participate in learning, educational, and therapeutic activities (Hartford, Lear and Nimmon, 2019).

3.7. Study limitations

It is important to note that this systematic review has a number of limitations. Firstly, it is a qualitative review that generates issues such as limited transferability. This is because most studies in the review were conducted in developed countries. Thus, it is incredibly difficult to transfer the findings to developing countries or countries with a non-Western culture. There is a lack of research that has examined the unmet needs of stroke patients in Asia which contributes to poor awareness regarding the needs of stroke patients beyond hospital settings in general, as well as poor care provisions post-discharge. Additionally, the incidence of strokes is very different between developed and developing countries, and they have different healthcare systems, policies, and challenges when it comes to stroke care provision; thus, the

extent of reported unmet needs may differ substantially. Nevertheless, a wide range of stroke patients' needs were shared across developing and developed countries, such as information needs. In addition, the review was not able to determine how the unmet needs are affected by various levels of physical, intellectual, and personality defects. Research is needed that takes on critical stances to reveal important social, educational, ethnic, and culturally sensitive information that will improve the ability to transfer these findings to different groups of people. Hence excluding non-English papers due to lack of translating facilities is a key limitation. This is especially important since socioeconomic and cultural factors influence the outcomes and, hence, the unmet needs of stroke patients.

Strokes affect patients and caregivers differently; these stakeholders may thus have different needs. It is also important to consider the fact that caregivers are commonly constantly involved in caring for stroke patients and thus can provide unique perspectives. Despite the importance of caregivers' perspectives, however, their perceptions were not considered in the initial search in order to retain focus. Nevertheless, key findings from included papers on this aspect were analysed and presented to maintain integrity of reporting and to guide future research focused on this group. Another limitation of this review is the exclusion of studies examining stroke patients' needs as seen from healthcare professionals' perspectives. Excluding these viewpoints may have limited the development of comprehensive understanding of stroke patients' unmet needs. Studies that were not published in English were also excluded from the review, potentially limiting its scope. In terms of methodological quality, studies being graded as weaker methodologically, were not included; however, this might have resulted in the loss of valuable insights from individuals' unique perspectives.

3.8. Implication for practice

To ensure that education is sufficient and effective, healthcare workers must provide patients with relevant information on a regular basis. To achieve this, several different methods of patient education can be combined. It is also important that stroke patients are assigned a contact person who can help them to locate important information and resources, as well as answer their practical questions and concerns. Medical professionals must provide stroke survivors with discharge plans including follow-up appointments. Ideally, these follow-ups should initially take place six weeks after the discharge and then at the six-month stage. From then on, a yearly follow-up is sufficient (Stroke Association, 2019). Moreover, it is also recommended that a system for annual reviews be developed to enable changing needs to be identified and addressed. Stroke survivors and caregivers can also be given specialised training courses to promote care continuity. The data revealed in this study indicate that patients require more psychological support during the care process.

3.9. Conclusions

In this review, the needs and desires of stroke patients have been examined. The findings have indicated that the long-term needs of such patients are not being fully met at present. Moreover, the findings show that existing care plans for stroke survivors do not address the long-term needs of stroke survivors. Thus, continuous treatment and therapies are required as well as specially designed programmes that meet the long-term needs of stroke survivors. However, only three studies were included in this review, all of which were carried out in Asia and, thus, it is important to explore the topic in other continents and other settings in order to fully understand the issue at hand. The next chapter will explore stroke patients' needs after their discharge from rehabilitation centres in SA.

Chapter 4: Exploring the Needs of Stroke Patients after Discharge from Rehabilitation Centres in Saudi Arabian Communities: an IPA Qualitative Exploratory Study Design.

Publication

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(Appendix 2).

Conferences

Temehy, B. Soundy, A. Sahely, A. Palejwala, Y. Heath, J. and Rosewilliam, S. (2023).

Exploring the needs of stroke patients after discharge from rehabilitation centres in Saudi Arabian communities: An IPA qualitative exploratory study design. Wales stroke conference 2023, Cardiff, UK, (Presentation).

Temehy, B. Soundy, A. Sahely, A. Palejwala, Y. Heath, J. and Rosewilliam, S. (2023).

Exploring the needs of stroke patients after discharge from rehabilitation centres in Saudi Arabian communities: An IPA qualitative exploratory study design. 8th World Physiotherapy Congress. 2023, Paris, France (Presentation).

Temehy, B. Soundy, A. Sahely, A. Palejwala, Y. Heath, J. and Rosewilliam, S. (2023).

Exploring the needs of stroke patients after discharge from rehabilitation centres in Saudi Arabian communities: An IPA qualitative exploratory study design. CSP annual conference 2023, Birmingham, UK, (Poster).

Temehy, B. Soundy, A. Sahely, A. Palejwala, Y. Heath, J. and Rosewilliam, S. (2023).
Exploring the needs of stroke patients after discharge from rehabilitation centres in Saudi
Arabian communities: An IPA qualitative exploratory study design. UK stroke forum 2023,
Birmingham, UK, (Poster).

4.1. Overview of the chapter

This chapter consists of a previously published paper (Temehy *et al.*, 2023) with some modifications made to meet the purpose of this thesis. The chapter begins with an introduction, followed by the aim and objectives of the study, methodology, how studies were analysed, the findings, discussion and conclusion.

4.2. Introduction

Exploring the needs of patients in SA is vital and was previously discussed in detail (Chapter 1). Studies on patients with stroke needs from a global perspective have been explored (Chapter 3). However, these studies' findings may not be applicable to the context of SA due to cultural, political, and social differences. Assessing stroke patients' needs in SA is essential to (1) recognise the success and limitations of the current stroke rehabilitation practice, and (2) develop relevant interventions.

When patients return to the community after hospital-based rehabilitation, challenges arise, with patients still having several requirements that need to be met. Further, health resources available throughout the rehabilitation process are less accessible, particularly in SA, where community-based rehabilitation is lacking (Ullah *et al.*, 2021). Thus, patients may develop their own adaptation strategies. Identifying these patterns of coping enables practitioners to provide the best possible support to patients. Furthermore, understanding stroke patients' needs will provide adequate preparation for patients and caregivers to cope in the community. During the transition period from hospital to home, patients and their families need to be

prepared for life after discharge via appropriate intervention to reduce associated burdens and prepare them for successful reintegration into the community (Perry and Middleton, 2011).

A thorough search of the literature yielded only one prior study evaluating the needs of Saudi Arabian patients undergoing rehabilitation (Alqahtani, 2015). A survey was utilised to assess the needs of 280 neurological patients in inpatient and outpatient clinics who had experienced stroke (37.1%), spinal cord injury or brain injury. The survey did not acknowledge the needs post-discharge. The survey did not reflect the lived experiences, and the depth and breadth of the research into actual needs were limited. To the best of the authors' knowledge, no research has considered the experience of stroke survivors in SA to explore their unmet needs in a holistic manner, which requires an in-depth data collection method. The present study will be the first step in developing an understanding of patients' needs and service measures to support patients after discharge, leading to future long-term rehabilitation/support services in SA.

4.3. Study aim

The current study aims to identify problems that impact stroke survivors' adaptation to daily life in the community after discharge from hospital, the factors that influence their adaptation and patients' needs after their discharge from rehabilitation services.

4.4. Methodology

4.4.1. Study design

The present study adopted an IPA qualitative exploratory study design (Smith and Osborn, 2008). IPA is a qualitative approach that investigates how individuals make sense of their life experiences (Smith, Langenhove and Harre, 1995). Phenomenology was identified as appropriate since it deals with the interpretation of individual lived experiences. Given the aim of the study and the focus on to exploring patients' experiences after a stroke. Further consideration to other approaches was not undertaken. For instance, alternative methodologies were not considered like Ethnography focuses on observing shared beliefs and behaviours within a certain culture or Grounded Theory aims to elucidate social processes and develop a theory. IPA is philosophically positioned as a minimal hermeneutic realist (Smith, 1996). This suggests that an external reality exists, but one must access it through an individual's personal world. Standards for reporting qualitative research was followed (O'Brien *et al.*, 2014). Ethical approvals to conduct this study was provided in (Appendix 6).

4.4.2. Participants

Participants were recruited if they met the following criteria: (a) were adults (> 18 years of age) who had experienced a stroke (ischaemic strokes and haemorrhagic strokes), (b) had been discharged from the hospitals within the past three years to minimise recall bias and to be relevant to current practice and (c) had completed their rehabilitation sessions in an outpatient clinic. Patients were excluded if they had (a) cognitive disorders (screened using Mini-Mental Status Examination (MMSE) ≥ 24 (Cockrell and Folstein, 2002; Lee *et al.*, 2011). (b) language/communication deficits (identified by a clinician who referred patients to

the PI, BT) or (c) lived in nursing homes and have paid caregivers who helped with their functional activities.

4.4.3. Sampling

The study adopted purposive stratified sampling. This non-random sampling method allows researchers to choose individuals with a deep understanding of the issue and who can provide the richest information and insights (Etikan, Musa and Alkassim, 2016). Stratification of samples was based on age as it has been identified that patients in working age have different needs compared to patients who are older (Davoody *et al.*, 2016). Hence two groups were aimed for during data collection. Working age adults was between 18 to 65 years and older patient group was above 65 to 99 years.

4.4.4. Procedure

Patients who were previously admitted to hospitals were identified based on the eligibility criteria by two rehabilitation specialists from the hospitals' existing database of patients. Both professionals approached patients who met the inclusion criteria via phone or email to determine interest. The interested individuals' contact details were passed on to the PI (BT), who is a registered therapist in SA. Individuals who expressed interest received participant information from the PI. The researcher gave them 48 hours to consider participation and offered them an opportunity to ask questions. Individuals who agreed to participate were asked to provide written informed consent in Arabic online. Consents were signed and sent by email or WhatsApp by participants or their relatives.

4.4.5. Data collection

A semi-structured interview was used (Biggerstaff and Thompson, 2008). The interviews explored patients' feelings, knowledge, values and beliefs about their lives post-discharge, starting with simple questions before progressing to in-depth ones. An interview guide was created based on similar studies (Chen, Xiao, and De Bellis, 2016; Reed *et al.*, 2010) (Appendix 12). The questions covered the interviewee's life poststroke, support received after discharge, any issues and concerns that reduced their ability to cope, their needs, the type of support offered to manage these needs and any suggestions to improve the quality of the services provided.

Data to define participants' characteristics such as type of stroke, age, gender, time since stroke, functional ability (Rivermead Mobility Index (RMI) (Collen *et al.*, 1991)), Barthel Index (BI) (Mahoney and Barthel, 1965), Stroke Specific Quality of Life Measure (SSQoL) (Williams *et al.*, 1999), and MMSE (Cockrell and Folstein, 2002) were collected on Zoom before conducting the interview.

The interview guide was translated into Arabic by authorised services and was then reviewed and revised by the authors. The questions were tested on one patient who was accompanied by the caregiver and four of the study's authors via Zoom. The cognitive interview was undertaken to test potential issues in the interview questions (Blair and Brick, 2010). The patient was asked to tell us his understanding of the question and to think aloud to analyse his answer and if it was related to the question. Some questions were found to have similar answers, while others were not understandable. Hence, questions were modified following this step. Furthermore, to test the applicability of this schedule, a pilot interview was conducted. The pilot interview demonstrated that it would take over 30 minutes to complete and would likely fall within the current recommendations of between 45 and 60 minutes

(Dalvandi *et al.*, 2010). Nondirect probing, such as tell me more, keep talking and can you say more about that, was added to obtain in-depth information. The pilot data was not included in final analysis due to the changes made to the interview guide.

The interviews were in Arabic, which is the mother tongue of both the PI and interviewees. Patients were invited to choose their preferred time and place to undertake the interview, such as face to face in their homes, in the hospital or via Phone/Zoom. The participants were assured of anonymity and confidentiality to ensure ethical rigour (Wiles *et al.*, 2006). The study used pseudonyms and removed any identifiable information, such as the participant's name, profession and organisation, to ensure anonymity and confidentiality. In addition, the subjects were informed of their right to ask questions and to take a break whenever they needed one. The data were recorded using Zoom and digital recorders with their permission and transcribed verbatim to minimise the risk of losing data. After each interview, the first author (BT) transcribed the audio tape verbatim. The transcripts were sent to an official translation service to be translated into English. All English transcripts were checked by the PI against the Arabic version to ensure that the translations reflected Arabic meanings; the meaning of the spoken language phrases in the translated transcripts was checked to see if they reflected the original spoken language (Trivedi, 2017).

4.4.6. Sample size

The sample size aimed to achieve data saturation and richness of data as is the strategy for qualitative studies (Fusch and Ness, 2015). Previous IPA studies found saturation after as few as 12 interviews (Turner, Barlow and Ilbery, 2002), while others were between 1 and 30 up to 48 individuals (Brocki and Wearden, 2006). However, in the present study, the saturation occurred at 19 interviews. Code saturation was achieved when the researcher found all data

from the interviews fit into previously identified code. No new descriptive codes were evolving at this point. However, to establish meaning saturation (ensure all dimensions or understanding of the described code is captured) it was suggested that 16 to 24 interviews were required (Braun and Clarke, 2021). Thus, an additional five interviews were conducted.

4.4.7. Analysis

Data were analysed using the IPA analysis tool of qualitative studies (Smith and Osborn, 2008). The interviews were read multiple times while listening to audio recordings to create initial notes. The analysis involved writing initial notes about the participants' sense of person and language used. Exploratory comments involving descriptive, linguistic and conceptual comments were used to create the initial notes. The next step was to code each interview transcript using line-by-line coding about the participants' context and stance. Then, we established relationships between the clusters of the different interviews one at a time. Specific methods were used to look for patterns and connections between themes (Smith and Osborn, 2008). Abstraction is one way in which the cluster is developed by grouping similar codes and then developing a new name. These clusters were added to the main analysis table (master table), which was summarised under themes. The themes were well defined, and the clusters within were checked for appropriateness to fit within these themes. Themes were triangulated between different participants. An example of the coding can be seen in (Appendix 13).

4.4.8. Rigour and trustworthiness

All interviews were conducted by the PI (BT), a registered physiotherapist in SA who had no prior relationship with the interviewees. Investigator triangulation took place: three independent analysts coded five interviews, and their interpretation codes were compared with the main analyst's coding/interpretation. Once the themes had been developed, the master table was presented to senior researchers for peer examination. The senior researchers refined the wording of the themes and checked for fit between codes and clusters. Furthermore, one interview transcript was checked by a participant (member checking) for accuracy. The logical flow of questions was shown to be adequate, so further interview transcripts were not shared with other participants. A summary of each interview thought/interpretation was made by the researcher. This helped to look for data saturation or additional guiding questions as the data collection progressed. To improve transferability, the context and characteristics of participants are described elaborately. The papers follow the guidelines outlined in the Standards for Reporting Qualitative Research (SRQR) to present the findings. Further, a completed COREQ checklist is attached in (Appendix 14).

4.5. Results

4.5.1. Description of participants

There were 24 participants recruited from two hospitals in the SA, 10 participants from site 1 (male = 7; Females = 3) and 14 from site 2 (male = 8; Females = 6). The age range of the participants was 29 to 75 years, and the time since their stroke varied from 7 months to 11 years (see details in Table 4.1). The interviews took place between October 2021 and January 2022 online via Zoom. Only one participant expressed willingness towards conducting an in-person meeting; however, this intent could not be carried out due to some constraints, leading

to the adoption of an online format for the interview. Other participants expressed a preference for Zoom interviews. The interview time ranged from 21 to 49 minutes. Caregivers assisted in the process of arranging the interview if the participants were not able to join. Caregivers were present for 10 interviews and offered responses in two interviews but if their responses were not clarification of what the patient had vocalised this data was not included in analysis. In this work, caregivers primarily acted as facilitators to help bridge communication gaps and enhance information exchange between the researcher and participants. Their presence was valuable, as they helped clarify information, provided additional context for prior healthcare experiences, and supported participants in articulating their thoughts more fully. Further, the dynamic of discussions was necessarily influenced by caregiver presence, with some participants looking to their caregivers for verification of details or elaboration of their experiences.

Table 4. 1: Participants' characteristics.

Participants	Gender	Age	Time post-stroke	Type of stroke	RMI	BI	SSQoL	Work
1	M	43	1 year	Ischemic	7	90	92	No
2	M	53	1 year	Ischemic	2	50	88	Nurse on sick leave
3	F	51	1 Y, 2 M	Ischemic	8	70	132	Unemployed after stroke
4	F	70	1 year	Ischemic	2	30	126	Unemployed
5	M	48	10 years	Not identified	13	65	150	Unemployed
6	M	65	9 months	Ischemic	14	95	205	Doctor changed to less intense role
7	M	56	1 year	Ischemic	12	75	211	Unemployed after stroke
8	M	74	9 months	Ischemic	10	75	173	Unemployed
9	F	72	11 years	Haemorrhagic	1	10	89	Unemployed
10	F	50	1 year	Ischemic	5	100	134	No
11	F	42	3 years	Haemorrhagic	2	20	104	Teacher has asked for retirement
12	M	54	2 years	Ischemic	13	100	229	No
13	F	64	2 Y, 6 M	Ischemic	13	100	196	No

14	M	63	3 years	Hemorrhagic	14	95	221	No
15	M	62	7 months	Hemorrhagic	6	80	182	Hospital administration, has retired
16	M	65	1 year	ischemic	7	50	143	Retired
17	F	59	7 months	ischemic	12	85	153	Unemployed
18	M	56	7 months	Ischemic	8	90	143	Private sector, on sick leave
19	F	29	8 months	Ischemic	15	100	230	Unemployed
20	M	55	1 Y, 2 M	ischemic	3	55	101	Unemployed
21	M	62	9 months	Hemorrhagic	11	70	141	Unemployed
22	M	41	9 months	Hemorrhagic	11	95	144	Private sector, on sick leave
23	M	51	1 year	Ischemic	15	100	237	Private sector
24	F	56	1 Y, 6 M	Hemorrhagic	0	0	59	Unemployed

The data revealed three themes: 1) therapy experience, 2) coping poststroke and 3) the need for adequate services. A summary of the themes can be seen in Table 4.2.

Table 4. 2: Summary of the themes and subthemes.

Major theme	Sub-themes	Codes	Definition		
Therapy experience	Perception of care	Delay diagnosis	This theme illustrates the experience of participants of care with current system.		
		Delay in starting physiotherapy			
		Unsatisfied intensity of care			
Post-discharge	Limited services	Loneliness	The experience that participants had after being released from the facility is described in this theme.		
		Covid 19 influence	Inability to access services	This theme described how Covid 19 affected on participants care process.	
Progression of condition					
Seeking private care					
Coping poststroke.	Coping barriers	Medical	In this theme, the barriers that affect participants adaptation were described including medical, psychological, social, financial and lack of guidance.		
		Psychological			
		Social			
		Financial			
		Lack of guidance			
Coping Facilitators	Faith	Recovery	This theme described the factors that helped participants to adapt to poststroke.		
		Social support and leisure			
		Rehabilitation programme			
Need for adequate services	Intervention needs	Staff needs	This theme represented the services needed by participants that related to the care programme.		
		Access to services			
		Hospital needs			
		Care continuity		Ongoing care	This theme demonstrates the services participants require to ensure they can continue therapy after discharge.
		Communication			
Follow ups					

4.5.2. Themes

Major theme 1: Therapy experience

This theme discusses the experiences of participants regarding the services provided by hospitals from hospitalisation to post-discharge. This theme contains three subthemes: (1) perception of care, (2) post-discharge experience and (3) COVID-19 influence.

Subtheme 1: Perception of care

This subtheme illustrates the experience of care participants when within the system. Five participants experienced a wrong or delayed diagnosis and thought that if the diagnosis had been earlier, the long-term disabilities would have been limited. At one site, most participants experienced a delay in starting physiotherapy in outpatients and reported that they waited a long time after discharge from the stroke unit. This made them worry because they thought the delay might hinder their recovery and have a long-term effect on their level of functioning and quality of life. Furthermore, the intensity and frequency of physiotherapy were suggested as being limited in both institutions; patients with moderate and severe strokes wanted intensive therapy. Participant 7 stated, *'I was undergoing physical therapy sessions at [hospital], but only one session per week, as you know, one session per week will not work because of my condition ... it is not enough, the patient needs more time, one or two sessions of half an hour each week is not enough'*.

The patients sought physiotherapy input from private clinics or had therapists come home to avoid delaying the start of physiotherapy and increasing the intensity of therapy. Another participant stated, *'My health condition has improved a lot ... but the number of sessions must be increased to get recovered, and if the specialist was not at my home, my condition would not have improved as required'* (Participant 1).

Subtheme 2: Post-discharge experience

The experience that participants had after being discharged from the outpatient facility is described here. Most participants admitted that they had trouble accessing services when they returned to community life; they felt alone post-discharge because there was no support offered and their rehabilitation ended unless they were financially able to access private clinics. One participant stated, *'They provided me with all the services while I was in the*

hospital, but after I left the hospital, there were no longer any services provided to me, and I felt alone, there is not enough guidance' (Participant 22).

Subtheme 3: COVID-19 influence.

The participants were unable to access services during this period. For some, their condition worsened. This was illustrated by participant 13: *'But in the beginning, I did not get treatment because of Corona and the Corona crisis. On the day when Corona infections began, they closed the outpatient clinic and closed the physiotherapy department, so I went there twice, and they told me that it was closed'.*

As alternative methods to seek treatment during this period, the participants either sought private therapy or virtual rehabilitation. However, the participants believed that virtual rehabilitation sometimes was not beneficial because they had no experience, no tools and were unable to understand the exercises. Participant 7 stated, *'They were explaining to me how to do the exercises through the screen; I did not understand the instructions very well. And it didn't work'.* Another said, *'Sometimes you undergo an exercise on the screen, but the tools are not available, and sometimes the patient's application varies' (Participant 6).*

Major theme 2: Coping poststroke

This theme illustrates the facilitators and barriers and factors that influenced participants' adaptability poststroke. This theme involves two subthemes: 1) coping barriers and 2) coping facilitators.

Subtheme 1: Coping barriers:

Several barriers to coping were identified.

1 - Medical barriers. This included issues experienced poststroke, such as physical weakness and inability to do activities of daily living, pain, dizziness, eye issues, sexual issues, sensory issues, shortness of breath, and inability to talk, which limited their adaptation. Participant 22 stated, *'My walking is slow, and I cannot leave the house, and I perform the prayer on the chair ... the eyes are one of the sufferings that I complain about, I cannot drive, I cannot watch TV, or read'*.

2 - Psychological barriers. Psychological barriers were identified poststroke, such as depression, an embarrassment of stroke, being a burden on others and the anger of having a stroke. The participants expressed negative emotions such as hopelessness, helplessness, uselessness and frustration with the inability to control things that were no longer under control. Furthermore, the patients described being self-conscious, and they did not want to be pitied. Two participants divorced after having their stroke. One participant illustrated this by stating, *'I was okay before the stroke, and I was married and so happy. However, today, I feel bad. Literally, I am between life and death waiting for death ... unfortunately, my wife left me alone'* (Participant 1).

Furthermore, those participants with a high level of education and who were currently working were more worried about their recovery and trying to return to their previous life.

Three participants, including a doctor and teacher, had travelled and spent a substantial amount of money receiving proper rehabilitation. Participant 22 stated, *'I have one last point, which is that from the day I was discharged from the hospital until today, there has been no improvement in my condition, only very simple improvement ... but I will return to work, whether I am well or not. However, I hope my condition improves'*. Another doctor said, *'I hope to be a surgeon again ... I no longer have this ability, so I'm trying to improve my hand movement'* (Participant 6).

3 - Social barriers. Many people with stroke identified that social participation was limited because of physical weakness, limited transportation, and places not being designed for people with disabilities. For instance, one participant stated, *'Even if I need something from the market, I can't go get it, my sisters help me with that. I stay in the car, and they get me what I want because there are no special places for wheelchair'* (Participant 10).

4 - Financial barriers. One patient retired because of stroke, three took sick leave from work and had not returned yet, and three were unable to continue working because of physical weakness and had various financial issues. However, most patients' workplaces were supportive in terms of giving sick leave or changing their responsibilities to what they were able to do. One participant stated, *'I buy things and then sell them, and I have obtained loans from the Jana Foundation to trade, but from the month of Rajab until today, all my work is suspended, and my salary is little, and I have an orphaned son and daughter'* (Participant 3).

Despite this financial pressure, the participants purchased their own walking aids and home modification items to avoid lengthy waits or a lack of response. Participant 15 stated, *'They told me to log on the internet and fill a form on their website and send it. I already sent it, but nobody replied'*.

5 - Lack of guidance. The patients suggested that they lacked guidance on what services were available to them, adequate guidance on how to do self-management and what financial supports were available, including aids and home modification support. A few young patients were aware of methods to seek information, such as calling toll numbers and the MoH. Four participants consulted an expert in the family if they needed guidance, but most waited to ask staff or doctors for follow-up appointments. Sometimes, the internet was used to find information. However, the internet was not a reliable source of information and provided only general information. One participant stated, *'If I had obtained these special instructions from the hospital directly, it would have been better than going to search for this information on*

the internet because we did not get the appropriate and correct instructions from the internet'
(Participant 23).

Subtheme 2: Coping facilitators:

There were many facilitators that helped coping.

1 - Faith. Faith that the stroke is a matter of God and that illness is controlled by God helped them cope. The participants also thought that patience and praying to God helped in achieving inner peace. One participant stated, *"When God loves someone, he afflicts him, and I shall submit to God's will and be patient and believe in my fate and destiny, never to feel sorry for that"* (Participant 1).

2 - Recovery. A better rate of recovery and comparing stroke severity with others helped participants adapt better. One participant stated, *'There are patients whose condition is worse than mine, so I say thank God'* (Participant 7).

3 - Social support and leisure. Social participation and family support, leisure, gardening and reading the Qur'an helped participants improve their psychological status. This theme was illustrated by one participant who stated, *'My good family dealing with me helped me a lot, they always help me to walk, they insist for me to walk and go out to the garden or our farm and raise my psychological spirit and they have a great role in psychological support'* (Participant 16).

Major theme 3: Need for adequate services:

Two subthemes under this theme included (1) interventional needs and (2) care continuity.

Subtheme 1: Intervention needs

This theme represented the services needed by participants related to their care.

1 - Rehabilitation programme. The patients suggested needs regarding their rehabilitation content: diet advice, speech therapy, psychological rehabilitation, return to work, driving assessment, intensive rehabilitation and providing a short- and long-term treatment plan to keep them informed about their recovery progress. Participant 6 stated, *'I must receive the necessary treatment through a standardised treatment plan in which all patients are treated equally'*. Participant 23 stated, *'I was hoping that they would put me on a diet programme in the hospital, a good diet programme in accordance with my condition because most of those who have had a stroke have a diet programme that must be followed'*.

2 - Staff needs. The participants stated that there were not enough staff in the hospital; thus, they had to rely on trainees with little expertise. Patients preferred to be treated by expert staff. Participant 15 stated, *'Physiotherapists always bring trainees from university and tell them to check patients because they claim that they are busy'*. One participant said, *'The number of doctors is few, while the number of patients is large, so there is no proportion between what is available and what is offered'* (Participant 6). Furthermore, the patients were concerned about staff rotation because they believed that changing their therapist each time wasted their time because the new therapist did not have complete knowledge about their status. Participant 2 said, *'Physiotherapists change constantly, and that's definitely having a negative impact on the patient'*. Furthermore, at one site, there was no female occupational therapy staff because the female participants wanted female therapists to treat them and not be touched by men for religious reasons. Participant 10 stated, *'Occupational therapy at the hospital is a men's section only, and I am a woman'*.

3 - Access needs. Not all patients were able to access physiotherapy in their cities because of a lack of physiotherapy departments or because there were no specialised stroke units. Therefore, these patients always sought therapy outside of their cities. Another reason for seeking therapy outside was that they believed therapy in larger cities was more professional

and advanced, as evidenced by the fact that the majority of participants had travelled to receive treatment.

Furthermore, nearly all the participants had not received any post-discharge services apart from private therapy if they were financially able to afford treatment. One participant stated, *'I went to the Saudi German Private Hospital my family transfer me to them ... then I went to Abdulatif Gameel Rehabilitation Centre in Jeddah, after that I travelled to Egypt'* (Participant 11). The participants wanted occupational therapy and physiotherapy sessions to be held on the same day. Furthermore, people residing outside of the city need to be scheduled for follow-up visits at several clinics on the same day because travelling for each appointment separately is difficult and expensive.

4 - Hospital needs. *'The hospital is ill equipped and needs expansion'* was raised by the participants at one site. Furthermore, the aids provided by the hospital were not advanced, and there were no clear methods of aid assessment. The participants were unhappy about the very long waiting times for medical appointments and follow-ups. Participant 12 said, *'I have suggestions in terms of physical therapy staff, expanding the place, bringing modern equipment, all the devices in the physiotherapy department are old; even medical splints are not suitable'*.

Subtheme 2: Care continuity

This theme demonstrates the services that the participants required to ensure they could continue therapy after discharge.

1 - Ongoing care. The patients wanted to extend their treatment in the outpatient department mainly because of the lack of post-discharge services. Furthermore, the participants had difficulty with transport going to the hospital for sessions and needed more home visits. They

wanted themselves and their families to be trained in self-management. Those participants who wanted to continue treatment post-discharge either brought in private therapists for sessions at home, performed what the hospital therapist did in the sessions at home or sought out private clinics; however, they viewed factors such as high cost as barriers to continuing treatment in private clinics and barriers to self-management such as the need for motivation, need for training, supervision, confidence and fear of falling. One participant stated, *'I did not get support or services, and as soon as the sessions ended, I had no choice but to implement the exercises myself, because they did not provide services after the end of the physiotherapy sessions'* (Participant 23). Another participant stated, *'No, I haven't. I have no money to be treated in a private hospital. If I had enough money, I would go to a private hospital to be treated there'* (Participant 1).

2 - Communication. Patients had difficulty scheduling appointments and were upset because of delays in sessions and the gap between appointments. Furthermore, there was no clear communication channel. Participant 22 stated, *'But there is no open channel, and there is no communication method that enables me to contact directly'*.

3 - Follow-up. The patients wanted continuous follow-up for psychological support. One participant said, *'No, I no longer go to the physical therapy clinic, I just refer to the consultant doctor in the neurology clinic'* (Participant 22).

4.6. Discussion

The current study was able to reveal the needs of patients with stroke following discharge from rehabilitation centres, illustrating the participants' experiences with the current health system, the factors that enabled their coping, facilitators and barriers for recovery, and need for further services.

Stroke survivors in the UK receive around 70 hours of multidisciplinary rehabilitation (Kalra and Walker, 2009), and a minimum of three hours daily in Australia (Clinical guidelines for stroke managements, 2017). Our findings found that the patients in the present study received rehabilitation for two days or less per week. However, most of the study participants claimed that two days per week was insufficient to achieve their target goal of improving physical function. They expressed the need for a more intensive and comprehensive rehabilitation schedule, but staff shortages and heavy workloads were an issue. Current services are insufficient to handle the projected increase in stroke cases because only 5% of strokes in the SA are admitted to acute stroke units with specialised staff (Al-Senani *et al.*, 2019). A survey of staff availability in 2019 showed that there were only 240 stroke physiotherapists working in SA at the time, which might be inadequate to care for the rising stroke population (Al-Senani *et al.*, 2019).

In UK stroke guidelines, all patients should be discharged from the hospital with individualised care plans to provide support by local services to facilitate their reintegration into the community and enhance their quality of life. Furthermore, 95% of stroke survivors are reviewed 12 months post-discharge to assess their needs (NHS, 2015). However, in practice, nearly half (45%) of patients with stroke in the UK felt unsupported post-discharge from the hospital. Additionally, another 40% are released from the hospital without any further rehabilitation plans (Bonifacio *et al.*, 2022). In Australia, one-third of stroke patients are discharged without a care plan (National stroke Audit, 2019).

The current study's patients had limited access to services post-discharge. Community-based rehabilitation services are a necessary component in managing people's chronic conditions that would enable them to continue to maintain and improve their recovery and help in releasing the pressure on hospitals. However, in developing countries like SA, there are only a few of these publicly funded services, leaving stroke patients limited choices and looking to

private healthcare institutions. One effective strategy that can be applied in communities where there is a lack of community-based services is self-management (Chodosh *et al.*, 2005).

Self-management training is an effective strategy to meet most needs including a) intensity of care b) long-term care continuity c) staff shortage and d) limited post-discharge service. Self-management training may be cost-effective in the long-term, benefitting both stroke patients' independence and improving health services (Joice, 2012). This strategy can ensure that all patients, regardless of their socioeconomic status, receive sufficient treatment. Wang *et al.* pointed out that mastering self-management skills by acquiring stroke-related knowledge and know-how could lead to positive outcomes (Wang *et al.*, 2013); here, setting goals and monitoring progress were found to be the two most common strategies (Warner *et al.*, 2015). Professionals need to provide patients and families a clear plan of their rehabilitation. Setting goals in collaboration with the patient, family members and professionals has been suggested as the most advantageous approach (Conneeley, 2004). Rehabilitation professionals in the SA might benefit from using this approach to encourage stroke survivors to pursue their goals.

Another potential approach suggested by a similar community context in Malaysia was to involve family in providing care (Nordin *et al.*, 2014). Family members who acted as the patient's caregiver played a significant role in the patient's successful recovery process (Tosun and Temel, 2017). Saudi patients' psychological well-being was greatly enhanced by the presence of familial social support and was mentioned by 17 participants in the present study. The elderly population of SA would rather obtain care and support from their own families than from other individuals or institutions; it is uncommon for Saudi families to send their elderly relatives to long-term care institutions because it is considered a dishonourable practise. Stroke patients in SA are almost always accompanied by their caregivers when they attend therapy. However, caregivers rarely have the opportunity to understand or acquire the

necessary knowledge and skills specific to stroke management and rehabilitation. Further, individuals who have survived a stroke may find it hard to absorb and interpret information and advice, which may explain why some patients have repeatedly asked for information or feel inadequately educated (Joice, 2012). Many participants in the present study were unable to read (12 participants), so giving instruction and education and training family members, who are acting as caregivers might support rehabilitation efforts. According to Kalra *et al.* caregiver training not only lowers the cost of care but also greatly enhances the patient's quality of life (2004). Hafsteinsdottir *et al.* showed that caregivers should be given training that is targeted, timely, client centre, and tailored to their individual needs and situation. The training should begin at entry time and continue throughout their stay with the patient (Hafsteinsdottir *et al.*, 2011). Thus, a family-supported treatment could help maintain long-term rehabilitation of stroke patients in SA.

For stroke patients to regain optimal health, they need to change and adapt certain health-related behaviours to enhance their recovery (Riegel *et al.*, 2017). The patients in the current study had limited guidance on various aspects of the recovery process. One solution to meet this need can be in the form of booklets that provide detailed information, as well as answer questions that stroke patients may have about their care, recovery and rehabilitation (Knapp *et al.*, 2010). However, Rodgers, Bond and Curless (2001) showed that giving stroke patients and their caregivers booklets was not nearly as effective as enrolling them in an educational programme that gave more in-depth knowledge and knowhow of treatment and rehabilitation procedures (Rodgers, Bond and Curless, 2001). These programmes not only raised the quality of the services, but also resulted in better adjusted patients and their families living more satisfactory and functional lives. Furthermore, when information was delivered in a way that actively engaged patients and caregivers, such as by providing multiple opportunities to ask questions, it had a greater impact on patient mood than information delivered on a single

occasion (Forster *et al.*, 2012). Future predischarge programmes could be introduced into the SA's healthcare system, and patients should be adequately and properly equipped before discharge from the hospital into their own homes.

4.7. Reflection

In SA, stroke patients typically receive immediate medication or surgery as required, followed by an average stay of five days in the inpatient unit of a public hospital. During this time, they undergo basic rehabilitation that primarily focuses on mobilisation and passive exercise, with little emphasis on education or preparation for their transition back home. After discharge, patients also often experience a gap in care while waiting for a referral to the physiotherapy department, based on the potential unavailability of an outpatient appointment. During this waiting period, they are unlikely to receive any rehabilitation unless they can afford private physiotherapy services or to hire a private physiotherapist to work in their home.

Once rehabilitation begins in the outpatient clinic, patients are also typically limited to around two sessions per week until they are discharged. A further significant limitation of the healthcare system in SA is the absence of specialised stroke units, while the frequency and intensity of care are made more insufficient due to the lack of community-based services and the heavy workload faced by existing physiotherapists. Intensity, frequency, and continuity of care are the primary needs expressed by patients, with these forming the core elements of effective rehabilitation. These challenges highlight the need for substantial improvements in the healthcare system. The issue arises not only within the healthcare system but also within the community support structure: the Saudi Stroke Association plays only a limited role in

providing educational resources and caregiver support, further exacerbating the gap in services available to stroke patients and their families.

At one site, it was reported that there were no female occupational therapy staff available. This meant that female patients had to travel to other sites to receive occupational therapy, as the religious and cultural value in SA limit and restrict interactions and communication between females and males in healthcare settings as well as more generally (Almutairi and McCarthy, 2012). One study indicated that more than 85% of female patients prefer to be seen by female physicians for a one-time examination where the procedure involved any exposure of the body (Alqufly *et al.*, 2019). In terms of receiving rehabilitation, many female patients ask for female therapists for cultural and religious reasons related to modesty and privacy, and the lack of such therapists means that women more commonly perceive healthcare services as being inaccessible, unavailable, or limited by specific cultural justifications or gender norms (Aldosari, 2017).

4.8. Study limitations

Some methodological considerations must be taken into account. The study took place in two hospitals, so the findings might not be transferable to other regions. The fact that the study excluded people with severe cognitive impairments and communication disorders is a limitation to the external validity. The findings are less applicable to patients with severe stroke because most patients have difficulty speaking poststroke. Further, although we aimed to recruit two groups, working age ranging from 18 to 65 years old and older patients from 65 to 99 years old, we recruited only a few patients above 65 because this group was mostly not able to read and did not have contact details, so reaching them was difficult. However, we covered both groups because 11 participants were working while the rest were not. All

interviews were not held face to face, which may have led to missing signals and clues from facial expression and body gestures could be resulted from the loss of connections (Barratt, 2012).

4.9. Conclusion

This IPA study provided an opportunity to explore the needs of Saudi patients with stroke post-discharge. Our findings have indicated a need for greater community access to educational and healthcare resources. These results are crucial in developing and implementing interventions to support stroke survivors after discharge. Future qualitative studies need to consider the perceptions and experiences of caregivers because stroke could have different effects on patients and caregivers. This could provide further contributions to creating recommendations for better preparation of stroke survivors supported by their caregivers. Additionally, capturing the changes in individuals' needs across the care continuum is required to understand the development and meeting of patients' evolving needs at each stage. Finally, understanding professionals' views is essential as their insights can help shape effective support systems and interventions for stroke survivors. Thus, the next chapter will explore physiotherapists' perspectives on care continuity approaches and their training needs to provide long-term care for patients with stroke.

Chapter 5: Exploring Physiotherapists' Perspectives and Training Needs for Stroke Patient Care Continuity in Saudi Arabia (SA): A qualitative study.

Publication and presentation

Temehy, B. Soundy, A. Sahely, A. and Rosewilliam, S. (under review) 'Exploring physiotherapists' perspectives and training needs for stroke patient care continuity in Saudi Arabia (SA): A qualitative study', (under review) (Appendix 3).

Presentation

Temehy, B. Soundy, A. Sahely, A. and Rosewilliam, S. (2024). Exploring Physiotherapists' Perspectives on and Training Needs for Stroke Patient Care Continuity in Saudi Arabia (SA): A qualitative study. 11th World Congress on Physiotherapy, Physical Rehabilitation & Sports Medicine, November 18-19, 2024, Rome, Italy.

5.1. Chapter overview

This chapter consists of a paper (Temehy *et al.*, under review) with minor changes made for the purpose of this thesis. The chapter begins with an introduction moving to the aim of exploring physiotherapists' perspectives, methods, findings and conclusion.

5.2. Introduction

The rationale for understanding physiotherapists needs and perspectives on providing continuity of care for patients with stroke was discussed in detail in Chapter 1.

Continuity of care is recognised as a critical component of effective primary care, supported by related concepts such as care coordination, patient-centred care, and integrated care (Uijen *et al.*, 2012). In this study, continuity of care was defined as the maintenance of long-term, consistent interactions between patients and healthcare providers across three key dimensions: information, management, and relationship continuity (Haggerty *et al.*, 2003; Hadjistavropoulos *et al.*, 2008). This definition captures the multi-dimensional nature of continuity of care, a crucial step in identifying existing limitations in SA care and finding potential solutions throughout the patient's journey and transition to long-term recovery.

The findings of the qualitative study on Saudi Arabian stroke survivors' needs post-discharge suggest that stroke survivors have a number of diverse rehabilitations needs and that many of these needs are currently being unmet (Temehy *et al.*, 2023). Given the varied clinical and social needs of stroke survivors, therapists must be trained in holistic care to address these diverse needs effectively. Delivering stroke-specific education for continual professional development is crucial to improving care quality and outcomes for stroke survivors. Such

education equips physiotherapists with the necessary skills and knowledge for optimal care throughout the stroke journey (Jones *et al.*, 2018). Furthermore, training has been recognised as a crucial factor influencing the successful implementation of evidence-based practice (Wandersman, Chien and Katz, 2012).

To ensure the delivery of effective training, it is vital to assess the current knowledge and skills of physiotherapists in SA. A study conducted by Alanazi and Alrwaily (2022) aimed to assess the knowledge and skills of 149 new graduate physiotherapists utilising a comprehensive examination test composed of seventy questions, and the passing score of the test was set at 55%. This competency test has been modified from a commercially available practice test and designed to closely simulate the National Physical Therapy Examination. Only six participants passed the test, indicating poor knowledge and skills among newly graduated physiotherapists in the SA. Further, a survey investigating physiotherapists' behaviour, attitudes, awareness, and knowledge regarding implementing evidence-based practice in SA was distributed to 385 physiotherapists. The research found that 70.2% had no formal training in universities or any other authorised centres (Alshehri *et al.*, 2017). Another study surveyed 64 physiotherapists, and it found that those physiotherapists who trained overseas had positive attitudes towards the findings in the literature (Hasani *et al.*, 2020).

Additionally, one study surveyed 347 physiotherapists about their knowledge, attitudes and barriers regarding the implementation of telerehabilitation in physical therapy settings. This research found that only 19.9% had tried telerehabilitation (Aloyuni *et al.*, 2020). Moreover, one study investigated the use of outcome measures of 180 physiotherapists in SA. The project found that 38% did not use outcome measures, while 86% reported that they would

use outcome measures in the future; of these, 35% stated they required specific training to improve the usage of such (Al-Muqiren *et al.*, 2017).

Despite these insights into physiotherapy practices in SA, the literature review highlights significant deficiencies regarding the training needs of physiotherapists specialising in stroke treatment in SA. None of the above studies focused explicitly on stroke care or addressed the training needed to deliver high-quality rehabilitation services to stroke patients. Therefore, it is essential to bridge this knowledge gap and create holistic rehabilitation strategies specifically designed for stroke patients in the area. Integrating physiotherapists' perspectives with the needs of patients with stroke can inform the development of rehabilitation training modules in a relevant and effective way. Consequently, this will facilitate long-term rehabilitation for patients who have suffered a stroke.

5.3. Aim

This study aimed to investigate physiotherapists' perspectives and training needs regarding the continuity of care post-discharge for patients with stroke in SA. The objectives include exploring care continuity, identifying local transition strategies and assessing gaps in the knowledge and skills of physiotherapists who treat stroke patients in SA.

5.4. Methodology

5.4.1. Design

This paper adheres to the SRQR guidelines in reporting the findings of the study (O'Brien *et al.*, 2014). A qualitative exploratory approach, situated with critical realism (Collier, 1994)

was considered the most appropriate method via which to achieve this objective. Ethical approval was to conduct this study was provided in (Appendix 7).

5.4.2. Participants

The study included male and female physiotherapists working in SA who were providing therapy to patients following stroke. Physiotherapists were excluded if they are not registered to practice in SA and do not work with patients with stroke.

4.4.3. Data collection

The development of the interview guide was based on insights from a prior review of stroke needs (Temehy *et al.*, 2022), and previous studies exploring the needs of patients with stroke in SA specifically (Temehy *et al.*, 2023), and other similar studies (Ang *et al.*, 2013; Jeffares *et al.*, 2021). The question guide explored physiotherapists' views and perspectives on three elements to meet the study objectives: (1) gaps in current practice for stroke care in SA (to address stroke patients' needs), (2) strategies that can be applied in a local context to improve the reintegration of patients into the community and (3) strategies via which to improve the skills, knowledge and attitudes of therapists regarding delivering services that enhance the care continuity after discharge from the hospital. In addition, demographic information, including age, gender, work setting, education level and years of clinical experience, were collected. The interview questions can be found in (Appendix 15).

To evaluate the interview questions, a cognitive interview was conducted with one participant (Blair and Brick, 2010). However, it was not included in the final analysis. Additionally, to

assess the interview schedule, a pilot interview was conducted with the same participant. After the pilot interview, the interview questions guide was revised for clarity and relevance. Yes/no questions were changed to open-ended ones to encourage more detailed responses, similar questions were merged, and ambiguous questions were clarified based on participant feedback. Further, new questions were added to capture important information about patient assessment tools, goal-setting and the desired training areas. The questions were rearranged to align better with the research objectives.

5.4.4. Procedure

The head of the department in seven hospitals was informed of the study requirements and requested to provide the PI with a list of therapists who worked with stroke patients. Therapists were selected randomly from the list and contacted by the first author. They were given a participation information sheet if they were interested and eligible. Potential participants had 2 days to consider whether to participate, during which they had the opportunity to ask questions. If they decided to participate, the PI obtained informed consent. Consents forms were signed and returned to the PI by the participants themselves. The project was carried out in the SA, and physiotherapists who worked with stroke patients were recruited.

Physiotherapists were invited to participate in semi-structured online interviews or focus groups. The interviews took place between October and December 2023. All focus groups and individual interviews were conducted online via zoom. Therapists were able to choose their desired times for the interviews and focus groups. While the therapists were proficient in English, the researchers preferred to conduct the interviews and focus groups in Arabic, the

participants' native language. This choice was intended to reduce potential limitations and communication barriers, facilitating a more effective and accurate exchange of information. In addition, it ensured that all participants could fully comprehend the instructions and questions presented to them. Therefore, the interviews and focus groups were conducted in Arabic. Subjects were also told about their right to ask questions and take breaks anytime they liked.

The interviews were recorded (with the participants' permission), transcribed verbatim and translated into English, and the participants' anonymity and confidentiality were ensured (Wiles *et al.*, 2006). Pseudonyms were used in the study, and any personally identifiable information, such as the participant's name or organisation, was removed. Data protection was ensured through adherence to the Data Protection Act (2018).

5.4.5. Sample size

Braun and Clarke (2021) argued that data saturation is not a valid approach for reflexive thematic analysis. Thus, the exact size was informed by information power (Malterud, Siersma and Guassora, 2016). Given the focused nature of the interviews, this is expected to be similar to past studies (Satink *et al.*, 2015; Munce *et al.*, 2017), at 27 and 33, respectively. For the focus group, as it suggested to conduct at least two focus groups for each defining demographic characteristic (Hennink, 2019). Each focus group could include six to 10 participants (Connelly, 2015). However, a smaller number of participants can work as well (Gill *et al.*, 2008).

Five items were identified as required to reach the power goals: study aim, sample specificity, use of established theory, quality of dialogue, and analysis strategy. The aim of this study was

clear and narrow. The targeted participants, physiotherapists who worked with patients with stroke, directly addressed the study's aim. A well-structured interview guide was also developed that encouraged the collection of detailed responses. Non-direct prompts, such as, "tell me more", "keep talking", and "can you elaborate on that?", were used to gather more detailed information as required. The researcher's familiarity with the topic, gained through conducting two prior connected stages of research, also provided a strong foundation for interpreting the findings effectively.

5.4.6. Data analysis

A reflexive thematic analysis of the qualitative data was undertaken (Braun and Clarke, 2019). The thematic analysis involves six stages: (1) Becoming familiar with the data: The researcher adopted an active reading approach that involved engaging deeply with the data itself, being observant, identifying patterns, raising questions, and analysing the information rather than passively absorbing it. (2) Generate initial codes: Line-by-line coding for the translated transcripts was developed. Additionally, the findings were subjected to a blind open coding process by two authors and the PI. The PI was required to present a defensible case for each stage of the analysis. (3) Searching for themes: the PI analysed the codes and the related data, then merged and grouped the codes into larger patterns, and then clustered them into groups using tables and maps. (4) Reviewing potential themes: The PI reviewed the themes to confirm they aligned with the coded data, the overall dataset, and the research question. (5) Defining and naming themes: The PI provided a brief definition of the major themes that capture the central concept of each theme. (6) Producing the report: The PI moved from the analysis point to writing a summary of the findings. An example of the analysis can be found in (Appendix 16).

5.4.7. Rigor and trustworthiness

All interviews were carried out by the PI, there were no pre-existing relationships between the interviewer and the interviewees. The rigour of this study was maintained via various approaches. The researcher engaged in thorough note-taking during interviews to facilitate comprehensive data documentation and analysis. Furthermore, the analysis was conducted by the PI (BT) concurrently with the data collection stage, which enabled immediate feedback and the in-depth exploration of emerging themes. Further, this approach facilitated the exploration of data saturation. The credibility of the analysis was ensured via triangulation, as the analysis was conducted by three analysts (BT, AS and SR). The three focus groups were independently coded by AS, and five individual interviews were coded by SR. Their coding and interpretations were compared with those of the primary analyst (BT). The master table of the themes were sent to senior researchers for peer examination. The maintenance of an audit trail throughout the research process ensured transparency. Additionally, a completed COREQ checklist is attached in (Appendix 17).

5.5. Findings

5.5.1. Description of participants

Overall, 26 physiotherapists participated in this study, 14 females and 12 males, with five, six and six participants in the three focus groups. There were nine individual interviews. The mean age of the participants was 32.4 years, and the mean years of clinical experience was 9 years. The interviews and focus groups time ranged from 18 minutes to 1:05 hour. The interview transcripts were written in Arabic and sent to an authorised translation services to

be translated into English. The PI reviewed all English transcripts with the Arabic to confirm the accuracy of the translation. Additionally, the researcher verified whether the translated transcripts accurately represented the original spoken language phrases. Table 5.1 shows participants characteristics.

Table 5. 1: Participants characteristics

Physiotherapists	Age	Gender	Education Level	Years of expertise
1	33	Female	Bachelor	9
2	33	Female	Bachelor	9
3	32	Female	Bachelor	9
4	32	Female	Masters	9
6	33	Female	Bachelor	9
6	35	Male	Bachelor	10
7	34	Male	Masters	10
8	32	Male	Bachelor	9
9	32	Male	Masters	9
10	33	Male	Masters	9
11	32	Male	Masters	9
12	30	Male	Masters	8
13	32	Male	Masters	9
14	35	Male	Masters	11
15	32	Female	Bachelor	9
16	35	Female	Bachelor	9
17	33	Male	Bachelor	10
18	32	Female	Masters	9
19	33	Female	Masters	10
20	31	Female	Masters	9
21	32	Female	Bachelor	9
22	32	Female	Bachelor	9
23	28	Female	Bachelor	6
24	34	Female	Masters	10

25	28	Male	Masters	6
26	35	Male	Masters	10

5.5.2. Synthesis and themes

Two major themes were identified (1) quality and continuity of care, and (2) training needs.

Table 5.2 provides details of the thematic structure.

Table 5. 2: Summary of the themes.

Major theme	Sub-themes	Codes	Definition
Quality and continuity of care	Limited post-discharge support	Lack of a post-discharge plan	This theme illustrates the lack of structured and organised post-discharge support for stroke patients.
		Therapists neglecting post-discharge factors	
		Limited social support	
		Insufficient home assessment	
	Perceptions of telerehabilitation	Uses of virtual clinics	In this theme, the current uses of virtual clinics and the facilitators of and barriers to telerehabilitation were described.
		Barriers to the successful implementation of virtual clinics	
		The need to establish trained tele-rehabilitation teams	
	Perceptions of self-management and home exercises	Lack of patient commitment to home-based rehabilitation programs	In this theme, the facilitators, limitations, and absence of a standardised protocol regarding self-management education for both patients and caregivers have been identified.
		Self-management facilitators and barriers	
		The need for patient education approaches	
	Overarching limitations of care	Absence of specialised rehabilitation centres	The limitations of rehabilitation care in SA are described in this theme.
		Lack of standardised clinical practice guidelines	
		Insufficient sessions and high workload.	
Absence of follow-ups			
Training needs		Limited training in stroke rehabilitation	This theme demonstrates the training needs regarding stroke assessment and management.

	Training on stroke assessment and management	Need for comprehensive training in neuro assessment and outcome measures		
		Need for training on psychological interventions		
		Need for training on social support		
		Limited awareness of goal-setting process		
	Improvements in training and education for patients and carer	Lack of standardised guidance for patient education		This theme illustrates the need for standardised patients' and caregivers' education and training.
		Need for structured caregiver training		

Major theme 1: Quality and continuity of care

This theme provides an overview of the post-discharge support and long-term rehabilitation care approaches provided to stroke patients in SA. This theme contains four subthemes: (1) limited post-discharge support, (2) perceptions of telerehabilitation, (3) perceptions of self-management and home exercises and (4) overarching limitations of care.

Subtheme 1: Limited post-discharge support

This theme illustrates the lack of structured and organised post-discharge support for stroke patients. According to the participants, the time that elapsed before outpatient rehabilitation began varied widely, ranging from one week to two months, with some experiencing a gap in rehabilitation services between inpatient and outpatient care. This was illustrated by

Participant 17: *'The gap between inpatients and outpatients was usually from 1 to 3 weeks or up to a month. It depends. I mean, where did they come from? Was it from the same hospital or not?'* Participant 2 said, *'they might leave the hospital, and then, after a month or even 2 months, they start as outpatients because of the appointment availability. Yes, it's because of the availability; there might not be any available slots initially.'* Participant 2 also said, *'In some instances, it appears that therapists may not give sufficient attention to the patient's life post-discharge, leaving them to navigate their recovery largely on their own.'*

Participant 7 stated that *'Once the patient is discharged, whether with a wheelchair, cane or anything else, they're discharged. There's not much emphasis on these issues like how they manage at home, how they walk around their home and how they handle things at home. To be honest, there isn't much attention given to this aspect.'* Another notable gap was highlighted in the therapists' assessment of the patients' home environment. Participant 26 stated that *'therapists should pay attention to the social aspects, such as assessing the patient's home environment for accessibility.'* Participant 9 stressed the importance of

therapists expanding their attention beyond functional issues and taking into account the social dimensions of a patient's life: *'But from a social perspective, there isn't much support. Most of them do not have access to social services.'*

Subtheme 2: Perceptions of telerehabilitation

In this theme, the current uses of virtual clinics, as well as the facilitators of and barriers to telerehabilitation, were described. The physiotherapists' perspectives on the benefits of using virtual clinics varied. While majority of them find telerehabilitation beneficial if implemented in the correct way, some consider it ineffective. Participant 17 claimed that *'They can be effective in some cases when needed, but as a substitute for in-person sessions, I don't see them as effective for therapeutic sessions. However, as a form of consultation, they might have some benefits.'* According to the therapists, virtual clinics currently primarily act as platforms for patient consultations and communication, rather than being utilised for the delivery of rehabilitation services. This is mainly because therapists are required to keep certain records of virtual sessions for annual evaluations, which are crucial for their promotion, rather than focusing on delivering rehabilitation services in more efficient way. Only a limited number of therapists had employed virtual clinics to deliver therapy, and these did not involve stroke patients. Participant 24 stated, *'It's more about maintaining communication. When it comes to physical exercises and telling the patient to do a certain exercise, it is quite challenging.'*

The identified barriers to the successful implementation of virtual clinics included the need for education among both therapists and patients, the need to ensure access to the internet and concerns related to the elderly population's limited awareness of technology. Moreover, the sense of security patients feel with their therapists plays a crucial role in this regard. The participants emphasised the importance of providing training in telerehabilitation, and they

recommended the establishment of dedicated telerehabilitation teams to enhance telerehabilitation implementation. Participant 24 stated, *'I think there are studies, as you know, that show the service can be provided if you train therapists specifically for it. I don't think therapists here have been trained or solely dedicated to telerehabilitation.'*

Subtheme 3: Perceptions of self-management and home exercises

In this theme, the limitations and absence of a standardised protocol for self-management education for both patients and caregivers have been identified. Therapists expressed a common concern regarding patients' lack of commitment to home-based rehabilitation programs. Participant 6 stated, *'After 10 years of experience, the majority, around 80%, of patients, don't adhere to the instructions or exercises you give them.'* Several self-management facilitators and limitations have been identified in this context. Psychological factors, such as depression and anxiety; patient motivation and family cooperation and support, or the absence thereof, play pivotal roles in determining the success of home programs. Moreover, a few therapists noted that patients may not always follow caregiver instructions. Additionally, challenges from the patients' perspective, such as resource constraints, busy schedules and the fear of exercising without supervision further complicate home-based exercises. Participant 24 highlighted that *'Sometimes, patients may not have enough education, some resources are not available to them at home or they might lack assistance.'* Participant 8 stated, *'We try to involve the patient's family. Sometimes, the patient may be in a state of depression and doesn't want to come or do exercises. The patient lacks internal motivation. In such cases, the family plays a crucial role.'* In some cases, caregivers were not supportive enough during the process of rehabilitation. This was illustrated by Participant 26, who stated that *'Caregivers are often busy, so the patient may not have anyone to assist them. Social support may be lacking.'*

To address these limitations, therapists emphasise the need for mandatory patient education approaches, highlighting the absence of a standardised protocol for self-management education for both patients and caregivers. Participant 4 stated, *'I personally give them guidance and instructions that they should adhere to. There's no specific model, and if they need something else, we tell them to come back.'* The participants stressed the importance of providing ongoing support, such as proper patient education, involving caregivers in the educational process and educating patients about the significance of adhering to home rehabilitation programs. Participant 8 emphasised that *'They need to show interest, ensure the patient attends their sessions and emphasise the importance of treatment and the current phase of recovery.'* Participant 17 stated, *'We're also working on raising awareness among patients about the importance of the home programme and completing sessions regularly and educating them about their condition.'* Participant 17. In essence, therapists emphasise a comprehensive approach to enhancing self-management perspectives and outcomes for patients.

Subtheme 4: Overarching limitations of care

The limitations of rehabilitation care in SA were described in this theme. Participants expressed the critical inadequacy of the current infrastructure. They noted that hospitals are ill-equipped to handle the large number of patients, resulting in insufficient sessions and a high workload for therapists. Participant 14 stated, *'It could be due to limitations in infrastructure and a lack of sufficient staff, equipment or rehabilitation protocols to optimise the service.'* Participant 17 added, *'The number of patients in our department is larger than the capacity of the facility.'* The absence of specialised rehabilitation centres and therapy teams compounds the problem. The participants believed that having a specialised team could

result in more time being dedicated to patients and their needs being addressed more effectively. Participant 1 stated, *'There should be a specialised rehabilitation center for the entire region, one equipped with the necessary devices and resources.'* She added, *'The issue in hospitals is that there is no specialisation. We don't have dedicated teams or groups for specific conditions.'* Additionally, participants highlighted a lack of standardised clinical practice guidelines, which leads to inconsistencies in therapy quality, depending on the training and expertise of individual therapists. Participant 14 illustrated this by stating, *'There are some shortcomings in terms of the service not being standardised across all hospitals and MoH centres. This leads to variations in the quality of the service provided in different locations. Some patients receive appropriate or excellent therapy based on the expertise and training of the physical therapist.'* They highlighted the absence of follow-ups, which creates a gap in terms of addressing long-term patient needs. Participant 8 stated, *'Once they are discharged, they typically do not have follow-up at the clinic.'* Addressing these limitations is paramount in enhancing the quality of rehabilitation services.

Major theme 2: Training needs

This theme highlights the crucial need for comprehensive training and education in stroke assessment, management and rehabilitation. This theme involved two subthemes: (1) training in stroke assessment and management and (2) improvements in training and education for patients and caregivers.

Subtheme 1: Training on stroke assessment and management

This theme demonstrates the training needs of physiotherapists regarding stroke assessment and management. The therapists perceived a lack of a specialised training for stroke rehabilitation after qualification. It should be noted that physiotherapists in the SA receive 1

year of training pre-qualification, which covers general aspects of various specialisations, including orthopaedics, neurology and paediatrics. They said that while some training occurs post qualification, it is often driven by therapist motivation, and courses are very limited. Participant 24 stated, *'the training for neurological cases is insufficient. There are limited courses that address the specific needs of practitioners.'* Participant 26 added, *'For stroke and neurological cases, the training is relatively limited.'* The therapists emphasised the importance of establishing regular and comprehensive training courses that focus on various aspects of stroke rehabilitation. Firstly, there is a recognised need for training in neurological assessment and outcome measures. Participant 24 stated, *'I believe they should focus on the basics, including assessment, evaluation, tailoring exercises and setting goals based on the patient's needs.'* She added, *'I believe if there's someone specialised in neuro, qualified for neuro cases, and they start offering courses, particularly in assessment—the foundation—and, then, they proceed with the treatment procedure, these things would be better because most therapists are not specialized.'* The therapists also stressed the importance of specialised training to support patients psychologically and socially. Participant 26 said, *'One of the key areas we could improve on is the psychological aspect. We are not particularly strong in this area.'*

It seemed that there was a lack of standardised tools for setting goals. Therapists individually establish goals for patients based on their conditions, as there are no formal tools used. Additionally, therapists often overlooked patient involvement in the goal-setting process, citing patients' limited knowledge of goal-setting as a barrier. Participant 25 stated, *'Goals are mostly determined by the therapist alone, and they proceed according to their treatment plan. If there is no initiation from the patient, it's rare for a therapist to ask about the patient's goals, wishes or aspirations. They assess the patient and start working on the*

existing impairments. Participant 1 stated, *'I mean, we ask them what they want, but they don't even understand physical therapy.'* Patients' goals are often perceived as illogical, highlighting a potential misalignment between patient expectations and therapists' objectives. Participant 17 stated, *'Honestly, I always ask this question, and in the majority, they answer unreasonable answers, and they usually say, "Yes." Like, "I want to return to normal. I want to be like before."* He added, *'The patient's initial goal is something that is not logical or difficult.'* The need for training in goal-setting was identified as one of the most frequently emphasised areas for improvement. Participant 17 stated, *'Perhaps improving in setting plans and explaining to caregivers would be helpful, as well as using the outcome measures.'* Addressing these gaps in training physiotherapists is essential in enhancing the quality of care for stroke patients.

Subtheme 2: Improvements in training and education for patients and caregivers.

This theme illustrates the need for standardised patient and caregiver education and training. The participants emphasised the critical need for patients to receive comprehensive education regarding their medical conditions. Participant 17 stated, *'The medical education provided for the patient and their companions may not be sufficient.'* However, the therapists highlighted a lack of standardised guidance and resources for educating both patients and their families effectively. This gap results in therapists lacking essential information about how to provide inpatient care and prepare patients and families for their transition to home. Participant 25 stated, *'Some (therapists) don't provide proper education for home programs; instead, they instruct patients to perform the exercises covered in the session at home.'* Participant 4 stated, *'I personally give them guidance and instructions that they should adhere to. There's no specific plan, and if they need something else, we tell them to come back.'* Moreover, the training of caregivers to support their relatives lacked organisation and structure. Participant

1 stated, *'Families need to be educated. There should be an educational programme for the families of stroke patients. It's not about the rehabilitation of the patient; it's about educating the patient's family on how to take care of them.'* Participant 7 added, *'But this idea isn't really implemented, to be honest. It's not implemented at all, but the concept of involving the caregiver in the treatment plan is great.'* These findings collectively emphasise the critical need for the development of standardised and organised patient education protocols, equipping both therapists and caregivers with the necessary tools to enhance patient understanding, facilitate smoother transitions and optimise overall care outcomes.

5.6. Discussion

The key objective of the present study was to examine and analyse the opinions of physiotherapists who are providing stroke care in SA to identify gaps in care continuity and the knowledge required by therapists to overcome these service gaps. The findings revealed limitations in delivering organised post-discharge services and the need for training to improve the level of care provided to individuals recovering from stroke.

In this study, therapists' perspectives on various community rehabilitation approaches are explored, and the key purpose of this is to ensure the continuity of high-quality care.

According to Langhorne, Baylan and Trialists (2017), most stroke survivors in developing countries do not have sufficient access to inpatient rehabilitation services. Thus, home-based exercises generally become the primary form of rehabilitation intervention. Such services play a crucial role in meeting the healthcare needs of individuals seeking rehabilitation.

Nonetheless, our study revealed a common concern about patients' adherence to home-based exercises. These obstacles are similar to those identified by Mahmood *et al.* (2022) including

factors such as a lack of emphasis on the part of professionals; a lack of knowledge pertaining to stroke recovery and difficulty accessing resources, family support and healthcare facilities. Furthermore, a lack of standardisation for services, proper education for patients and proper therapist training in SA may negatively influence the implementation of home-based programs.

One of the most important strategies for improving stroke survivors' adherence to home-based exercises is effective patient education. It is crucial for patients and their families to have a thorough understanding of their condition, as this forms the basis for effective collaboration and sets the stage for successful rehabilitation efforts (Falvo, 2010). According to Ogwumike, Badaru and Adeniyi (2014) clinicians should ensure that the intensity, length and quantity of exercises suggested in an exercise plan are all simplified, individualised and regularly reviewed to match the skills and capacities of each stroke patient. Furthermore, goal-setting is frequently used in physical therapy to improve adherence (Argent, Daly and Caulfield, 2018), but it seems to be overlooked by the participants in this study. Mahmood *et al.* (2022) indicated that enhanced participation in home-based exercises post-stroke was observed when utilising a personalised adherence programme tailored to individual goals and physical capabilities. Establishing specific goals by working closely with patients to match interventions with personal goals and periodically reviewing and modifying these goals are both critical in maintaining patient motivation and engagement during the rehabilitation process.

Additionally, it is also important that therapists set aside time to educate patients about the importance of home-based exercise to overcome these issues. This will be made easier by the incorporation of technology and the ability to monitor participation electronically or

remotely. Studies have shown that telerehabilitation can enhance patient education (Dodakian *et al.*, 2017). Moreover, a survey conducted in SA found that 50% of rehabilitation care providers believed telerehabilitation to be critical to service provisions but that they were not using telerehabilitation technology in their work practices (Ullah *et al.*, 2021).

Patient adherence to rehabilitation is low due to challenges involving transportation. In this context, telerehabilitation could be a viable and even vital tool. The best course of action may be to use a virtual clinic to educate patients and assess their compliance with at-home exercises, goal-setting and action-planning. In a setting similar to SA, telerehabilitation was found to facilitate ongoing rehabilitation care post-hospital discharge and during follow-up, as well as to enhance engagement with remote rehabilitation services as compared to conventional methods (Kargar *et al.*, 2020). Additionally, telerehabilitation protocols showed good adherence rates (Nabutovsky *et al.*, 2020).

To ensure that the most suitable technology is being used properly, it is critical for rehabilitation clinicians and patients to undertake telerehabilitation training. Nonetheless, this has been identified as a major obstacle. The Saudi guidelines on implementing telerehabilitation assured that all specialists must receive training and education regarding the safety of equipment and the implementation of safety measures during telerehabilitation (Qureshi *et al.*, 2021). However, none of the participants in this study had received any training regarding telerehabilitation. Thus, there is a need for guidance about how to create a focused training programme that suits the needs of therapists, enabling them to provide better post-discharge care.

5.7. Study limitations

Some limitations must be acknowledged. Firstly, online platforms were employed to conduct the focus groups and interviews. Generally, online focus groups can be beneficial because they enable participants to remain anonymous during discussions. Nonetheless, online interactions may not be able to capture the complexities of the topic and real-life reactions fully or accurately, which are critical in providing comprehensive insights into participant dynamics (Stewart and Shamdasani, 2017). Another limitation was encountered due to poor internet connectivity during a few of the interviews. This hindered smooth communication and may have affected the quality and depth of the data collected during those particular interviews. Furthermore, because the sample population was limited to a single city in SA, it is challenging to ensure the transferability of the findings. Therefore, the perspectives and experiences captured in the study may not fully represent the diversity of viewpoints and practices that exist across regions. Moreover, the maximum number of work experience years for the therapists included in this project was 10 years, and thus, their experience may have been limited.

5.8. Conclusion

This qualitative study investigated the perspectives of therapists on long-term care for patients with stroke. The findings highlighted a lack of quality in the services provided post-discharge. The study identified a need for a training programme designed to improve therapists' proficiency in providing long-term care post-stroke, especially in terms of the limited availability of community rehabilitation services in SA. It is suggested that healthcare organisations and policymakers should collaborate to establish structured and organised post-

discharge services for stroke patients. Furthermore, efforts should be made to increase the availability and accessibility of community-based rehabilitation services for stroke survivors. The next chapter will provide details on how the STP was designed based on the above three stages.

Chapter 6: Designing the Stroke Training Programme (STP) to Improve Long-Term Care for Saudi Arabian Stroke Patients

6.1. Chapter overview

This chapter highlights the rationale for providing training for physiotherapists in SA. Further, it details the STP's development, the application of the Six Steps in Quality Intervention Development (6SQuID) framework in developing the training, and a conclusion.

6.2. Introduction

Continuous education is essential to provide high-quality care for stroke patients, as well as other patients. However, SA has limited stroke care training, as discussed in Chapter 1. This lack of training has hindered evidence-based practice (Alshehri *et al.*, 2017) and the use of outcome measures (Al-Muqiren *et al.*, 2017). Further, a review found that physiotherapists commonly lack stroke management training (Bindawas and Vennu, 2016). Thus, physiotherapists in SA need training on how to deliver long-term care for patients with stroke.

One possible way to enhance training for physiotherapists in SA is through online training (Preston *et al.*, 2012). Frequently reported advantages of online training are convenience, accessibility, time efficiency, comprehensiveness, and simplicity (Eng *et al.*, 2014). Evidence supports the effectiveness of online training worldwide (Cooper *et al.*, 2017; Kobak *et al.*, 2017; Scrivener *et al.*, 2021), and in SA (Al-Dabaan, Asimakopoulou and Newton, 2016; Almutairi, 2022).

6.3. The STP.

The STP is an online training programme that consists of four modules that provide guidance to physiotherapists in SA on stroke care. The STP was presented in a PowerPoint format as pre-recorded lectures via Zoom and delivered by the PI (BT). The full components of the STP and additional resources are provided in detail along with justification in (Appendix 18).

6.4. Development of the STP

Numerous frameworks can be employed to develop an online training programme, including the Analyse, Design, Develop, Implement, and Evaluate (ADDIE) model and Kirkpatrick's four-level training evaluation model (Molenda, 2003; Praslova, 2010); however, these models are better suited for programme evaluation, rather than development. On the other hand, there are several intervention development frameworks in healthcare, including the medical research council (MRC) framework (Craig *et al.*, 2008); intervention mapping (Bartholomew, Parcel and Kok, 1998); the conceptual framework for planning intervention-related research (De Zoysa *et al.*, 1998); and the framework for the design and evaluation of complex interventions to improve health (Campbell *et al.*, 2007). Intervention mapping involves highly technical and detailed methods which can take years to implement, while the conceptual framework for planning intervention-related research and the framework for design and evaluation of complex interventions to improve health are the opposite, as the approaches lack sufficient guidance and practical steps on developing an intervention. The MRC framework does not provide further details on the three stages (1, 2, and 3) and mainly focuses on evaluation. Thus, these frameworks were not adopted for this work, due to being overly complex or providing insufficient guidance regarding the development of the intervention. Additionally, they have been primarily employed as a means of developing interventions to be implemented by healthcare practitioners and not as training programmes.

The 6SQuID framework provides a useful foundation for the development of a public health intervention (Wight *et al.*, 2016). It consists of six stages and was suitable for designing the STP, because it covers all aspects from problem identification to implementation planning and is simple and applicable to the current study. The framework facilitates the efficient utilisation of limited public resources by prioritising systematic intervention development, suitable implementation, and comprehensive evaluation (Pringle *et al.*, 2018). Furthermore, this approach focuses on developing health interventions within the pragmatic focus, which is aligned with the researcher's stance at this stage. The six steps are discussed below:

Step 1: Define and Understand the Problem and its Causes.

The initial phase in intervention development involves identifying the issue with stakeholders by utilising the available research evidence (Wight *et al.*, 2016). For the purpose of this stage, three studies were conducted to explore the needs of stroke survivors and physiotherapists (Stages 1, 2, and 3).

Stroke care in SA has many limitations, such as the lack of stroke units (Al-Senani *et al.*, 2019), lack of post-discharge services (Al Khathaami *et al.*, 2011), and lack of care standardisation (Alqahtani, Kashoo and Ahmad, 2018). Patients with stroke in SA could have a low quality of life (Asirvatham and Marwan, 2014) and many psychological disorders, such as anxiety and depression (Al-Busaidi and Alamri, 2016). It is critical to identify effective solutions to improve stroke care in SA. Thus, assessment of patients' needs was vital to assess the effectiveness of services provided to them. Moreover, an assessment of physiotherapists' training needs to deliver effective stroke care was necessary. The first stage suggested that the availability and suitability of information provided to patients were both lacking. In addition, the care they received was inadequate. The second stage revealed that patients with stroke in

SA lacked adequate rehabilitation services post-discharge. Care continuity was one of the main reported limitations in stroke care in SA. The third stage suggested many barriers relating to long-term approaches and the need for training on numerous aspects for physiotherapists, such as providing proper education to the patients and long-term approaches for stroke care.

In SA, cultural and religious beliefs play a crucial role in shaping both the approaches of healthcare providers and the attitudes of patients towards rehabilitation (Felemban, O'Connor and McKenna, 2014). Islamic values, such as the importance of patience, family, and community may, in particular, affect physiotherapists' interactions with patients and influence patients' attitudes and behaviours within rehabilitation. Tailored education and communication strategies that align with cultural norms and values are thus key to ensuring behaviour change within patients; physiotherapists must deliver rehabilitation services that are culturally sensitive to support behaviour change.

Acknowledging the professional role and identity of physiotherapists in the context of long-term stroke care and rehabilitation are also integral to the success of rehabilitation outcomes. In SA, the role of physiotherapists has evolved significantly, although these professionals are often still seen as secondary to physicians in the healthcare hierarchy: indeed, many physicians in SA believe that physiotherapists are not qualified to independently assess patients (Alshehri *et al.*, 2018).

Step 2: Clarify which Causal or Contextual Factors are Malleable and Possess the Greatest Scope for Change.

The factors that shape the problem and have the greatest scope for change should be identified (Wight *et al.*, 2016). The insights acquired from stroke patients and therapists are valuable contributors to identifying the causal and contextual factors; however, it is crucial to identify the impact of certain factors, including the shortage of stroke units, the absence of community rehabilitation centres, poorly equipped hospitals, staff shortages, and the scarcity of standardised services. These elements require action from policymakers (rather than individual practitioners): therefore, it was determined that this study would only focus on the issues that could be directly addressed by the practitioners. These are the unmalleable factors within the scope of this PhD work.

The STP was designed to address the dominant limitations identified across stages 1, 2, and 3. These limitations were discharge and planning for transition, reduced therapy intensity, care continuity, and long-term approaches such as delivering education, self-management and telerehabilitation. Each identified gap was thus addressed with specific elements of the intervention, carefully selected from among recommendations taken from international guidelines that might be applicable to SA healthcare practices. Table 6.1 summarises the key findings from each stage and the key gaps found.

Table 6. 1: Summary of key findings from stages: Themes (findings)

Key training needed	First stage	Second stage	Third stage
Discharge planning	Transition in care from hospital to home was poor, disorganised, and fragmented.	Therapy experience (Delays in starting physiotherapy).	Limited post-discharge support (Lack of a post-discharge plan, Therapists neglecting post-discharge factors).

Education	Limited availability and suitability of information.	Coping barriers (lack of guidance).	Training needs (Lack of standardised guidance for patient education, need for structured caregiver training)
Continuity of care approaches Self-management + Family training + Telerehabilitation	Intervention needs (Programme intensity) Travel support Continuity of care (ongoing care, follow-up services and communication).	Therapy experience (Unsatisfied intensity of care, inability to access services and seeking private care). Post-discharge (Limited services). Continuity of care (Ongoing care, communication and follow up).	Quality and continuity of care (Barriers to the successful implementation of virtual clinics) Overarching limitations of care (Insufficient sessions and high workload, absence of follow-ups).
Goal-setting	Engagement in goal-setting (need for clear and individualised plan).	Rehabilitation programme (Providing a short-term and long-term treatment plan).	Training needs (Limited awareness of goal-setting process).
Patient needs and quality of life assessment	Intervention needs (Return to work, driving rehabilitation, sex rehabilitation, leisure activities, psychological support). Social needs (motivation, income support)	Rehabilitation programme (diet advice, speech therapy, psychological rehabilitation, return to work, driving assessment, intensive rehabilitation).	Training needs (Insufficient home assessment, Need for training on social support).

Step 3: Identify How to Initiate Change - the Change Mechanism.

Following the identification of the most viable causal factors that can be changed, the subsequent stage concerns identifying strategies to facilitate the change (Wight *et al.*, 2016). Throughout the three stages (1, 2, and 3), several key themes emerged repeatedly illustrated in table 6.2 along with change mechanism. Justification for change mechanism was provided in (Appendix 18).

Table 6. 2: Intervention components, justification and change mechanism.

Intervention components	Justification	Change mechanism
Transition	<p>One repeated concern that was raised across the three stages referred to post-discharge services and transition, including delays in initiating physical therapy, inadequate coordination between inpatient and outpatient services, and limited post-discharge planning. In the second stage, some patients reported that they had hired private therapists for sessions at home or sought out private clinics to address this gap. Additionally, there was a variation in the commencement of outpatient rehabilitation services in SA (ranging from one week to two months), with some patients experiencing a gap in rehabilitation services during the transition from inpatient to outpatient care settings in stage three. Thus, there is a clear lack of coordinating services post-discharge in SA, and discharge planning for stroke patients in SA requires increased focus.</p>	<p>Include, Discuss, Educate, Assess, and Listen (IDEAL) discharge planning form.</p>
Continuity of care (education)	<p>The lack of patient education, which is essential to care continuity, was evident in the first two stages. Physiotherapists, on the other hand, expressed the critical need for patients to receive comprehensive education regarding their medical conditions in the third stage. Education supports individual patients by enhancing their understanding of their illness, which facilitates their decision-making</p>	<p>Active education.</p>

	<p>process (Edwards, 2003). Moreover, education plays a crucial role in secondary stroke prevention and promoting effective self-management of chronic conditions (Tyson and Turner, 2000). Thus, training on delivering effective education to patients and their families was considered crucial.</p>	
<p>Continuity of care (family training).</p>	<p>Family training is an approach that applies to the Saudi Arabian context which can enhance care continuity. Involving family members plays a crucial role in assisting with activities of daily living and providing emotional support, and overall contributing to the rehabilitation process. However, carers are rarely provided the opportunity to develop a thorough understanding and knowledge of the requisite skills for the successful management and rehabilitation of the patients (Almehmadi and Alrashed, 2023). Further, carers play a crucial role in supporting home-based stroke survivors, and the provision of adequate training for carers reduces care costs and significantly improves the patient's quality of life (Kalra <i>et al.</i>, 2004).</p>	<p>Education of caregivers (Stroke for carer). Common questions after stroke. The questions were driven from (Heart and Stroke Foundation of Canada, 2024) checklists. Practical advice and tips.</p>
<p>Continuity of care (telerehabilitation).</p>	<p>Telerehabilitation is another vital approach which can be used to deliver rehabilitation services to individuals who are isolated and have limited access to services. Telerehabilitation is cost-effective, enables continuity of care, and can provide high levels of therapy (Laver <i>et al.</i>, 2020). Despite the apparent advantages of this</p>	<p>Operational measures. Considerations for ensuring safety during telerehabilitation.</p>

	approach, physiotherapists reported that they had not received any training regarding this approach.	
Continuity of care (self-management).	Another viable approach adopted in areas with limited community-based services is self-management (Chodosh <i>et al.</i> , 2005), which ensures access to rehabilitation for all patients. Encouraging patients to take an active role in self-management can enhance their ability to cope and achieve their primary goals by providing them with the pertinent knowledge, skills, and confidence they need to improve their ability to function and reintegrate into the community (Warner <i>et al.</i> , 2015).	Self-management intervention to improve mobility in the community after stroke (Sahely <i>et al.</i> , 2023). Graded Repetitive Arm Supplementary Program (GRASP). Patient Activation Measure (PAM).
Goal-setting for self-management	One approach that could facilitate self-management is providing a detailed rehabilitation plan and involving goal-setting in collaboration with the patient, their family members, and professionals (Conneeley, 2004). However, this process is frequently overlooked by physiotherapists, as identified in stage three. Goal-setting can influence patients' motivation, enhance their adherence and cooperation in rehabilitation, and reduce conflicts (Conneeley, 2004). Strategies to facilitate patient-centred care involve patient and family education regarding the pathology, improving therapists' skills, graded decision-making, and the use of standard measures to examine	SMART. Goal-setting and Action-Planning (G-AP). Goal attainment scale (GAS).

	all aspects while setting goals with patients (Rosewilliam, Roskell and Pandyan, 2011).	
Stroke assessment and outcome measures.	The need for training in other aspects was also emphasised by physiotherapists, such as delivering education to patients, stroke assessment, and effective use of outcome measures. The efficacy of physiotherapy treatment relies on the therapists' capacity to evaluate and analyse the underlying causes of the issues they seek to address (Kersten, 2004): therefore, physiotherapists must be well trained in this aspect. The effective use of outcome measures was another need noted by physiotherapists in the third stage and was also highlighted by a previous study in SA (Al-Muqiren <i>et al.</i> , 2017). Thus, these elements are considered crucial in training.	<p>The use of ICF.</p> <p>Stroke assessment (subjective and objective).</p> <p>Outcome measures training:</p> <p>Stroke Severity (NIH stroke scale).</p> <p>Motor function (Fugl-Meyer Assessment, Modified Ashworth scale).</p> <p>Activities of daily living (Barthel Index, Functional Independence measure).</p> <p>Quality of life (SS-QoL).</p> <p>Depression and Anxiety (Hospital Anxiety and Depression Scale).</p>

The above insights guided the development of the STP. Given physiotherapists' reported lack of training in these areas, in addition to the gap in the provision of effective care, as reported above, they need to undergo training regarding transition and care continuity techniques, such as providing effective education to patients and families, self-management, and telerehabilitation.

Step 4: Identify How to Deliver the Change Mechanism

In stage 4, it is crucial to identify how to deliver the required change (Wight *et al.*, 2016). A modern approach involves utilising the internet to deliver training, either entirely or partially, via training-specific websites or platforms (Holt *et al.*, 2015). Online training is a highly effective approach to the delivery of training to healthcare professionals, as it can enhance trainees' knowledge and influence clinicians' behaviour. Many characteristics distinguish this training from traditional methods, including the standardisation of instruction and evaluation and enhanced cost-effectiveness (Cendan and Lok, 2012).

Given the busy schedule of physiotherapists in SA, pre-recorded lecture mode training was considered to offer an effective approach and scalable approach. This allowed physiotherapists to access the training materials at their convenience, without having to commit to fixed times or to disrupt their busy workdays. Additionally, pre-recorded training can be reviewed multiple times (Kobak *et al.*, 2017). This sort of pre-recorded training has previously been found to be effective in improving students' communication skills (Soundy *et al.*, 2023). Additionally, in physiotherapy education, e-learning has been shown to be as effective as traditional methods of education in terms of enhancing students' knowledge, skills, satisfaction, and attitudes (ShahAli *et al.*, 2023). The STP training was also provided in

a mix of Arabic (framing) and English (medical terminology) to enhance students' understanding and engagement.

Step 5: Test and Refine on a Small Scale

The feasibility of the intervention should be tested, and adaptations should be made, including the content, structure, duration, and strategies to enhance the delivery of the intervention (Wight *et al.*, 2016). Stage 4 of this research provided a pilot evaluation of the STP. The study carried out pre-and post-training assessments to assess the change in the physiotherapists' knowledge, confidence and attitudes. Qualitative interviews one month post-training were conducted to assess therapists' perceptions and acceptability of the training. Additionally, an integration of quantitative findings and qualitative interviews was conducted to explain and relate the reasons for the change in the physiotherapists' knowledge, confidence and attitude. Details on this evaluation are provided in Chapter 7.

Step 6: Collect Sufficient Evidence of Effectiveness to Justify Rigorous Evaluation and Implementation

At this stage, sufficient evidence on the effectiveness of the intervention should be collected in order to move to a wide scale of evaluation (Wight *et al.*, 2016). Additionally, the outcomes of the intervention, such as the short-term should be assessed. The effectiveness and feasibility of the STP are discussed in detail in Chapters 7 and 8. The Template for Intervention Description and Replication (TIDieR) checklist for the STP can be found in Appendix 19, and a description of the modules in the STP can be found in Table 6.3.

Table 6. 3: Description of the STP.

Themes covered in the training	Topics included under each theme
Welcome	This section welcomed participants to the training and emphasised the importance of the training programme.
Module 1: Introduction to stroke care	This module provided an introduction to stroke pathology and stroke rehabilitation in hospitals and the community.
Module 2: Carer-education and care-transition	This module provided a demonstration of patient and carer education, discharge planning and home needs assessments.
Module 3: Outpatient care for stroke patients	This module provided a demonstration of the ICF, stroke assessment procedures, stroke outcome measures, and the process of goal-setting in the community settings.
Module 4: Self-management and telerehabilitation	This module provided evidence-based practice regarding the provision of supported patient self-management approaches and the effective employment of telerehabilitation.

6.5. Conclusion

This chapter described the rationale for designing the STP. It also detailed how the programme was developed using the 6SQuID framework. The next chapter discusses the evaluation of the STP using two phases, namely pre-and post-training questionnaires and qualitative interviews post-training.

Chapter 7: Evaluating a Stroke Training Programme (STP) for Physiotherapists to Improve the Delivery of Long-term Care for Patients with Stroke in Saudi Arabia: a Pilot Mixed Methods Design.

Publication

Temehy, B. Soundy, A. and Rosewilliam, S. (under review) 'Evaluating a Stroke Training Programme (STP) for physiotherapists to improve the delivery of long-term care for patients with stroke in Saudi Arabia: A pilot mixed methods design' (Appendix 4).

7.1. Chapter overview

This chapter starts with an introduction, followed by the aim and methods used to collect and analyse the data. Then, the quantitative, quantitative, and integrated results are demonstrated. Finally, the discussion and conclusion are provided.

7.2. Introduction

The lack of training provided to physiotherapists in SA has been highlighted in the previous chapters (Chapters 1 and 5).

A modern approach involves utilising the internet to deliver training, either entirely or partially, through training-specific websites or platforms (Holt *et al.*, 2015). E-learning is an easily expandable and accessible training method (Kobak *et al.*, 2017). Studies have indicated that digital training is equally or more effective compared to traditional methods, especially in knowledge and skills acquisition (Frank, Becker-Haimes and Kendall, 2020; Ødegaard *et al.*, 2021). Digitalisation is rapidly increasing in the healthcare system in SA (Alharbe, 2021).

Evidence from other countries supports the use of online platforms to deliver training for physiotherapists in task-specific training in physiotherapy after stroke (Scrivener *et al.*, 2021), interpersonal psychotherapy (Kobak *et al.*, 2017), cognitive behaviour therapy (Cooper *et al.*, 2017), and self-management interventions (Hurley *et al.*, 2019).

Online training has been evaluated for its effectiveness in SA for delivering training for teachers (Almutairi, 2022) and dental practitioners (Al-Dabaan, Asimakopoulou and Newton, 2016). The findings of both studies indicated an improvement in the participants' skills and knowledge, leading to the conclusion that online training is effective. Further, one training programme provided comprehensive education to nurses in person about stroke care in SA (Catangui, 2015) and found that the training was an effective way of learning for nurses. To the best of the author's knowledge, no study has been conducted to date to evaluate an online training programme for physiotherapists to enhance stroke care in SA. Hence, this study aimed to address this gap by evaluating the effectiveness of such training.

7.3. Aim and objectives

This study aimed to evaluate an online training programme that was developed to build the knowledge and skills of physiotherapists to deliver long-term care following the discharge of stroke patients.

Objectives

- 1- To evaluate the effectiveness of the STP in improving physiotherapists' knowledge, attitudes, and confidence.
- 2- To assess the perceptions of usefulness and acceptability of the STP.

- 3- To understand and relate reasons for improvement or lack of it in the knowledge, skills and confidence aspects using qualitative data through the opinions and perceptions of the physiotherapists.

7.4. Methodology

7.4.1. Design

This study was a pilot sequential explanatory mixed methods design with two phases. Phase one involved quantitative data from a before-and-after (pre-test and post-test) design, which is a widely used approach to assess online training programmes. This phase aimed to measure the change in knowledge, confidence and attitudes between pre-training and post-training. The second phase comprised qualitative interviews, which aimed to gain a deeper understanding of physiotherapists' perceptions and acceptability of the STP. The interviews were conducted one month after completion of the training. The one-month follow-up was chosen for pragmatic reasons and the study timeline. Ethical approval to conduct this study was provided, as set out in Appendix 8.

7.4.2. Participants

The participants recruited for this study were physiotherapists of any gender who were currently providing therapy to stroke patients and working in SA. Participants had to have access to the requisite online technology, such as Zoom or Teams, which enabled them to participate remotely. Participants were excluded if they were working outside the city for which ethical approval was sought.

7.4.3. The outcome measure instrument

Researchers frequently adopt one of three primary methodologies when using a questionnaire-based approach: the utilisation of pre-existing questions, the modification and adaptation of existing questionnaires, or the development of a new questionnaire (Estabrooks and Wallin, 2004). This study adopted the third approach, as to the best of the author's knowledge, no available instrument currently covers all aspects of the STP. The instrument measured three main elements: knowledge, attitude, and confidence. The knowledge element in the questionnaire consisted of 15 multiple-choice items that reflected the content of the STP. The second element was attitude, which consisted of three multiple-choice questions and four items in the form of Likert-type scales designed to measure the change in physiotherapists' attitudes. The final aspect was confidence, and consisted of five rating questions that covered the module aspects. Identical questions were repeated on both occasions (pre- and post-training). An additional section was added to the post-training questionnaire which assessed satisfaction. Fifteen items with Likert-type and open-ended response options were developed to assess the satisfaction and experience of an online programme. The questions in this section were adapted from a similar study (Meiser *et al.*, 2022). The full copy of the questionnaires can be found in Appendix 20 and the full content of the training was described previously in Chapter 6.

The questions were translated into Arabic. The translated version was sent to a linguistic colleague for feedback on the Arabic version. The second version was sent to a physiotherapist (not eligible for the study, as he was not from the city for which we had ethical approval). Minor changes were made, including (1) adding diploma choice to the demographic section, (2) rephrasing one question in the satisfaction section, and (3) rephrasing two items in the knowledge section for clarity.

7.4.4. Procedure

The heads of the departments of the participating hospitals were informed of the study requirements by the principal investigator (PI). The PI then contacted them to obtain a list of physiotherapists, who were subsequently contacted and provided with an information sheet if they were interested and eligible. Potential participants had two days to consider participating, during which they had the opportunity to ask questions to the researcher. If they decided to participate, the PI obtained informed consent electronically. Consent forms were signed and sent by email or WhatsApp by participants themselves.

7.4.5. Data collection

The eligible therapists were contacted with the information on the procedure of the whole study. Firstly, participants were required to complete a pre-training questionnaire. The questionnaire was set up in Microsoft Forms and sent to the participants before the training. Quantitative data pre-training was collected from April 5 to June 12, 2024. Demographic information, including age, gender, education level, and years of clinical expertise, were collected. Once the pre-questionnaire had been completed, the link for the STP was sent. Participants were asked to inform the PI when they had completed the STP; otherwise, researchers checked if the training was completed. After training completion (within a week), participants received another questionnaire (post-training questionnaire).

One month after the STP was completed, participants received an invitation via email to participate in a follow-up interview over the phone or on Zoom. The interview explored therapists' experiences of the STP, what aspect of the learning sessions was considered the

most valuable, and what modifications needed to be made to the STP. To facilitate the learning process, supplementary resources and additional materials were provided to the participants. These resources included tutorial access, guides, and links to online educational materials and videos. If participants did not complete the post-training questionnaire, their data were excluded from the study. Participants were given one month to complete the training. The post-training interview guide can be found in Appendix 21.

7.4.6. Sample size

Quantitative phase: convenience sample of 30 participants were used for this pilot study, which is supported by the recommendation of qualitative studies (Browne, 1995). Thus, a sample size of 30 participants may provide valuable insights into the efficacy of the investigated intervention.

Qualitative phase: convenience sampling was used to select participants for interviews from those who had completed the STP. In qualitative studies, no specific method is used in sample size calculation, so data saturation was used as a sample size guide (Mason, 2010). The exact size was informed by information power (Malterud *et al.*, 2016).

7.4.7. Data analysis

For phase one, frequency tables were used to summarise demographic variables. The Chi-Square test was used to compare categorical variables to determine whether there was a relationship between variables (Pallant, 2011). Wilcoxon's test was used to compare data that were not distributed normally (Fagerland and Sandvik, 2009). The significance level for all comparisons was set at $p < 0.05$. Additionally, to assess the change in the variables according to demographics, the Mann-Whitney test was used to assess the change against age and

gender, while the Kruskal-Wallis test was used to measure the change according to participants' education levels and their years of expertise in physiotherapy and stroke care. The analysis was limited to individuals who filled out both the pre-and post-training questionnaires.

For the data from the qualitative phase, reflexive thematic analysis was used (Braun and Clarke, 2019). The PI (BT) performed the coding and categorising of the data. Line-by-line coding was conducted to generate initial codes. The PI identified patterns and clustered similar codes together to generate themes (Braun and Clarke, 2019). The final step of the analysis was carried out to integrate the data from the two phases.

7.4.8. Quality of the study

Several measures were employed to enhance the quality of the questionnaire. Firstly, the validity of the questions was improved through assessments and reviews by senior researchers. Secondly, the accuracy of the translated version was enhanced by having a linguistic expert review the questions. The questions were piloted on one physiotherapist holding a master's degree to identify and minimise any issues. Formatting bias was reduced by designing the questionnaires to follow the recommendations from previous studies (Choi and Pak, 2005; Krosnick, 2018). Items were kept simple, short, and written in two languages to ensure clarity of the questions. The content was relevant to the STP, appropriate in length, and efforts were made to avoid leading questions. Additionally, selection and sampling bias were reduced by contacting every individual on the lists provided by the department heads at the seven hospitals. Participants were blinded to the study's aims to prevent response bias.

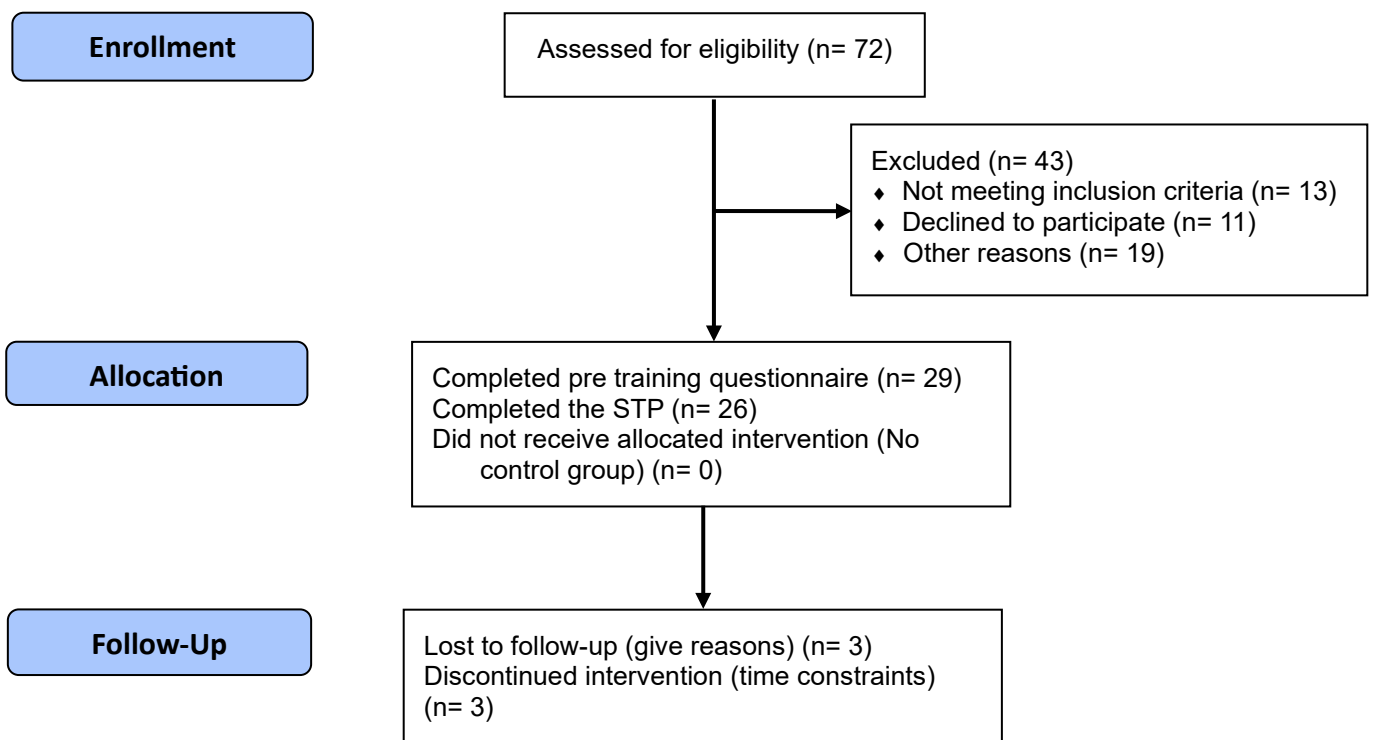
7.5. Findings

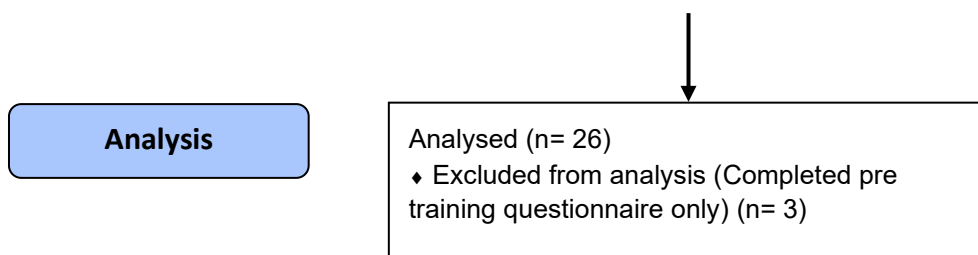
Detailed findings are presented in flow diagrams and tables in this section and only the significant findings have been presented in the narrative.

7.5.1. Participant Flow

A total of 72 physiotherapists were contacted to participate in the study. Of them, 13 did not meet the inclusion criteria, 11 declined to participate, mainly because of time constraints, and 19 either did not reply or initially agreed to participate but subsequently failed to complete the pre-training questionnaire. Three participants completed the pre-training questionnaire but did not complete the training. A summary of the flow of participants in this study can be seen in Figure 7.1, a total of 26 participants completed the programme and outcome measure assessment and 16 participants were interviewed one-month post-training.

Figure 7. 1: CONSORT flow diagram of participants in the study





7.5.2. Participant Characteristics

Participants were most often female (17 female, 9 male) and the majority of participants (80.8%) were 30–39 years old, while the remaining 19.2% were 18–29 years old. In terms of participants’ education, 61.5% of the participants had bachelors’ degrees, 30.8% of the participants had masters’ degrees, and 7.7% were in their internship period. Most participants (61.5%) had 6 to 10 years’ experience as physiotherapists. The participants’ characteristics are presented in Table 7.1.

Table 7. 1: Summary of participants’ characteristics.

Variable	Characteristics	n (%)
Gender	Female	17 (65.4)
	Male	9 (34.6)
Age	18-29 Years	5 (19.2)
	30-39 Years	21 (80.8)
Education	Bachelor	16 (61.5)
	Internship	2 (7.7)
	Master	8 (30.8)
Total years of experience as a physiotherapist	Less than 1 Year	2 (7.7)
	1-5 Years	4 (15.4)
	6-10 Years	16 (61.5)
	11-20 Years	4 (15.4)
Total years of experience in stroke care	Less than 1 Year	5 (19.2)
	1-5 Years	6 (23.1)
	6-10 Years	14 (53.8)
	more than 10 Years	1 (3.8)

7.5.3. Quantitative results

1- Change in knowledge.

Knowledge of education and planning:

Education (Q1): Post-training, the improvement in knowledge in educating patients and carers was not statistically significant ($p=0.257$). However, there was still an increase in correct responses to 23 (88.5%).

Planning (Q2-3): Post-training, while there was an improvement in knowledge on post discharge planning 10 (38.5%) to 15 (57.7%), this change was not statistically significant ($p=0.197$). In contrast, a statistically significant improvement was identified in knowledge of the intensity of rehabilitation, with correct responses increased to 20 (76.9%) ($p=0.008$).

Knowledge of stroke assessment

Stroke assessment (Q4-7): the results indicated significant improvements across all assessment items post-training. Stroke severity assessment knowledge increased significantly to 24 participants (92.3%) ($p=0.001$). Further, there was a notable increase with the number of participants correctly identifying regular assessment intervals which increased to 15 (57.7%) ($p=0.001$).

Following the training, knowledge of the Fugl-Meyer assessment scale significantly improved to 25 correct responses (96.2%) ($p=0.008$), while recognition of the Barthel Index increased to 26 (100%) ($p=0.014$).

Knowledge of goal-setting, self-management and telerehabilitation

Goal-setting (Q8-10): Knowledge of goal-setting and action-planning improved significantly post-training, with 25 (96.7%) participants showing correct knowledge ($p=0.001$). Similarly, understanding of what constitutes a good action plan increased from 10 (38.5%) to 25 (96.2%) ($p=0.001$). Additionally, familiarity with the Goal Attainment Scale (GAS) rose from 11 (42.3%) to 25 (96.2%) ($p=0.001$).

Self-management (Q11-14): knowledge improved significantly in all self-management items. Post-training, 23 participants (88.5%) demonstrated awareness of common self-management strategies ($p=0.021$). Further, familiarity with Graded Repetitive Arm Supplementary Programme (GRASP) rose significantly from 8 participants (30.8%) to 20 participants (76.9%) ($p=0.001$). Understanding of different GRASP versions also improved, increasing from 10 participants (38.5%) to 22 participants (84.6%) ($p=0.003$). Post-training knowledge of Patient Activation Measure (PAM) reached 100%, with all 26 participants demonstrating awareness ($p=0.003$).

Telerehabilitation (Q15): pre-training, most participants (21; 80.8%) understood safety measures during telerehabilitation. Post-training, comprehension of safety protocols significantly improved, with correct responses rising to 26 participants (100%) ($p=0.025$).

Table 7.2 demonstrates the findings in detail, and full items can be found in Table 5 (Appendix 22).

Knowledge and participant characteristics

The trends in knowledge gain levels in relation to participants' characteristics were explored. Female participants' knowledge gain level was significantly higher than that of male participants ($p=0.045$). Participants who were in the younger age group demonstrated lower

knowledge gain: the mean knowledge level of 30–39-year-olds was significantly higher than the mean for 18–29-year-olds ($p=0.028$). Further, participants' number of clinical years as a physiotherapist had an influence on the level of knowledge gain, with participants who had been practising for 6–10 years demonstrating a statistically significant knowledge gain than other groups ($p=0.008$). Table 6 demonstrates the change in knowledge level according to demographic variables (Appendix 22).

Table 7. 2: Differences in items of knowledge between pre-test and post-test

Category	Items	Pre (n/%)		Post (n/%)		Wilcoxon	
		Correct	Incorrect	Correct	Incorrect	Test Value	P-value
Education	Q1	20 (76.9)	6 (23.1)	23 (88.5)	3 (11.5)	-1.13	0.257
Planning	Q2	10 (38.5)	16 (61.5)	15 (57.7)	11 (42.3)	-1.29	0.197
	Q3	10 (38.5)	16 (61.5)	20 (76.9)	6 (23.1)	-2.67	0.008**
Assessment	Q4	9 (34.6)	17 (65.4)	24 (92.3)	2 (7.7)	-3.87	0.001***
	Q5	1 (3.8)	25 (96.2)	15 (57.7)	11 (42.3)	-3.74	0.001***
	Q6	18 (69.2)	8 (30.8)	25 (96.2)	1 (3.8)	-2.65	0.008**
	Q7	20 (76.9)	6 (23.1)	26 (100)	0 (0)	-2.45	0.014*
Goal-setting	Q8	11 (42.3)	15 (57.7)	25 (96.2)	1 (3.8)	-3.74	0.001***
	Q9	10 (38.5)	16 (61.5)	25 (96.2)	1 (3.8)	-3.87	0.001***
	Q10	11 (42.3)	15 (57.7)	25 (96.2)	1 (3.8)	-3.74	0.001***
Self-management and Telerehabilitation	Q11	15 (57.7)	11 (42.3)	23 (88.5)	3 (11.5)	-2.31	0.021*
	Q12	8 (30.8)	18 (69.2)	20 (76.9)	6 (23.1)	-3.21	0.001***
	Q13	10 (38.5)	16 (61.5)	22 (84.6)	4 (15.4)	-3.00	0.003**
	Q14	17 (65.4)	9 (34.6)	26 (100)	0 (0)	-3.00	0.003**
	Q15	21 (80.8)	5 (19.2)	26 (100)	0 (0)	-2.24	0.025*

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

2- Change in attitude.

Changes in attitudes about assessment, goal-setting, and goal achievement methods:

Assessment methods prior to discharge: pre-training, 11 participants (42.3%) utilised the Include, Discuss, Educate, Assess, and Listen (IDEAL) discharge planning form to prepare patients for discharge. While 6 participants (23.1%) asked patients directly for goals, 4 participants (15.4%) developed their own assessment methods. Post-training, the percentage

of participants using no particular method to assess patients' the needs decreased from 5 (19.2%) to 1 (3.8%).

Goal-setting: Post-training, the number of participants with no specific goal-setting methods dropped to 2 (7.7%) from 10 (38.5%). In contrast, the use of the GAS increased slightly, with 11 participants (42.3%) indicated they utilised this scale. Additionally, 9 participants (34.6%) adopted the G-AP approach.

Monitoring goal achievement: Post-training, the reliance on personal experience and clinical judgment decreased to 5 participants (19.2%). Furthermore, discussions regarding goals with the multidisciplinary team rose to 4 participants (15.4%). Table 7.3 illustrates the differences between pre-and post-training findings in assessment practice and goal-setting.

Table 7. 3: differences between pre-test and post-test in assessment practice.

Variable	Methods	Pre	Post
		n (%)	n (%)
Assessment methods of patients' needs prior to discharge to community	No Particular Method	5 (19.2)	1 (3.8)
	Ask Patients	6 (23.1)	5 (19.2)
	IDEAL discharge planning form	11 (42.3)	10 (38.5)
	Team has developed its own method	4 (15.4)	6 (23.1)
	other	0 (0.0)	4 (15.4)
Goal-setting	No Particular Method	10 (38.5)	2 (7.7)
	Goal attainment scale	10 (38.5)	11 (42.3)
	G-AP	0 (0.0)	9 (34.6)
	Team has developed its own methods	6 (23.1)	4 (15.4)
	Others	0 (0.0)	0 (0.0)
Monitoring of goals	Using outcome measures	11 (42.3)	12 (46.2)
	In discussion with the MDT	1 (3.8)	4 (15.4)
	I use my experience and clinical judgment (individually decided by staff)	11 (42.3)	5 (19.2)
	Decided by patient	3 (11.5)	5 (19.2)

Attitudes towards education, goal-setting, outcome measures and telerehabilitation:

Following STP training participants showed improvement in attitudes, however, these changes in attitude scores for education, outcome measures, and goal-setting were not statistically significant. Nevertheless, a significant improvement was observed in attitudes toward telerehabilitation.

Pre-training, education for patients and carers was rated ‘extremely important’ by 20 participants (76.9%), increased to 23 (88.5%) post-training ($p=0.768$). Similarly, the rating for using outcome measures as ‘extremely important’ rose from 16 participants (61.5%) to 21 (80.8%) after training ($p=0.599$). Additionally, the importance of setting goals with patients increased from 14 participants (53.8%) pre-training to 22 (84.6%) post-training ($p=0.349$).

In contrast, attitudes towards telerehabilitation showed a significant change, with those considering it ‘extremely important’ increasing from 15 participants (57.7%) pre-training to 18 (69.2%) post-training ($p=0.02$). Table 7.4 shows the differences between pre-test and post-test attitude scores.

Further, considering demographics, the greatest attitude changes were seen in those who were in their internship period, younger participants (18–29 years), and those who had fewer than 5 years of experience. Table 4 shows the changes in attitude according to demographic variables (Appendix 22).

Table 7. 4: differences between pre-test and post-test in attitude.

Variable	Rating	Pre	Post	Chi-Square	
		n (%)	n (%)	Test Value	P-value
Importance of patients' and	Moderate	1 (3.8)	0 (0.0)	0.53	0.768
	Very Important	5 (19.2)	3 (11.5)		
	Extremely Important	20 (76.9)	23 (88.5)		

carers' education					
Importance of using outcome measures in stroke care	Moderate	1 (3.8)	1 (3.8)	2.76	0.599
	Very Important	9 (34.6)	4 (15.4)		
	Extremely Important	16 (61.5)	21 (80.8)		
Importance of goal-setting session with patients and family	Moderate	1 (3.8)	0 (0.0)	2.11	0.349
	Very Important	11 (42.3)	4 (15.4)		
	Extremely Important	14 (53.8)	22 (84.6)		
Importance of tele-rehabilitation for patients with stroke	Low	3 (11.5)	0 (0.0)	15.02	0.02*
	Moderate	5 (19.2)	3 (11.5)		
	Very Important	3 (11.5)	5 (19.2)		
	Extremely Important	15 (57.7)	18 (69.2)		

Note: * $p < 0.05$.

3- Change in confidence.

Pre-training, confidence in providing patients with the necessary support prior to discharge scored the highest, as the mean confidence score was 8.58 out of 10 (SD 1.68), and demonstrated the lowest change post-training, at 9.19 ($p= 0.095$). Confidence in providing carers with education and support during the rehabilitation process was the second highest item pre-training, with a mean score of 8.35 (SD 1.50), which rose post-training to 9.42 (SD 0.99) ($p= 0.009$).

The mean confidence in using outcome measures was moderate, at 7.15 (SD 2.68). This level increased post-training to 9.46 (SD 0.86) ($p=0.0001$). While participants' confidence in goal-setting was the lowest pre-training, goal-setting showed the greatest improvement post-training, rising from 6.73 (SD 2.24) to 9.46 (SD 0.95) ($p=0.0001$). Further, the mean confidence level for providing effective telerehabilitation pre-training was 6.85 (SD 2.75). This level increased significantly to 8.69 (SD 2.02) ($p=0.0001$). Table 7.5 shows differences in items of confidence between the pre-test and post-test.

Additionally, participants holding masters' degrees showed higher confidence than other groups, with a mean of 83.44 (SD 32.95). Table 8 shows the change in confidence level based on the demographic variables (Appendix 22).

Table 7. 5: Differences in items of confidence between the pre-test and post-test.

Items	Pre	Post	Wilcoxon	
	Mean (SD)	Mean (SD)	Test Value	P-value
Item 1: Carer education “I feel confident in providing carers the education and support they need to help in the rehabilitation process”	8.38 (1.50)	9.42 (0.99)	-2.611	0.009***
Item 2: Transition “I feel confident in providing stroke patients the necessary support prior to discharge”	8.58 (1.68)	9.19 (1.27)	-1.669	0.095
Item 3: Outcome measures “I feel confident in using outcome measures related to stroke care”	7.15 (2.68)	9.46 (0.86)	-3.558	0.0001***
Item 4: Goal setting “I feel confident in using G-AP to set goals for patients with stroke”	6.73 (2.24)	9.46 (0.95)	-3.88	0.0001***
Item 5: Telerehabilitation “I feel confident in providing effective rehabilitation virtually”	6.85 (2.75)	8.69 (2.02)	-2.939	0.003**

Note: ** p < 0.01, *** p < 0.001.

4- Usage and satisfaction

The mean score for the appropriateness of the online format was 9.12 (SD 1.14), reflecting a high degree of appropriateness. The majority of participants (n=17; 65.4%) completed the STP in one sitting, while 9 (34.6%) needed multiple sessions. Among those who did not complete the programme in one sitting, 4 (44.5%) returned three times, 3 (33.3%) returned four times, and the rest returned either twice or five times. Furthermore, 21 (80.8%) of participants believed that the duration of the online training programme was about right, with a small proportion finding it too short (n=2; 7.7%). In terms of content quality, 24 (92.3%) of

the participants found the training content to be informative and clear. Furthermore, 21 (80.8%) of respondents rated the content as adequate, 23 (88.5%) as appropriate, and 22 (84.6%) as both relevant and useful. The overall satisfaction with the training was very high for a majority of participants (n=18; 69.2%). Additionally, 25 (96.2%) of the participants felt that the training covered everything they needed, with just 1 (3.8%) indicating that something was missing. Table 7.6 and 7.7. summarises the usage and satisfaction findings.

Table 7. 6: Satisfaction of the STP.

Question	Category	n (%)
Complete the STP in ONE sitting	No	9 (34.6)
	Yes	17 (65.4)
The number of times they returned to the programme before completion	2 times	1 (11.1)
	3 times	4 (44.5)
	4 times	3 (33.3)
	5 times	1 (11.1)
Length of the STP	Too Much Short	1 (3.8)
	Short	2 (7.7)
	About right	21 (80.8)
	Long	2 (7.7)
Satisfaction of the information contained in the STP	Very Dissatisfied	1 (3.8)
	Satisfied	7 (26.9)
	Very Satisfied	18 (69.2)
Aspects they wanted to add but not covered in the STP	No	25 (96.2)
	Yes	1 (3.8)

Table 7. 7: Satisfaction of the STP.

Appropriateness of online format.	Rating		Mean (SD)
	Maximum	10	
Minimum	7		
Accessibility of additional information	Maximum	10	9.35 (0.892)
	Minimum	7	

7.5.4. Qualitative findings

Three themes were identified: (1) Feedback and experience, (2) Limitations in the STP, and (3) The applicability of the training. A summary of the themes is provided in Table 7.8.

Table 7. 8: Summary of the themes.

Theme	Sub-themes	Definition
Feedback and experiences.	Overall experiences	This theme reflected participants' experiences with the STP.
	Content feedback	
	Particular useful aspects	
Limitation of the STP.	Lack of practical content	This theme highlighted the programmes' limitations and included suggestions for improvement.
	Short duration of the training	
	Superficial explanations of specific topics	
	Online delivery	
Applicability of information.	Applicable content	This theme addresses how the information from the STP can be practically applied.
	Challenges to applicability	
	Maintain accessibility	

Theme 1: Feedback and experience.

Participants' experiences with the STP seems to be positive. They found the training smooth, clear and simple to understand. Participant 16 stated, "*It was a programme with scientific value, presented in an easy and understandable way, supported by all the latest updates in the rehabilitation of stroke patients*". Participant 24 added, "*I liked the explanation, ease of access to information, presentation, and the useful and new information*". Participant 12

stated, *“I liked the explanation was in Arabic, as you know not all physiotherapists have good English language”*.

Participants indicated the usefulness of the content in providing them with relevant, detailed, and up-to-date information. Participant 1 said, *“The ease and clarity of the information, the programme had a lot of useful information, and honestly, much of it was new to me”*.

Additionally, participants suggested that the programme was useful for new physiotherapists, since it provided fundamental knowledge required for their professional development, as illustrated in Participant 2’s comment: *“Most of the provided information is recent and detailed enough to help any new physical therapist understand what a stroke is and how to treat it in detail”*.

The assessment section, outcome measures, and goal-setting were reported to be the most useful elements of the stroke training programme. Participants highlighted that the programme offered them a recap of information such as the assessment procedures for stroke. Participant 13 stated, *“The assessment section provided a valuable recap of important information, which we need”*. Additionally, the programme provided them with new information such as the G-AP approach for setting goals, self-management strategies, and GRASP. Participant 7 stated, *“The sections on goal-setting and outcome measures were excellent and useful. There were many new parts, like the patient activation measure, which was also new to me”*. Participant 1 added, *“The self-management part was somewhat new and had excellent information”*. The outcome measures information was among the most frequently identified as useful information. Participant 13 said, *“Some of the outcome measures mentioned in the training were very useful”*.

Theme 2: Limitations

The STP had a few areas for improvement, as noted by the participants, including lack of practical content, short duration, superficial explanations of specific topics, and online delivery. One key point was the lack of practical components and clinical scenarios, which are essential for implementing theoretical information. Additionally, the programme was short, as stated by Participant 7: *“The programme was short and lacked practical aspects”*. Participant 12 stated, *“You could expand the information further so that it can be divided into two, three, or more lectures, in order to benefit us to a greater extent”*. Participant 4 added, *“The information may be more useful theoretically than practically”*.

Further, there was a need for in-depth explanations on topics such as outcome measures and telerehabilitation, which are essential for comprehensive patient care. Participant 13 said, *“If the outcome measures were deeper, not just a quick overview, it would be better, because that’s the part we need the most”*. Additionally, a few participants indicated that they preferred in-person workshops over online training in order to facilitate interactive learning and practical application. Participant 4 said, *“It could be adding practical parts, maybe a real workshop rather than online”*.

Theme 3: Applicability and adaptation

Few participants noted that the applicability of training elements in practice was simple, and some participants had successfully utilised information acquired from the training such as the outcome measures. Participant 12 stated, *“It’s easy to implement the information, and with continuous practice, it could become easier”*. Participant 1 added, *“I used the Fugl-Meyer, and I used some outcome measures like the depression scale”*. However, many participants indicated that effective application of this information requires that physiotherapists need to

have adequate time, good management, and collaboration across all departments. Participant 4 stated, *“Implementing these things requires time and good management, and we are under significant time pressure”*. He added, *“Having education sessions and goal-setting for every patient every two weeks is difficult because they require a lot of time”*. Several participants asked for the supplementary file that contained all checklists and references in the training. Additionally, a few participants suggested that the programme should remain available to them beyond the research period and should be widely disseminated to those who want to improve their knowledge of stroke care. Participant 16 said, *“I hope the programme remains available for those who wish to develop themselves in the future”*.

7.5.5. Integration of findings

Integration of the findings revealed the following:

Following training, knowledge about the education of patients and carers improved but did not show a statistically significant increase. Further, only one participant mentioned the patient education section as a useful part of the programme. Similarly, transition and planning of post-discharge services, such as the use of the IDEAL planning form for care post-discharge was not taken up by the participants, none of the participants mentioned planning post-discharge in the qualitative interviews.

Secondly, in terms of assessment, goal-setting, and self-management and telerehabilitation quantitative data showed statistically significant findings in all of the above domains. The positive feedback from participants in the interviews supported the quantitative findings. Additionally, most of the participants mentioned that much of the information provided in

these sections was new to them. Table 7.9 provides quotes from participants to validate the quantitative findings.

Further, the increase in knowledge level was influenced by demographics, as female participants' knowledge level was significantly increased than that of male participants. Qualitative data demonstrated that males voiced many more barriers to implementation of the STP than females. Additionally, males were reluctant to participate in the training, as most participants in the study were females (17). Further, the female participants who had been practising for 6 to 10 years demonstrated significant knowledge acquisition; they also indicated positive feedback on the given information, such as the outcome measures and assessment forms, which they found highly valuable for improving their skills and patient care. Females showed higher participation levels and increased perception of knowledge following STP training.

The findings regarding attitude suggested a positive change. The positive change in attitude was supported by the fact that participants had utilised some of the knowledge gained from the programme, such as the use of outcome measures, as demonstrated in Table 7.9 Similarly, there was a statistically significant change in the confidence level post-training. The qualitative findings highlighted that many participants felt that the training offered them comprehensive and up-to-date information, which reflects the positive impact of the training on their confidence in providing stroke care.

Additionally, the appropriateness of the online format was scored high, with a mean score of 9.12 out of 10 (SD 1.14). However, a few participants suggested that in-person workshops would be more beneficial. In terms of overall satisfaction, 26.9% of respondents were

satisfied, while 69.2% were extremely satisfied with the programme. Additionally, 80% of participants believed that the length of the training was about right in the post-training questionnaire. However, some participants' feedback contradicted this, as the shortness of the programme was one of the common comments by participants as a limitation of the training. Table 7.9 summarises the integration of findings.

Table 7. 9: Integration of quantitative and qualitative findings.

Description of findings	Quantitative data	Qualitative data
Increase in knowledge (Assessment)	Knowledge of stroke assessment improved significantly in all items.	Participant 13 stated, <i>“The assessment section provided a valuable recap of important information, which we need”</i> . Participant 13 said, <i>“Some of the outcome measures mentioned in the training were very useful”</i> .
Increase in knowledge (Goal-setting)	Knowledge of the goal-setting approaches improved significantly in all items.	Participant 7 stated, <i>“The sections on goal-setting and outcome measures were excellent and useful. There were many new parts, like the patient activation measure”</i> .
Increase in knowledge (Self-management and telerehabilitation).	Knowledge of self-management and telerehabilitation improved significantly in all items.	Participant 1 stated, <i>“The self-management part was somewhat new and had excellent information”</i> .
Increase in knowledge (females demonstrated higher level)	Female participants’ knowledge level was significantly increased than that of male participants ($p=0.045$), and females showed a higher participation rate in the training (17 female and 9 male participants).	Male participants expressed barriers to implementation: Participant 4 stated, <i>“but as I said, not all of it is applicable, especially in SA. Applying some of these things is difficult, like goal-setting ... it is not that easy; all patients have one goal, which is to return to normal”</i> . Participant 4 stated: <i>“Implementing these things requires time and good management, and we are under significant time pressure”</i> . He added,

		<i>“Having education sessions and goal-setting for every patient every two weeks is difficult because they require a lot of time”.</i>
Increase in knowledge (females demonstrated a higher level)	Female participants who had been practising for 6 to 10 years demonstrated significantly greater knowledge acquisition than other groups ($p=0.008$).	Participant 8, a female who had been practising physiotherapy for 6–10 years, stated, <i>“The outcome measures form was excellent, the online video resources were also new and helpful, the assessment forms were straightforward to use”.</i> Participant 7 stated, <i>“The programme had very advanced information, especially knowing a set of outcome measures; I will use it in monitoring neuro cases in the future”.</i> Participant 8 said, <i>“The programme was excellent and provided valuable information about stroke rehabilitation. The programme can have a good impact on improving specialists’ skills and knowledge, which positively affects patient care”.</i>
Change in attitude	Ratings for the importance of education, using outcome measures, setting goals and telerehabilitation all increased post-training.	Participant 1 stated, <i>“I used the Fugl-Meyer, and I used some outcome measures like the depression scale”.</i> Participant 11 stated, <i>“I used the outcome measures and the assessment tools”.</i>
Change in confidence	There was a significant increase in all items except for providing necessary	Participant 2 said, <i>“Most of the provided information is recent and detailed enough to help any new physical therapist understand what a stroke is and how to treat it in detail”.</i>

	support to stroke patients prior to discharge.	Participant 24, who was in his internship, said, <i>“It was helpful, and I learned new things that help me assist patients with strokes”</i> .
Appropriateness of online format	The mean value for the appropriateness of the online format was 9.12 out of 10 (SD 1.14), reflecting a high degree of appropriateness.	Participant 4 said, <i>“It could be adding practical parts, maybe a real workshop rather than online”</i> .
Length of the training	80% of participants believed that the length of the training was about right in the post-training questionnaire.	Participant 7 said, <i>“The programme was short and lacked practical aspects”</i> . Participant 12 stated, <i>“you could expand the information further so that it can be divided into two, three, or more lectures, in order to benefit us to a greater extent”</i> .
Satisfaction with the contents	92.3% rated the content as clear and informative, 80.8% as adequate, 88.5% as appropriate, and 84.6% as both relevant and useful.	Participant 24 stated, <i>“I liked the explanation, ease of access to information, presentation, and the useful and new information”</i> . Participant 1 said, <i>“The ease and clarity of the information, the programme had a lot of useful information, and honestly, much of it was new to me”</i> .

7.6. Discussion

This study aimed to assess an online training programme designed to improve physiotherapists' provision of ongoing care after the discharge of stroke patients. The STP seemed to be effective overall as significant changes post-training in physiotherapists' knowledge and confidence were found. The results for the attitude towards rating the importance of providing education, using stroke outcome measures and setting goals were not significant, but showed positive impact. Participants provided positive feedback regarding the training, with some limitations in implementing the information.

Physiotherapists' knowledge was assessed in previous studies in SA, but only in relation to evidence-based practice (Alshehri *et al.*, 2017) and telerehabilitation (Aloyuni *et al.*, 2020). The studies found insufficient knowledge among physiotherapists. Given the limited training for physiotherapists in SA (Al-Muqiren *et al.*, 2017; Alatawi, 2021; Alodaibi *et al.*, 2022), it was essential to address the gap in their knowledge to enable them to deliver long-term care for patients with stroke. The quantitative findings between the pre-and post-training questionnaires demonstrated a statistically significant increase in knowledge about stroke assessment, goal-setting, self-management and telerehabilitation, but no significant difference in patient education or discharge planning. The study results are consistent with previous studies that provided training to therapists via online platforms and demonstrated an increase in knowledge (Kobak *et al.*, 2017; Hurley *et al.*, 2019; Scrivener *et al.*, 2021). Although the findings of these studies are not directly comparable due to differences in the assessment methods and actual contents, they demonstrated an increase in the physiotherapists' knowledge and confidence by delivering training through online methods.

The majority of the physiotherapists who participated in this study had no previous formal training in stroke rehabilitation. Therefore, it was expected that their knowledge test scores would improve after completing the training, particularly in areas such as self-management and goal-setting, where the information presented might have been novel to them. This was supported by the qualitative interviews, in which many participants expressed that much of the information presented in these sections was new to them. Additionally, any training programme provided to health professionals is likely to enhance their knowledge and skills by introducing new information (Coomarasamy and Khan, 2004). Further, the significant increase in the knowledge scores could be due to the Hawthorne effect, where individuals perform better when they are under observation or are part of a study (Adair, 1984).

On the other hand, the physiotherapists' knowledge levels about providing stroke education to patients was found to be high pre-training. This finding is relevant to a recent study by Alhenaki and Shaik (2024). The study explored physiotherapists' awareness of stroke prevention, and its findings demonstrated that physiotherapists had good levels of knowledge about stroke prevention and management. This suggests that the curriculum in SA may be effective in delivering such information. Nonetheless, gaps were identified, suggesting that therapists should be provided with continuous training and education (Alhenaki and Shaik, 2024). Additionally, education of patients with stroke should not only be about prevention and risk factors. Delivering education on how patients can take care of themselves and do home exercises could be more important in the community. This was supported by Mahrous's (2013) study, which revealed very low levels of satisfaction among patients regarding the education they had received, with most ratings ranging between 19.3% and 50%, which highlights a significant need for improvement in patient education.

Further, the standardisation of practice in delivering patient education is still lacking (Temehy *et al.*, 2023). This inconsistency in delivering educational content can lead to different outcomes. Variations in curricula and degree programmes across countries (Alghadir *et al.*, 2015), along with differences in education levels (Alshehri *et al.*, 2017) and the country of education (Hasani *et al.*, 2020), contribute to diverse practices among physiotherapists. To minimise variation in the treatment of stroke patients across different regions in SA, it is essential to first establish comprehensive guidelines (Memish *et al.*, 2022). Following this, providing targeted training for physiotherapists will be crucial. This approach will bridge the gap between theoretical knowledge and practical application, ultimately enhancing patient outcomes (Wein *et al.*, 2018).

Furthermore, physiotherapists may not have primary responsibility for planning patients' care post-discharge, given the multidisciplinary nature of stroke care. Nurses are frequently responsible for planning and coordination activities (McAllister *et al.*, 2018). However, the STP emphasised post-discharge planning to ensure that patients are thoroughly assessed against their physiotherapy rehabilitation needs prior to discharge. This included scheduling appointments for outpatient clinics and developing a comprehensive rehabilitation plan to manage the transition period between inpatient care and outpatient follow-up. Furthermore, it is possible that the STP did not provide sufficient depth and practical applications in key areas such as the education module and post-discharge planning, which may impact the findings.

The assessment of clinical skills and the practical implementation of knowledge in this study was limited because the primary goal was to evaluate changes in knowledge, confidence, and attitudes. Previous studies have similarly focused more on user satisfaction

and knowledge acquisition rather than on the clinical application of the information (Bennett-Levy *et al.*, 2012; Scrivener *et al.*, 2021).

In this study, male participants demonstrated reluctance to participate in the training programme. Additionally, male participants believed that implementation needs more collaboration across departments and adequate time. In SA, physiotherapy is predominantly a female profession, with 63% of physiotherapists being women (World Physiotherapy, 2020), a figure consistent with international trends. For instance, in the UK, 70% of physiotherapists are female (HCPC, 2023), and in the US, 64% (World Physiotherapy, 2022). On the other hand, stroke in SA is more common among men, with 68.4% (Asirvatham, and Marwan, 2014). This gender disparity could explain why male physiotherapists were more hesitant to implement the training programme, as they may face higher workloads compared to females.

Further, the issue here could be that once individuals become used to a specific system, they tend to adhere to it, as changing usual practice requires time and various strategies (Grimshaw *et al.*, 2012). Other common barriers to implementing stroke guidelines include difficulty accepting new treatment approaches and a lack of motivation to change (McCluskey *et al.*, 2013). Hurley *et al.* (2019) assessed implementation of training. However, they indicated a low implementation rate and recommended a local peer mentor to facilitate the implementation. Multiple studies have emphasised the importance of organisations in the implementation of interventions (Beidas and Kendall, 2010; Herschell *et al.*, 2010).

Organisations need to facilitate implementation by monitoring physiotherapists, auditing, and feedback (Cormican *et al.*, 2023). Additionally, in order to ensure successful implementation, it is essential that the intervention is in line with the organisation's missions and resources

(Terpstra *et al.*, 2018). Thus, future research should focus on developing strategies to enhance the translation of knowledge from training into practice.

Additionally, the study lacked practical aspects, which may have an influence on translating knowledge into practice. Providing physiotherapists with knowledge is effective but not sufficient to facilitate the implementation of this knowledge. Utilising practical strategies such as role-playing to facilitate behaviour change has been shown to be effective in other settings (Cane *et al.*, 2012). However, this training consisted of multiple resources such as video clips, tutorials and supplementary files, which have been found to be effective in improving therapists' practical skills (Preston *et al.*, 2012).

The overall satisfaction, low attrition (three participants), and positive feedback could indicate that the STP was feasible and acceptable. Satisfaction is crucial to assess the feasibility of the training, as the participants are unlikely to finish the training if they find it challenging, unhelpful or impractical (Kobak *et al.*, 2017). Additionally, engagement was another factor used to assess the success of a training programme in previous studies (Hurley *et al.*, 2019). Engagement was demonstrated in this study by the fact that 65.4% of respondents completed the training in one setting. These findings were in line with previous studies which described a high satisfaction rate with online training (Kobak *et al.*, 2017; Hurley *et al.*, 2019). However, in order to enhance the completion rate, Bennett-Levy *et al.* (2012) compared two modes of online training: one was independent and the other had fifteen minutes of support for therapists. They found that the supported online training mode had a higher completion rate (Bennett-Levy *et al.*, 2012). Further, a personalised message weekly was found to be effective in improving the response rate (Sánchez *et al.*, 2012). Thus, the

researcher aimed to send one message per week, but the participants' time constraint was the main reason for not completing the training.

Further, a few adaptations were recommended, although the programme received high overall satisfaction from physiotherapists. There were a few suggestions for conducting in-person workshops instead of online training. Online training was found to be no different from the in-person workshop method (Gallegos *et al.*, 2021). However, in-person training can be interactive and particularly valuable for acquiring practical skills (McCaul *et al.*, 2021). It was evident that the online platform was effective in enhancing knowledge acquisition, but other aspects such as acquiring hands-on practical skills need in-person approaches (Bampton *et al.*, 2022). Thus, a blended approach or a combination of both approaches could be more effective. Further, a few participants suggested that the duration of the training is short. However, previous training programmes for therapists of two hours (Harned *et al.*, 2011) and three hours (Bernhardsson *et al.*, 2014; Kobak *et al.*, 2017) were found to be effective in enhancing knowledge and skills post-training. Finally, the participants were under 40 years old, and the majority (22 participants) had fewer than 10 years of experience. This could be because physiotherapy educational programs are relatively new in SA. Further, younger individuals may be more familiar with online training methods than older individuals.

7.7. Study limitations

The findings from this study must be interpreted with caution due to several limitations. Firstly, the absence of a control group and randomisation reduce the accuracy of measuring the effectiveness of the current training programme. These two elements are critical for ensuring that the changes in participants' knowledge, attitudes and confidence are truly due to the STP rather than any other external factors. The utilisation of control and comparison

groups is primarily intended to prevent unwarranted interpretations (internal validity) (Marsden and Torgerson, 2012). Individuals who participated in the study might be more motivated to enhance their knowledge and skills in comparison to those who did not volunteer. This bias could influence the findings, making the programme appear more effective. Further, the study findings might have been affected by the Hawthorne effect. However, participants were not aware of the study hypothesis. In addition, triangulation of positive feedback and a very high satisfaction rate provides evidence to support the effectiveness of the programme. Additionally, the period between the pre- and post-training questionnaires was short. This limited time-frame might have affected the participants' ability to fully process and integrate the information given in the STP, which might have led to less accurate or incomplete responses in the post-training questionnaire and limited evidence on the long-term retention of knowledge acquired through the training. The follow-up period was likely inadequate to comprehensively evaluate the changes in physiotherapists' attitude resulting from the training. Despite the fact that the online format provided ease and accessibility for physiotherapists, it did not give the value of in-person conversations that are generally present in traditional physical workshops. The training lacked practical elements and interaction, which may have limited participants from developing the essential hands-on skills needed to treat stroke patients effectively. Another limitation of this study was the lack of consideration for participants' diverse learning styles. The online format may have been effective for those who prefer self-directed learning, but participants who perform better in more interactive or hands-on environments may not have fully benefited. Thus, incorporating multimodal delivery methods, such as live discussions, practical demonstrations, and collaborative learning, could better accommodate various learning preferences.

Further, the short duration of the STP may have reduced the depth of information that was presented. Further, the sample in the study was restricted to a single city, limiting the generalisability and applicability of the findings to wider contexts. Thus, the above elements, such as the use of a control group and extended training duration and follow-ups, may be incorporated to improve future training programmes.

Finally, the absence of an assessment of the long-term implementation was another limitation. The study primarily focused on immediate changes in participants' knowledge and confidence, it did not evaluate how the training translated into practice. Factors such as workplace culture, the availability of necessary resources, institutional policies, and the provision of ongoing support were not explored, despite their critical role in determining the success of long-term implementation. Future research should address these aspects to provide a more comprehensive evaluation of training effectiveness in real-world settings.

7.8. Implications for practice

The STP training provided physiotherapists who participated in this study with sufficient knowledge of stroke care. Given the STP positive feedback and effectiveness in enhancing physiotherapists' knowledge and confidence, it's recommended that the STP be integrated into higher education curricula. The programme provided illustration of key assessment procedures and strategies which can help standardise care and ensure care continuity.

Incorporating these elements into university courses could strengthen physiotherapists' ability to provide long-term rehabilitation. Further, the training has the potential to directly enhance their performance in clinical settings. However, this translation into practice needs to be studied in the future.

In addition, the training can promote the standardisation of practices in various physiotherapy settings by establishing a consistent knowledge base. Further, the training can act as foundational steps towards more extensive training in the future, allowing continued education of physiotherapists in SA. The programme aligns with global care standards as it primarily guided by international guidelines such the NICE, while being adapted to address the specific needs of the Saudi Arabian context. Evidence-based practice plays a vital role in healthcare across all cultural backgrounds and has been shown to have positive outcomes and enhance decision-making among practitioners (Gibbs and Gambrill, 2002).

Finally, the training programme not only focused on enhancing the skills of physiotherapists but also emphasised empowering patients through education, self-management, and active involvement in goal setting. Patients should be equipped with comprehensive information about all aspects of healthcare, enabling them to actively participate in decision-making regarding their treatment and access suitable services (Department of Health, 2010).

Additionally, Insufficient information provision impacts adherence to secondary prevention measures and affects the psychological and social well-being of stroke survivors and their caregivers (Crocker, *et al.*, 2021).

7.9. Conclusion

The training seemed to be beneficial and acceptable to improve participants' knowledge and confidence to some extent in delivering long-term care for patients with stroke. However, strategies for performance monitoring must be implemented to facilitate effective implementation and behavioural change. Additionally, continual training is essential to ensure that physiotherapists remain informed about the latest developments in their field. Further, providing practical training could be valuable for bridging the gap between theory and

practice. The next chapter will provide a discussion of the main findings, contributions, recommendations and conclusion.

Chapter 8: Discussion and Conclusion

8.1. Chapter overview

This chapter provides a summary of the main findings, including lack of care standardisation, inadequate transition, and continuity of care approaches such as patients' and carers' education, telerehabilitation, self-management, and training of physiotherapists. These findings are discussed in comparison with available research evidence. The chapter then sets out the study contributions, recommendations for practice in education and for clinical practice, suggestions for future research, and the study's conclusion.

8.2. Summary of findings

This thesis reviewed stroke survivors' needs from a global perspective in stage 1, explored their needs in the SA context in stage 2, and then explored physiotherapists' training needs and perspectives on long-term approaches for stroke care in SA in stage 3. It identified key points for designing the STP based on these three stages, and finally evaluated the effectiveness of the STP in stage 4. A summary of the key findings is illustrated in Table 8.1.

Table 8. 1: Summary of the findings

Merged findings	Stages (themes)	Recommendations
Care standardisation	<p>Stage 2: There was variation in the start of physiotherapy rehabilitation post-stroke, which reflects a lack of standardisation (Therapy experience).</p> <p>Stage 3: There is a need for a standardised education about stroke for patients and carers. Further an absence of standardised clinical practice guidelines for self-management and telerehabilitation was identified. Lack of guidelines resulted in some patients receiving appropriate or excellent therapy while others did not, depending on the physiotherapists' expertise and training (Quality and continuity of care)</p> <p>Stage 4: Variation of care was evident in terms of planning, assessment and goal-setting, based on the pre-training results (Attitude pre-training).</p>	<p>An interprofessional group of experts needs to be involved in a committee to develop new guidelines for practice in SA.</p> <p>Strategies to facilitate dissemination and translation of guidelines to practice must be developed and implemented.</p>
Discharge and transition	<p>Stage1: The theme of adequacy of care and services highlighted stroke survivors' experiences within the rehabilitation processes and transition at discharge. Participants expressed dissatisfaction with fragmented and disorganised rehabilitation services, often feeling anxious and distressed as a result. Transitional experiences from hospital to home were marked by poor organisation and lack of support, leading to concerns about coping and readiness for discharge (Adequacy of care and services)</p> <p>Stage 2: Post-discharge experiences revealed challenges in accessing services, leaving many participants feeling unsupported in their rehabilitation journey. The challenges were intensified by the COVID-19 pandemic, with the closure of outpatient facilities and restricted availability of physiotherapy. Some participants reported experiencing delays in starting physiotherapy sessions.</p>	<p>Incorporate IDEAL discharge planning within SA practice.</p> <p>An educational programme should be provided for patients and their families to facilitate their reintegration into the community.</p>

The bold formatting within brackets highlights the original themes.

	<p>These patients either sought private or virtual therapy as alternatives. Additionally, patients experienced difficulty in scheduling appointments and expressed frustration due to session delays and lack of clear communication channels (Therapy experience).</p> <p>Stage 3: Physiotherapists expressed the same concerns as the patients around the insufficiency of post-discharge services. Structured rehabilitation services post-hospital discharge were limited, with significant delays in initiation of outpatient rehabilitation. Additionally, physiotherapists also mentioned additional limitations not identified by patients, such as infrastructure deficiencies including insufficient equipment, staff shortages, and lack of specialised rehabilitation centres (Quality and continuity of care).</p>	
Care continuity	<p>Stage 1: There was a need for more frequent, intensive, and long-term rehabilitation programs tailored to individual goals and needs. Social needs emerged prominently, with participants expressing unmet needs for an increasing motivation discourse from healthcare professionals, family support needs, and peer support, income support, and travel assistance (Adequacy of care and services).</p> <p>Stage 2: The most dominant needs were related to care continuity. Patients emphasised the need for continuous therapy after being discharged to maintain their recovery. They wanted prolonged care in outpatient departments because of the absence of post-discharge services and encountered difficulties with transportation to hospital appointments (Need for adequate services).</p> <p>Stage 3: Ill-equipped hospitals and high staff workload resulted in insufficient sessions. Additionally, physiotherapists expressed many barriers to care continuity approaches, including limited stroke education, telerehabilitation, and self-management (Overarching limitations of care).</p>	<p>Activation of Saudi Stroke Association to facilitate social and peer support.</p> <p>To overcome challenges such as lack of transport, high staff workload and lack of community centres, other approaches should be considered to maintain care continuity. These include patients' education, caregivers' training for long-term care, telerehabilitation, and self-management.</p>
Education and carer training	<p>Stage 1: There was a lack of pre-stroke education on risk factors and warning signs, with a desire for more detailed information on prevention post-stroke. Participants required detailed information</p>	<p>Active education of patients by structuring dedicated education</p>

	<p>on stroke treatment, particularly in the immediate post-stroke phase. They emphasised the need for tailored content and accessible formats, including verbal, written, and visual formats, stressing the importance of repeated education over time. The review revealed that patients preferred proactive education by healthcare providers. Staff time constraints and lack of knowledge also hindered information delivery. Moreover, patients often did not seek information because they were unsure of what to ask, forgot, believed they did not need any information, or assumed that the information would be provided to them (Limited availability and suitability of information).</p> <p>Stage 2: Patients highlighted that they needed guidance on what services were available to them, self-management strategies, financial support, and home modification (Lack of guidance on available services).</p> <p>Stage 3: Physiotherapists highlighted that they needed clear protocols for delivering education to patients (Physiotherapists' training needs).</p>	<p>sessions to address stroke patients' information needs, either face-to-face or through telehealth.</p> <p>A structured training programme directed to caregivers needs to be implemented into SA practice.</p>
Telerehabilitation	<p>Stage 2: Not all patients could access physiotherapy in their cities due to a shortage of physiotherapy departments or the absence of specialised stroke units. As a result, these patients often had to seek therapy outside their local areas (Need for adequate services).</p> <p>Stage 3: Virtual clinics are currently used mainly for patient consultations and communication, rather than for delivering rehabilitation services. This is due to therapists needing to maintain records of virtual session records for annual evaluations, which are important for their career progression, rather than prioritising more efficient rehabilitation services. Challenges identified were lack of protocols, hospital resources and education of physiotherapists and patients, and internet access. Physiotherapists recommended specialised trained teams to facilitate the implementation (Quality and continuity of care).</p>	<p>Committee of experts recruited by the MoH to develop guidelines that align with SA culture and practice.</p> <p>Establish specialised telerehabilitation teams.</p> <p>Training sessions for physiotherapists about long-term care are essential.</p>

	There were other needs for infrastructure and resources, such as adequacy of staff, access to services, inadequate equipment in hospitals, and the need for well-equipped rehabilitation facilities (Overarching limitations of care).	
Self-management	<p>Stage 2: There was lack of guidance on stroke management and the required self-management training. Sometimes, participants used the internet or expert family members to acquire information (Coping barriers).</p> <p>Stage 3: Patient non-adherence, resource constraints, and insufficient caregiver support were challenges to self-management and home exercise, highlighting the need for standardised protocols and ongoing education (Quality and continuity of care).</p>	Incorporating approaches such as G-AP and PAM to facilitate patients' adherence to self-management.
Physiotherapists' training	<p>Stage 1, Stage 2: Patient participants were not satisfied about many aspects of care, such as discharge planning, education, rehabilitation planning and care continuity, reflecting limitations in current practice (Limited availability and suitability of information, adequacy of care and services, therapy experiences, need for adequate services).</p> <p>Stage 3: Physiotherapists indicated a need for specialised training in stroke rehabilitation after completing their qualifications, as the currently available training is limited and frequently influenced by personal motivation. They highlighted gaps in stroke assessment, using outcome measures, and providing psychological support for patients. Further, the practice of goal-setting lacked standardisation, with therapists primarily determining goals without patient involvement (Physiotherapists' training needs).</p>	<p>Incorporate the training modules and self-directed learning into the current curriculum.</p> <p>Facilitate continuing professional development by providing training.</p> <p>Specialisation of physiotherapists to focus on skill development in stroke rehabilitation long-term care.</p>

8.3. Discussion of the findings

Based on the findings, the most prominent issues identified were the lack of guidelines and standardisation, insufficient post-discharge services and transition, and gaps in care continuity. Ensuring care continuity requires comprehensive patient education, caregivers' training, telerehabilitation, and self-management. Additionally, the use of goal-setting, action-planning, and patient activation to promote self-management are key. Finally, training of professionals is vital to address these issues effectively.

8.3.1. Care standardisation

This study showed that a variation in use of guidelines has resulted in some patients receiving appropriate or excellent therapy, depending on their physiotherapists' expertise and training, while others do not (stage 3). There was variation in post-discharge services, provision of education and self-management (stage 3), and planning and goal-setting (stage 4). Thus, it seems that physiotherapists in SA had no guidelines to follow. This finding aligns with previous studies that called for the establishment of national guidelines to standardise care and improve health outcomes in SA (Asirvatham and Marwan, 2014; Bindawas and Vennu, 2016; Memish *et al.*, 2022).

National and international guidelines are essential elements to enhance the quality of the healthcare system (Cormican, Hirani and McKeown, 2023). In the UK, healthcare practitioners who provide rehabilitation for stroke survivors usually follow NICE guidelines, while in the US, they follow guidelines from the American Heart Association. Unlike the UK and the US, SA lacks a national reference for health practitioners to follow. The Saudi Stroke

Pathway Standards (SSPS) are the only published stroke guidelines in SA (SSPS, 2019). However, they have not been widely disseminated across all hospitals, and their existence remains largely unknown among physiotherapists. Additionally, the SSPS guidelines were developed by members working in acute stroke care units in SA. The practice in other SA public hospitals is hugely different than stroke units. Thus, multiple organisations in SA have independently worked on producing documents to provide guidance for therapeutic decisions, including recommendations, consensus documents, and protocols (Almagro *et al.*, 2021). However, according to Memish *et al.* (2022), standardised practice following local independent guidelines has been hindered by various factors, due to a lack of reliable, clinically credible, accessible, locally applicable, and nationally adopted guidelines.

Thus, due to the lack of national guidelines, physiotherapists in SA deliver non-standardised clinical practice based on their training and education. This is because of variations in the curriculum content and the length of education, as some universities provide Bachelor of Physiotherapy degrees, while others offer doctoral physiotherapy degrees (Alghadir *et al.*, 2015). Additionally, physiotherapists who trained in foreign countries have different practice and have been found to be better in incorporating evidence-based practice into their treatment approaches (Hasani *et al.*, 2020). Further, physiotherapists' practice and attitude vary based on their education level (Alshehri *et al.*, 2017).

To limit variations in care, an interprofessional group of experts who are familiar with the practice in public hospitals need to be involved in a committee to develop new guidelines that are relevant to the current practice. Members of this committee must be experts from different settings to create shared generalisable guidelines, reflecting the strategies used in other countries to develop their guidelines, such as Canadian guidelines for patients with stroke

(Hebert *et al.*, 2016) and NICE guidelines in the UK (NICE, 2023). Additionally, to facilitate the dissemination and translation of guidelines to practice across the country, education is the preferred option (Bayley *et al.*, 2012; Fisher, 2014; Hickey *et al.*, 2019). However, isolated education is not effective in promoting changes in practice; instead, organisational processes like training, dissemination, and performance monitoring play crucial roles in implementing guidelines (Cormican, Hirani and McKeown, 2023). Additionally, monitoring performance through auditing and feedback has been shown to be effective in changing healthcare professionals' behaviours (Cormican, Hirani and McKeown, 2023). In our study (stage 4), training was found to be effective in enhancing physiotherapists' knowledge and confidence in stroke assessment, using outcome measures, goal-setting with patients, and long-term approaches such as self-management and telerehabilitation. However, it remains uncertain whether this improvement in knowledge will lead to long-term changes in their practice to address the fragmented aspects of stroke care identified from the first three stages in this study. Thus, further research is needed to equip physiotherapists with the appropriate training and evaluate the implementation of knowledge by focusing on assessing the challenges that physiotherapists may encounter during its application, the long-term retention of skills, and long-term outcomes for patients.

8.3.2. Discharge and transition

Transitions from inpatient to home were found to be ineffective and poorly organised in all stages (1, 2 and 3). Patients experienced worry due to disorganised transition services (stage 1), and prolonged gaps between inpatient and outpatient admission periods (stages 2 and 3). These findings align with previous studies which indicate that the transition phase in SA is poorly organised (Mahrous, 2013; Al Reshidi, Long and Cappleman, 2016). Patients'

preparation for discharge and transition in SA was not effective due to staff workload, ineffective education of patients, and short hospital stays, which limited patients' information uptake (Mahrous, 2013). Additionally, factors such as the absence of clear policies for discharge planning, communication challenges, and the clear role of nurses in the discharge process hindered effective discharge (Al Reshidi, Long and Cappleman, 2016).

SSPS recommends that individuals should have access to outpatient care within two weeks from hospital discharge (SSPS, 2019). However, this study's findings showed that access to outpatient services varied across hospitals from one week up to several months, with no clear pathways post-discharge (stage 3). Patients in SA cannot access physical therapy departments directly: they need physicians' referrals to access outpatient clinics (Algudairi *et al.*, 2018). Even after referral, they might have to wait for appointments to become available (stage 2). Lack of transport could further delay access to outpatient rehabilitation (stage 2). Mahrous's (2013) study indicated that patients' satisfaction with arrangements made by hospitals in SA and follow-ups post-discharge was low in both private and public hospitals, although private hospitals were somewhat better than public hospitals.

Coordinated care and teamwork have been recommended to facilitate this process (Canadian Stroke Best Practice, 2022; NICE, 2023). The UK stroke guidelines recommend that all patients be discharged from hospital with personalised care plans (NICE, 2023). Similarly, Canadian guidelines (Canadian Stroke Best Practice, 2022) recommend that patients should be given information about the next stage and next care setting before discharge. Additionally, they recommend collaborative goal-setting, ongoing education, skills training, discharge planning, and access to services for successful transition (Canadian Stroke Best Practice, 2022). Thus, to match international standards, IDEAL discharge planning, which

has been found to be an effective method in improving patients' satisfaction when integrated into healthcare systems similar to that of SA (Moradi *et al.*, 2024), could be trialled.

Implementing IDEAL practice in SA could facilitate patients' and families' preparation for the transition period. Additionally, to prepare patients and their families for reintegration into the community, Canadian Stroke Best Practice developed a checklist to facilitate transition, which assigns contact persons and includes written instructions, educational materials, and advance care planning (Cormican, Hirani and McKeown, 2023). Additionally, a discharge planning programme by Taha and Ibrahim (2020) was significantly effective in improving patients' knowledge, activities of daily living and quality of life. The programmes comprised four sessions of theoretical and practical instructions to patients about movement, eating and drinking, bathing, clothing, and home exercising (Taha and Ibrahim, 2020). Therefore, it is recommended to evaluate the implementation of these interventions in SA practice to improve successful transition, followed by evaluating the facilitators and barriers to adapting such novel practices and patients' satisfaction with the transition phase.

8.3.3. Care continuity

Continuity of care refers to the establishment of long-term and sustained interactions between the patient and the care provider. These interactions involve continuity of information, management, and relationships (Van Servellen, Fongwa and Mockus D'Errico, 2006).

Limitations in continuity of care in SA settings was another dominant finding in all stages of this research (Table 8.1). The main barriers to providing continuity of care were (1) lack of social support, (2) lack of transport, (2) lack of community services, and (4) staff shortages and heavy staff workloads.

Firstly, social support such as motivation from family and peer support was one of the needs expressed by patients to enhance ongoing rehabilitation (Stages 1 and 2). Extrinsic motivation for rehabilitation can be significantly increased when patients observe others completing their training and when they receive mutual encouragement (Yoshida *et al.*, 2022). Peer support is highly effective in providing support post-stroke (Kessler, Egan and Kubina, 2014). Peer support through vicarious experiences also improves self-efficacy (Moudi *et al.*, 2016). Additionally, peer support helps to reduce loneliness and isolation, and improves social skills, social acceptance, and acceptance of chronic conditions (Kyngäs, Kroll and Duffy, 2000).

Despite the value of peers for patients and carers and their perceived benefits in the care process, peer support groups are lacking in SA. In many countries worldwide, organisations such as the Stroke Association in the UK and the American Stroke Association play an active role to facilitate peer support by connecting individuals with shared experiences and providing educational resources. The Saudi Stroke Association (SSA) in SA was developed in 2007. However, it has not maintained the level of activity needed to fulfil this gap in peer support. This could be due to insufficient funding or shortage of qualified staff. The MoH should actively support the SSA by providing financial resources and developing professionals' specialist skills, establishing not only structured support groups for stroke survivors and their families but also outreach programmes and public awareness similar to those provided by Stroke Associations in the UK and the US. Alternatively, a simpler method to develop peer support could be to create authorised stroke patient groups on social media within local hospitals.

In addition to the lack of social support, transportation is another issue that reduces patients' access to rehabilitation. Many participants had challenges with transportation to the hospital to attend their sessions (stage 2). There is a noticeable lack of transportation options in SA, as the country has only recently begun to develop public transportation systems including buses and metro networks. Private cars remain the predominant mode of transport. Al-Eisa (2010) found that 60% of patients missed attending two consecutive scheduled sessions and transportation was the main cause of this low adherence. Additionally, Alzakri *et al.* (2023) explored the barriers and facilitators for adherence to physiotherapy and found that lack of transportation and distance from the hospital was the second most common barrier. In stage 2, participants called for home care to solve transportation problems. However, home care in SA is a different sector from care in outpatient clinics. Patients must fulfil certain criteria to be eligible for home care, such as being bedridden, obese, or living alone. Different approaches to overcome transportation challenges will be discussed in the following sections.

Thirdly, limited community centres were another barrier to continuity of care. Access to services post-discharge in SA was limited (stages 2 and 3). Unless patients can afford private clinics, rehabilitation is only available through outpatient clinics (stages 2 and 3). Limited post-discharge services were discussed in a previous study in SA (Ullah *et al.*, 2021). Many studies in SA have called for specialised rehabilitation centres, as well as more stroke specialised rehabilitation teams (Al Jadid, 2011; Robert and Zamzami, 2013; Asirvatham and Marwan, 2014).

Additionally, the rehabilitation services provided in outpatient clinics are insufficient to meet patients' needs. During stage 2, patients frequently expressed the need for intensive and ongoing rehabilitation, as they usually received rehabilitation for two days or fewer per week

in outpatient settings (Stage 2). Staff workload was another barrier. The MoH reported that approximately 2,500 physiotherapists were registered in centres and hospitals in 2012. Interestingly, the report also revealed that nearly four million patients visited physiotherapy clinics between 2008 and 2012 (MoH, 2012). This significant volume of patients compared to staff availability has led to increased workload and strain on physiotherapists, which has affected the quality of care provided and limited patient access to services.

Approaches that could be implemented to improve continuity of care, including patients' education, carers' training, telerehabilitation, and self-management, are discussed below.

8.3.4. Education

Education for patients and caregivers plays a crucial role in ensuring continuity of care after discharge, especially in SA, which has limited community rehabilitation centres, high staff workload, and lack of transport. Multiple studies have suggested that it is crucial to provide comprehensive education to stroke patients regarding all aspects of their condition and its treatment (Rodgers, Bond and Curless, 2001; Eames *et al.*, 2010). Providing tailored, high-quality information can enable patients to take greater responsibility for their health and respond more effectively and promptly to health issues (Heinemann *et al.*, 2015). Despite the critical importance of education, numerous reviews on stroke education have consistently found it to be inadequate internationally (Young and Forster, 2007; Hafsteinsdóttir *et al.*, 2011; Du, Ma and Li, 2016) because of lack of access and communication with healthcare providers (Helbach *et al.*, 2024).

This study's findings also align with these previous studies, confirming that education for stroke patients remains insufficient in SA in terms of stroke pathology, recovery, and the need for guidance on self-management (stages 1 and 2). This made patients feel anxious about the next stage of rehabilitation (stage 1). Further, patients wanted the information tailored to their individual needs (stage 1). One study investigated patients' satisfaction with the information given during hospital stays in SA (Mahrous, 2013) and found very low satisfaction levels among patients. Satisfaction ratings were between 19.3% and 50%, with only two items (medication usage and laboratory results) achieving slightly higher percentages of 53.4% and 56.8%, respectively (Mahrous, 2013). Similarly, Alnaif and Alghanim (2009) found that only 20% of patients at primary healthcare centres received health education. Most participants identified television and friends or relatives as their main sources of health information (Alnaif and Alghanim, 2009). These findings indicate an urgent need for improvement in the provision of education to patients.

Patients strongly prefer individual verbal discussions with physiotherapists (Hoffmann and Cochrane, 2009), and printed materials to help in information recall (Eames *et al.*, 2003). However, physiotherapists often do not have sufficient time for such discussions, as they move quickly from one patient to another. Further, delivering education to patients with stroke in SA is fragmented, due to lack of guidelines on how to deliver such education and lack of sufficient training for physiotherapists to deliver patient-centred information.

Physiotherapists are also repeatedly frustrated that patients do not adhere to instructions, which could demotivate them from delivering adequate information to patients (stage 3).

Wider literature revealed that educational booklets containing information on patients' conditions had no significant impact on their physical and social functioning (Pain and

McLellan, 1990), nor on their knowledge (Lowe, Sharma and Leathley, 2007). A potential mechanism for improving the efficacy of stroke information interventions has been suggested by a Cochrane review which advised that active interventions were more effective in reducing patients' anxiety and depression than passive educational interventions, as they actively engaged patients and carers and enabled the clarification and reinforcement of information (Forster *et al.*, 2012). Educational session with two hours of interactive presentation about stroke signs and mechanisms, risk factors, warning symptoms, and what to do in case of repeated stroke significantly improved patients' knowledge at 3 and 12 months post-stroke (Benoit *et al.*, 2020). Such successful programmes could be trialled in the SA context.

Additionally, in terms of education content, there are helpful Western guidelines that provide checklists of essential topics that need to be delivered to patients and their families (Heart and Stroke Foundation of Canada, 2024). Whether these resources meet the needs of patients in SA must be investigated further.

Building on these findings, future research should explore the effectiveness of scheduling dedicated education sessions to address stroke patients' information needs in SA. Studies should investigate the impact of delivering these sessions either face-to-face or through telemedicine. Additionally, research should assess patient satisfaction, engagement, and long-term benefits of such educational interventions in stroke care in SA.

8.3.5. Caregiver training for care continuity

Involving caregivers in the rehabilitation process in SA could be the most valuable approach to ensure care continuity. No clear approaches for carers' education have been identified in

current studies. Alshammari *et al.* (2017) highlighted that 74.9% of caregivers in SA required training to provide care for elderly people. Another study found that lack of knowledge and awareness hinder effective caring experiences in SA (Khalil, Aladwani and Aljehani, 2020). Additionally, financial issues and the need for equipment were identified as Saudi caregivers' greatest needs (Almehmadi and Alrashed, 2023).

The majority of stroke patients in SA are elderly, aged 61–70 (Al-Jadid and Robert, 2010), with potential cognitive decline due to ageing. The strong interpersonal bonds between family members in SA place caring for relatives as a family responsibility (Almehmadi and Alrashed, 2023): individuals who need long-term care are usually looked after by family and not within care institutions, as 87.9% of caregivers are family members (Alshammari *et al.*, 2017). Caregivers always accompany stroke patients to rehabilitation sessions. They play an important role by giving critical patient information and contributing to the overall success of the treatment (Qureshi *et al.*, 2021). Hence, carers should be identified, supported, and actively included in the rehabilitation process.

Effective communication with the health system, access to information and receiving training on the fundamental aspects of caregiving are useful to improve caregiving (Rodger, Neill and Nugent, 2015). In the UK, a systematic structured training programme directed to caregivers comprised caregiver education on aspects of stroke and hands-on training. The results demonstrated a decline in anxiety and depression and higher quality of life for caregivers (Kalra *et al.*, 2004). Therefore, a focused approach on educating caregivers for better patient outcomes and caregiver well-being should be investigated further within SA practice to evaluate its feasibility and long-term outcomes for both patients and carers.

8.3.6. Telerehabilitation for continuity of care

Telehealth has been found to be significantly effective in improving knowledge acquisition for people with stroke in terms of pathology, rehabilitation, community support and performing exercises (Lai *et al.*, 2004; Dodakian *et al.*, 2017). However, physiotherapists in SA currently use telehealth only to check on patients' progress and to maintain communication (stage 3). Telehealth use is required for their career progression, but it is not used effectively for patient care. Telerehabilitation could be incorporated to facilitate patients' and caregivers' education.

Telerehabilitation could have several advantages in SA if implemented effectively: it could enhance the accessibility of rehabilitation, increase the dose of rehabilitation received, and become an acceptable method for providing rehabilitation in SA (Alsobayel *et al.*, 2021). The MoH aims to implement telemedicine throughout the kingdom: the first smartphone application, “*Sehha*”, has been developed to enable patients to engage in medical consultations with their providers via video, audio, and text messages (Amin *et al.*, 2020). Users reported improved health experiences in terms of access to and satisfaction with healthcare services (Alharbi, Alzuwaed and Qasem, 2021). Additionally, telerehabilitation in the Saudi context was found to be effective in improving pain, disability and health status in patients with musculoskeletal conditions (Alsobayel *et al.*, 2021). Participants in the same study reported high satisfaction with the services provided through telerehabilitation, which helped them to cope better (Alsobayel *et al.*, 2021). Other studies showed that patients perceived telerehabilitation as a user-friendly and acceptable approach (Aljabri, Bulkeley and Cusick, 2021; Aljabri, 2023).

Nevertheless, it should be acknowledged that there are many limitations, including organisational and human limitations, that hinder the implementation of telerehabilitation in SA (stage 3). These barriers include: (1) lack of guidelines, (2) infrastructure barriers, (3) lack of education of physiotherapists and patients, and (4) patients' readiness. Thus, to effectively implement telerehabilitation in SA, several key factors must be addressed.

Firstly, to address administrative limitations, telerehabilitation guidelines should be established using a committee of experts recruited by the MoH. Lack of guidelines has been identified as one main barrier for implementing telerehabilitation in SA (Ullah *et al.*, 2021). The system in SA follows Islamic jurisprudence and the unique social and cultural norms of the region (Qureshi *et al.*, 2021). Further, rehabilitation professionals in SA identified patients' privacy and security as one of the primary risks associated with implementing telerehabilitation (Ullah *et al.*, 2021). Therefore, universal guidelines for telerehabilitation such as consent, patient evaluation, and privacy, may not be directly relevant in this context; instead, unique guidelines should be established to ensure that these are culturally appropriate. For example, for religious and cultural reasons, confidentiality of female patients and therapists must be maintained by establishing confidentiality practices that are aligned with these factors.

Secondly, as identified in this study and others, infrastructure and hospital limitations have been the main issue in implementing telerehabilitation (stage 3) (Aloyuni *et al.*, 2020; Aljabri, Bulkeley, and Cusick, 2021). Telerehabilitation services can be delivered in a range of settings, including clinics, residences, therapy offices, long-term care institutions, and other community settings (Shem, Irgens and Alexander, 2022). Telerehabilitation in SA is usually delivered by physiotherapists in hospitals. However, hospitals have limitations such as the

lack of specialised rooms equipped with reliable internet connections, appropriate audio-visual equipment, and privacy considerations for patient consultations. Alatawi *et al.* (2020) revealed that 75.8% (69 out of 91) of public hospitals were considered technically inefficient. Additionally, just 31.7% of the participants in Aloyuni *et al.*'s (2020) study highlighted that their workplaces were equipped with the necessary equipment for telerehabilitation. Establishing specialised teams that are solely focused on telerehabilitation could be a solution to facilitate its implementation (Santos *et al.*, 2022). This approach is essential to ensure high-quality video and audio, improve time efficiency, and enable real-time remote monitoring alongside simultaneous updating of clinical records. Additionally, continuous training and using telerehabilitation over a period of six months significantly improved professionals' confidence and acceptance (Cottrell *et al.*, 2018). Thus, it is recommended to develop specialised teams for telerehabilitation for long-term stroke care.

Several physiotherapists believed that telerehabilitation is impractical and patients prefer face-to-face rehabilitation (stage 3). Previous studies identified that a lack of skills and technical issues was the primary barrier to implementing telerehabilitation in SA (Aloyuni *et al.*, 2020; Leochico *et al.*, 2020; Alrushud *et al.*, 2022). Training sessions are required to establish a suitable therapist-patient relationship in preparation for telerehabilitation, developing a clear comprehension of the concept of telerehabilitation, and emphasising the significance of self-management (Alrushud *et al.*, 2022, Shem, Irgens and Alexander, 2022). Operational challenges should be resolved by ensuring that devices are properly set up and positioned for ease of use and optimal visibility, and the telerehabilitation team should arrange the delivery of rehabilitation kits to their patients to improve patient participation and engagement (Kim *et al.*, 2022). Additionally, professionals should receive specific training on the safe use of equipment and the implementation of safety measures during

telerehabilitation, and adequate technical support must be provided to ensure that devices are functioning properly and compatible with necessary software (Qureshi *et al.*, 2021). These elements of training for professionals and patients are essential to facilitate the implementation in SA context.

Finally, it should be recognised that telerehabilitation is not suitable for every patient in SA. Guidelines recommend that telerehabilitation should be offered to individuals who are willing to participate (NICE, 2023). The conservative cultural norms, particularly for women, about the use of video calls or recordings, could pose a significant challenge to the implementation of telerehabilitation in the Saudi population (Alrushud *et al.*, 2022). Organisations should also ensure patient privacy and inform patients of their rights (Brennan *et al.*, 2010). Further, Alrushud *et al.*'s (2022) study indicated that telerehabilitation may be feasible for young and educated individuals, as well as those with less severe medical conditions, based on physiotherapists' views in SA. These risks marginalising individuals due to age and condition. Alternatively, caregivers can play a crucial role in facilitating telerehabilitation by providing technical support for patients and actively participating in the sessions regardless of age or severity of condition (Gately *et al.*, 2023).

To sum up, guidelines that are aligned with Saudi culture and practice are needed, while dedicated telerehabilitation teams and training for both patients and professionals are essential factors to facilitate implementation. Further research is needed to evaluate the impact of training on patients and explore the barriers and facilitators of telerehabilitation from patients' perspectives.

8.3.7. Self-management

Patients mostly reported insufficient intensity of rehabilitation, as they were receiving a maximum of two sessions of rehabilitation a week, without adequate self-management support (stage 2). There was no clear educational framework in place to guide home-based rehabilitation (stages 1, 2 and 3). Following discharge after a typical 5-day stay in the hospital, there was a gap of several weeks before starting outpatient therapy.

In situations where staff workloads and shortages were the main factors preventing intensive rehabilitation, self-management could be an effective solution to meet this need in SA. To the best of the author's knowledge, there are no available studies on self-management in SA related to rehabilitation. However, Western studies on self-management indicate that self-management post-stroke could significantly increase functional abilities (Warner *et al.*, 2015; Sahely *et al.*, 2023). Self-management helps to reduce the cost of care by reducing reliance on professional providers (Lindberg *et al.*, 2013). Additionally, studies show that the intensity of rehabilitation is positively correlated with the outcomes (Bode *et al.*, 2004; Kwakkel *et al.*, 2004), and guidelines emphasise that the greater the intensity, the greater the recovery (NICE, 2023). Self-management interventions, either delivered one-to-one or in groups in home or community settings, mostly accompanied by usual care and via telerehabilitation, have been found to be effective in improving patients' mobility (Sahely *et al.*, 2023). The average sessions were 2.5 sessions per week for 54 minutes duration (Sahely *et al.*, 2023).

It is evident that most patients prefer to be cured rather than empowered, as being involved in treatment decisions can feel like an additional burden to them (Lucas, 2015), and adherence to home-based exercise among older adults tends to be low (Bassett, 2003). However, a valuable approach to enhance motivation and adherence to exercises is peer support (Clark *et*

al., 2020). Further, approaches such as involving people in developing plans, setting goals, taking appropriate actions, and following up on goal attainment are effective self-management strategies (Warner *et al.*, 2015). Goal-setting and action-planning are the most commonly reported tools to facilitate the implementation of self-management (Richardson *et al.*, 2015; Kanai *et al.*, 2017; Ezeugwu and Manns, 2018). Additionally, self-management interventions that include action-planning components enhance self-motivation and boost self-efficacy (Oh *et al.*, 2022).

Approaches to facilitate self-management, namely (1) structured goal-setting and action-planning and (2) patient activation, are discussed below.

8.3.8. Goal-setting for self-management

Involving patients in goal-setting was usually overlooked by physiotherapists in stroke care practice in SA (stage 3) despite the call from patients to be engaged in planning (stages 1 and 2). This could be because the physiotherapy curriculum does not cover how to set goals with patients, physiotherapists believed that patients' goals were unrealistic, or they had limited knowledge on collaborative goal-setting (stage 3). Additionally, there was no specific approach or framework to guide therapists in goal-setting with patients and their families. This finding aligned with previous research that investigated shared decision-making in managing low back pain in SA. The study found that half of physiotherapists preferred making decisions independently rather than involving the patient (Al-Khatrawi, 2013). On the other hand, AlHaqwi *et al.* (2015) explored Saudi patients' preferences regarding their involvement in decision-making and found that 57% of the patients preferred shared decision-making.

To address this issue, implementing comprehensive goal-setting frameworks should be considered, involving key components necessary to set effective goals for self-management, including preparation, formulation of goals, formulation of action plans, coping planning, and follow-up (Lenzen *et al.*, 2017). According to guidelines, goal-setting sessions should be established within five days of the patient's admission, to ensure that they are meaningful, relevant, and documented. Patients should receive copies of their goals, and regular progress reviews should be conducted (NICE, 2023). G-AP is a framework that has been developed utilising a theory–practice approach for stroke rehabilitation in community settings (Scobbie, Wyke and Dixon, 2009). Adopting G-AP could be highly appropriate at this stage because it has been found to be beneficial and acceptable when used with stroke patients (Scobbie *et al.*, 2013). Further, this approach is easy to implement, as it provides a systematic method for goal-setting along with accessible resources and comprehensive online training on its application (G-AP Framework, 2024).

8.3.9. Patient activation for self-management

Patient activation is “*understanding one's role in the care process and having the knowledge, skill, and confidence to manage one's health and health care*” (Hibbard and Greene, 2013, p. 207). The patient activation measure (PAM) is a tool used for this purpose. PAM has been incorporated for patients with stroke. The individuals improved by one or two levels from the start of rehabilitation to six months post-rehabilitation (Van Meijeren-Pont *et al.*, 2022). Additionally, there is a positive association between educational attainment and activation level (Do *et al.*, 2015). These findings suggest that improving patients' self-management knowledge and confidence in managing their own health could potentially improve their activation levels. Thus, incorporating PAM into physiotherapists' practice in SA would be

beneficial to allow staff to dedicate more time to less activated individuals, while those with higher activation levels could be managed with minimal intervention. Furthermore, highly activated patients could be effectively treated through telehealth services or self-management practices, optimising resource allocation and enhancing care efficiency.

In conclusion, future research should focus on exploring the integration of the G-AP alongside the PAM to enhance patient self-management in rehabilitation. Additionally, strategies to promote patient empowerment and improve adherence to rehabilitation could be identified by examining how these approaches work together.

8.3.10. Training of physiotherapists

Study findings indicated that physiotherapists had limitations in knowledge and confidence in many aspects, such as assessment, goal-setting, and providing education to patients in the long term (stage 3). This could be due to many reasons, including (1) limitations in their curriculum, (2) lack of practical experience, and (3) lack of suitable continuing professional development opportunities.

Firstly, the content of the physiotherapy curriculum may not address the need for long-term care for patients with stroke. There is limited emphasis on evidence-based practice (Alshehri *et al.*, 2017) in the curriculum. Further, there seems to be a shortage of modules that provide clear pathways to physiotherapists on educating patients, goal-setting, home-based exercises, telerehabilitation, and implementing the current guidelines (stage 3).

Secondly, another main issue is the clinical placements, where students may not have the opportunity to transfer the knowledge they have learned in theoretical classes to clinical practice. This is because they are unable to treat patients during the first four years of their studies. The gap between understanding theoretical concepts and implementing them in practice can have a major impact on information retention and problem-solving abilities.

Thirdly, studies found that physiotherapists in SA are not well trained to provide effective rehabilitation for patients with stroke (Bindawas and Vennu, 2016) and receive no formal training to incorporate evidence-based practice (Alshehri *et al.*, 2017; Al-Muqiren *et al.*, 2017). In order to overcome the lack of training, the following recommendations should be implemented: (1) adapt the STP within the current curriculum, (2) enhance self-directed learning, (3) ensure continuing professional development, and (4) encourage specialisation of physiotherapists.

The online training developed for this study was effective in improving therapists' knowledge and confidence in providing long-term care for patients with stroke (stage 4). Further, given the lack of opportunities for training in SA, the curriculum could provide more emphasis on approaches that teach physiotherapists self-directed learning (SDL), which is one of the most suitable methodologies for practitioners to remain informed about the most recent literature (Quartey *et al.*, 2020). A review found that SDL in medical education leads to a moderate enhancement in the knowledge domain when compared to traditional teaching methods, and may be equally successful in improving skills and attitudes (Murad *et al.*, 2010). SDL is an effective method to facilitate continuous education for physiotherapists.

Continuing professional development (CPD) is essential for healthcare professionals to stay updated and provide evidence-based care to their patients (Da Silva *et al.*, 2023). CPD and post-qualification training are crucial to maintaining high standards of patient care and professional development by ensuring that physiotherapists remain informed about the most recent developments in their field (Gunn and Goding, 2009). Courses on CPD in medical field in SA showed improvement of physicians' levels of knowledge, clinical skills and attitudes to patient care (Al-Baghli *et al.*, 2015). CPD occurs through different approaches in the workplace, including daily activities, performance evaluations, journal club meetings, discussions with peers, in-service training, critical reading, and self-reflection (French *et al.*, 2008). Moreover, online training, as demonstrated in previous studies (Kobak *et al.*, 2017; Hurley *et al.*, 2019; Scrivener *et al.*, 2021), and in the present study (stage 4), was found to be effective in enhancing therapists' knowledge and confidence. In addition, e-learning has high utility in delivering CPD to healthcare professionals (Berndt *et al.*, 2017). Thus, incorporating technology to facilitate the training of physiotherapists in SA could improve the future quality of long-term care.

Specialisation could make it easier for physiotherapists to concentrate on expertise in one area (Bennett and Grant, 2004). “*Specialisation is described as having in-depth knowledge, skills and competence attained by a physical therapist qualified in a specific area within the scope of practice recognised as physiotherapy*” (World Physiotherapy, 2023). Specialisation can lead to better quality of service and care, a reduction in practical errors, and an increase in job loyalty and satisfaction (Adibelli, Turan and Çınar, 2017).

However, in most hospitals in SA, there is no specialisation for physiotherapists, and each physiotherapist is responsible for treating various types of patient, including musculoskeletal,

paediatric, or neurological cases. Specialisation for physiotherapists in SA is urgently needed to enhance practice. By having fewer cases with similar characteristics, physiotherapists can consolidate them into group sessions, allowing for more efficient use of time and resources. This will facilitate peer support, which is needed to maintain motivation and adherence. Hence, organisations should start to train physiotherapists in specialities in SA.

To sum up, while training of physiotherapists has shown promise in enhancing their knowledge, the implementation of services such as SDL within the curriculum could facilitate the CPD of physiotherapists in longer term. Further, specialisation is important to allow more efficient use of time and resources.

8.4. Study contributions

Firstly, while other reviews were limited to specific types of needs perceived by patients with stroke (Hafsteinsdóttir *et al.*, 2011; Pindus *et al.*, 2018), the review for this study covered a broad range of needs and provided knowledge of gaps in education and adequacy of care for patients with stroke. Further, the review provided practical steps for the understanding of effective education for stroke survivors. Participants illustrated the type of information needed on stroke pathology and its recovery. Additionally, it explored adequate delivery methods, such as amount, content, time, and formats (verbal, written, and visual). Participants preferred a proactive verbal approach with tailored information, especially for younger patients, as the information given was not appropriate for them.

Further, the review stage emphasised the need for more frequent, intensive, and long-term rehabilitation interventions. Additionally, aspects such as psychological needs were ignored

during the rehabilitation process and needed additional emphasis by providers. Social needs such as motivation from families and peers was also needed. Further, patients required follow-ups and easy communication. A coordinator role was suggested to facilitate the process. The quality of care could be significantly enhanced by addressing these needs.

Stage 2 illustrated that stroke care in SA needed further development to meet patients' needs. This stage provided an overview of participants' experiences of care within the current system. Firstly, the study revealed the importance of coordinated care pathways during the transition phase, as several patients experienced delays to admission to outpatient clinics. Providers must address this gap between inpatient and outpatient care needs to reduce anxiety, as patients believed that the delay could negatively impact their recovery.

The study provided new information on the facilitators and barriers that promote patients' adaptations post-stroke. Identifying facilitators may allow physiotherapists to enhance the factors that positively influence adaptation, such as providing faith support, while identifying barriers enables physiotherapists to address these challenges that patients face. For instance, the lack of guidance and communication hindered patients' coping. Additionally, identifying these facilitators and barriers can help in designing rehabilitation plans that overcome these barriers and align with patients' preferences.

Moreover, the study illustrated the limitations of rehabilitation interventions, including the need for services such as speech therapy, psychological rehabilitation, return to work, and driving assessment. Patients expressed a need for engagement in planning to keep them informed of their progress. Further, difficulty contacting providers and the lack of follow-ups were highlighted. Continuity and intensity of care was one dominant need identified by

patients, and they lacked guidance and training on self-management. These findings warrant the introduction of new approaches to the system in order to ensure care continuity instead of focusing just on the current outpatient clinic rehabilitation system. Additionally, the findings can help physiotherapists and policymakers to create guidelines and instructions to ensure equality and standardisation of care among physiotherapists. This could lead to more improved and organised services, especially post-discharge, and improve patients' education and involvement in the rehabilitation process.

These insights from the first two stages are valuable and transferable across several settings within SA and worldwide. This is because the issues encountered by patients with stroke are universal. For instance, the lack of post-discharge services and support is seen more widely in the Western literature. In UK practice, 45% of stroke patients report feeling unsupported after being discharged and 40% are discharged without any follow-up rehabilitation plans (Bonifacio *et al.*, 2022). Likewise, in Australia, about one-third of stroke patients leave hospital without a care plan (National Stroke Audit, 2019). Unmet rehabilitation needs were the most reported needs by patients with stroke worldwide, including in SA (Talbot *et al.*, 2004; Vincent *et al.*, 2007; Kamalakannan *et al.*, 2016). The findings from this study could be useful for informing policies and practices in diverse healthcare systems.

The findings from the third stage contribute to the understanding of gaps in physiotherapists' knowledge in order to provide effective long-term care for patients with stroke. One of the main aspects which needed urgent improvement was patients' transition between inpatient and outpatient services. The findings from this stage are critical to develop standardised care approaches and ensure that all stroke survivors receive standardised and equitable access to long-term care. Additionally, the barriers and facilitators of long-term approaches, such as

self-management and telerehabilitation from physiotherapists' perspectives, were explored. Findings indicated that depression and anxiety, patient motivation, and family cooperation may influence patients' commitment to self-management. Additionally, the lack of training on telerehabilitation limited its usage to just maintaining communication with patients, rather than delivering rehabilitation. These findings provide a valuable contribution to help modify current practice within the limited resources available locally.

The study found certain areas in which physiotherapists lacked confidence in managing stroke patients. These aspects included stroke assessment, using outcome measures, goal-setting, and providing effective education. Understanding physiotherapists' needs is essential to ensure that they receive targeted education that could directly enhance their abilities to deliver effective long-term care to stroke patients through the inclusion of appropriate, evidence-based stroke strategies.

The STP in stage 4 improved the knowledge and confidence of therapists in the study settings, and could enhance the overall proficiency of physiotherapists in the provision of long-term rehabilitation for stroke patients. The STP covers the basic knowledge and skills necessary for effective long-term rehabilitation and is a foundational step towards building more advanced and detailed workshops capable of delivering high-quality, long-term rehabilitation to stroke survivors in the future. Practical sessions could be added to allow therapists to apply new skills to ensure that they could confidently implement these techniques in their daily practice. These findings could also be valuable for other contexts where physiotherapy training may be limited.

8.5. Study recommendations

8.5.1. Recommendations for physiotherapy education in SA

Based on the previous findings, physiotherapists had limitations in delivering rehabilitation to patients with stroke in the long term. Given the positive feedback and high satisfaction of participants following the STP, and its effectiveness in enhancing physiotherapists' knowledge and confidence, incorporating the training into the physiotherapy curriculums of higher education institutions is recommended. The programme provides a range of illustrations of assessment procedures, including outcome measures, that may help in care standardisation in the future. Additionally, the STP provided strategies that could help physiotherapists to ensure care continuity, such as using G-AP, GRASP and PAM to promote self-management. Therefore, universities could restructure their curricula to integrate information from the STP to provide a solid foundation to help physiotherapists to provide long-term rehabilitation. Additionally, incorporating approaches such as involving students in group discussion, flipped classrooms, learning contracts, and minimal-guidance instruction that can facilitate SDL (Robinson and Persky, 2020) could encourage students to take responsibility for their life-long learning.

Organisations are recommended to adopt approaches such as performance evaluations, journal club meetings, discussions with peers, in-service training, critical reading, and self-reflection (French *et al.*, 2008). These approaches can be incorporated into weekly, bi-monthly, or monthly staff meetings (Khan, 2008) to provide learning opportunities for aspects such as providing effective education to patients, how to set goals with patients, and how to deliver effective long-term care. Furthermore, virtual platforms and webinars can replace in-person seminars and provide physiotherapists with better access to educational opportunities.

Further, organisations are advised to develop specialist training for physiotherapists in SA. Specialisation can allow physiotherapists to develop in-depth knowledge and skills in specific areas, consequently improving care quality and treatment outcomes. Specialist expertise should be delivered through professional development and ongoing education, which includes both formal and informal training opportunities (Adibelli, Turan and Çınar, 2017).

8.5.2. Recommendations for practice

Based on the findings of our studies, the following recommendations are made: (1) preparation for transition to home; (2) assessment and standardisation of care; and (3) recommendations for care continuity, which includes education of patients and carers, self-management, goal-setting, action-planning, and telerehabilitation.

1- Preparation for transition to home

The transition phase for stroke patients in SA was found to be disorganised and fragmented. Preparing patients for discharge should begin at the time of admission, as it is a continuous process throughout their hospitalisation, rather than a one-time event (IDEAL Discharge Planning, 2017). Discharge planning is crucial to ensure a smooth transition for patients to their home environment, and to prepare them for the potential challenges they may encounter during this transition. Hence, life at home and the next steps should be discussed with patients and their families as soon as the patient is admitted.

The discharge planning discussion should include:

(1) Arrangement of services for the next stage of care before discharge (NICE, 2023). This proactive approach helps in reducing stress and anxiety for patients and families. Patients

must receive care arrangements and follow-up appointments to commence outpatient rehabilitation to avoid delays in starting rehabilitation. According to the SSPS, patients should have access to outpatient clinics within two weeks, while other guidelines suggest 72 hours (NICE, 2023).

(2) A clear communication channel through a named contact needs to be provided, to enable patients to contact the health services if they require information on how to manage their lives after returning home. Through the establishment of communication channels, patients are assured that assistance is available if they find any difficulties while coping at home.

(3) Patients and carers should receive proper education and home exercises to meet their information needs during reintegration (education will be discussed in detail in the next sections). The use of IDEAL discharge planning can help in facilitating the process.

2- Assessment and standardisation:

In order to support implementation of evidence-based practice, clinical guidelines are recommended. However, as discussed previously, SA lacks national guidelines for reference. Thus, the development of guidelines and approaches to ensure standardisation of practice are two urgent needs. In order to develop guidelines, Browman *et al.* (1995) suggested the following steps: topic identification, a systematic review of evidence, recommendation development, consultation of users, clinical development, localisation, and pilot testing of the guidelines. This development should involve clinicians to ensure that the guidelines are usable in both clinical practice and specific local contexts (Browman *et al.*, 1995).

Additionally, to ensure that guidelines are applicable within the facilities' resources and constraints.

Physiotherapists are recommended to use stroke outcome measures to assess several elements of patients' function, including motor function, balance, activities of daily living, and quality of life, such as the Fugl-Meyer Assessment, which is a reliable and valid tool (Malouin *et al.*, 1994), and is one of the most widely used tools to assess motor impairments (Gladstone, Danells and Black, 2002). The National Institutes of Health Stroke Scale and the Barthel Index are other outcome measures that can be used to collect valid and responsive information from patients in the Saudi Arabian context (NICE, 2023). Additional outcome measures such as the Berg Balance Scale, the Functional Independence Measure, the Frenchay Activities Index, and the Rivermead Mobility Index are also recommended, as they are valid and reliable (Salter *et al.*, 2005), but are seldom used in stroke long-term care in SA. Physiotherapists frequently prioritise mobility function over quality of life; however, the STP emphasises quality of life evaluation and depression assessment by using tools such as the SSQoL and the Hospital Anxiety and Depression Scale, which are valid and widely used (Duncan, 2013).

3- Recommendations for care continuity

The following recommendations are made for practice in outpatient and community phases to ensure care continuity: (a) education for patients and caregivers, (b) self-management and goal-setting, and (c) telerehabilitation.

(A) Education of patients and carers

In order to provide effective education, the following are key recommendations driven by the study findings:

- (1) Physiotherapists should deliver formal education sessions to patients and families.

- (2) It is necessary to provide information to patients about stroke, including stroke definition, risk factors, signs, symptoms, causes, complications, and stroke prevention.
- (3) It is necessary to provide information to patients about stroke emergency interventions, medication, medication side effects, treatment plans, recovery rates, recovery facilitators, self-management, and guidance on available health services.
- (4) Providing patients with information using appropriate methods is essential. The information given needs to be detailed and sufficient. Information needs to be provided at multiple times across the care continuum and relevant to the patient's age group and diagnosis. Different formats of education are needed, such as written, verbal or via technology, but the verbal mode is the most favoured.
- (5) Educational session could be face-to-face, to facilitate interaction and discussion between therapist and patients; or via technology, which is beneficial in exchanging information for management and support.

Further, caregiver training and education is another important aspect to ensure smooth transition and care continuity. It is crucial to involve caregivers in the structured educational sessions provided to the patients. Further, it is vital to establish carer support groups to enhance carers' education and social support. These groups are vital platforms where patients and caregivers may share experiences, seek advice, and access resources to gain a better understanding of stroke and effectively handle the challenges involved with caring for stroke survivors. Further, the support groups must aim to provide a sense of community and shared support among carers by facilitating regular in-person and virtual meetings.

Stroke Associations in other communities play a fundamental role in providing educational and group support to patients with stroke and their carers. For instance, the Stroke Association in the UK provides support to over 60,000 stroke survivors and their families each year (Stroke Association, 2024). Additionally, websites such as Stroke for Carers in the UK can provide comprehensive education for caregivers. However, the lack of Arabic resources and content on stroke poses another significant challenge to the provision of effective education and awareness among Arabic-speaking communities. Arabic materials and websites, including brochures, videos, and online content, need to be developed to meet the informational needs of patients with stroke and their caregivers.

(B) Self-management:

Stroke is a long-term condition that requires ongoing care. It is both unsustainable and costly to rely solely on hospital or institutional rehabilitation services. It may be more cost-effective to motivate stroke survivors to implement self-management strategies (Sit *et al.*, 2016). In order for patients to receive comprehensive training and education on self-management principles, training should first be provided to the physiotherapists on self-management principles and strategies. Patient self-management training should start during outpatient care, and by discharge, patients should have basic skills in goal-setting and action-planning. Additionally, utilising tools such as GAS to record goals, GRASP to inform action plans, and PAM to improve patient involvement can effectively support patient self-management.

Goal-setting and action-planning for self-management

Individuals need to participate actively in their own rehabilitation (Desrosiers *et al.*, 2009), as making progress towards meaningful personal goals is believed to be beneficial for patients' self-image and coping mechanisms (McGrath and Adams, 1999). Encouraging patients to

identify their goals will help them to build realistic goals that are in line with each patient's expectations (Leach *et al.*, 2010). Moreover, patients in SA prefer to be actively involved in the care process and engage in shared decision-making (AlHaqwi, 2015). The content of the sessions should be determined by the patient and their personal goals rather than being professionally directed (McKenna *et al.*, 2015). Goal-setting sessions should focus on negotiating patients' rehabilitation goals, building an action plan to achieve these goals, assessing the challenges that patients encounter in commencing the action plan for self-management at home, and reassessing progress.

A structured conversation, setting aside enough time and using simple language, should be adopted to build person-centred goals. The session should be conducted with the patients and caregivers either face-to-face or via telerehabilitation. Physiotherapists may benefit from employing a goal-setting strategy, such as the G-AP format. This strategy helps to motivate stroke survivors to follow their goals, even if they are difficult to achieve (Scobbie *et al.*, 2013). Once patients' goals are identified, physiotherapists need to work together with patients and their families to develop appropriate action plans, taking into account the patients' safety and functional capacity. Patients should be given an action-planning folder (such as G-AP) to use as a guideline for their training at home. Specific instructions such as information on when, where and how often exercises must be done should be provided during the sessions. Furthermore, physiotherapists might find it beneficial to utilise available booklets, such as GRASP, to inform the content of their patients' action plans (Harris *et al.*, 2009). Available forms could be used to record goals, such as the Goal Attainment Scale (GAS) (Turner-Stokes, 2009). Finally, physiotherapists need to reassess the goals every two weeks (Sahely *et al.*, 2023).

The main aim of designing self-management sessions is to enhance the intensity and continuity of rehabilitation. Instead of just two sessions per week with the therapist, patients can undertake four to five: two with a therapist (current practice) and the others through self-management. Further, training on self-management during the outpatient rehabilitation stage would give them opportunities to ask questions in the next session if they had difficulty performing exercises until they mastered self-management. It is difficult to absorb knowledge and methods in one session: therefore, this training should be delivered throughout the outpatient clinic stage to ensure that the patient and the family are able to continue by themselves in the next phase.

To ensure that patients receive the appropriate support during the self-management process, it is crucial that the exercises are monitored on a regular basis. Patients in the community can be monitored through telephone follow-ups (Sahely *et al.*, 2023). The purpose of phone calls is to help therapists to identify compliance with exercises and offer support and guidance with any issues (Damush *et al.*, 2011).

(C) Telerehabilitation

Incorporating technology can facilitate effective communication between patients and physiotherapists, such as during education sessions, goal-setting sessions, and monitoring through telehealth. However, to achieve this, it is essential to assign a dedicated team to deliver telerehabilitation, and appropriate education and training should be delivered to patients and physiotherapists. Then, to ensure effective delivery of telerehabilitation, the following is recommended: Firstly, physiotherapists should discuss patients' digital readiness for telerehabilitation (Brennan *et al.*, 2010). This is important, as not all patients have the

ability to use technology. Secondly, physiotherapists should deliver a training session for patients and carers. This session should include the following:

(1) Ensuring privacy and confidentiality. Privacy and digital security are critical concerns when it comes to technology, particularly in relation to personal health information (Baroni *et al.*, 2023);

(2) Operational instructions: it is essential to provide the patient with an appropriate device (such as a computer or smartphone) and basic instructions on how to use it (Baroni *et al.*, 2023). Equipment related to rehabilitation exercises should also be delivered.

8.5.3. Recommendations for future research

Firstly, research is required to explore the variations in practice among various cities and hospitals in SA. Then, the next step should focus on developing and implementing standardised guidelines that align with public hospitals' policies, not only those of stroke units. Subsequently, research should focus on developing training programmes and implementation strategies and procedures to facilitate translation of knowledge into practice.

Secondly, the transition phase was found to be uncoordinated and disorganised. Thus, future studies should focus on implementing interventions that provide clear policies for discharge planning, such as communication contacts and scheduling appointments.

Thirdly, feasibility studies are required to assess the acceptability of implementing community programmes tailored to stroke survivors in SA. These interventions should be tailored to the specific needs of individuals affected by stroke, as identified through the stages of the thesis. For example, self-management training specific to aspects of stroke

rehabilitation such as mobility, social participation, and upper limb function should be developed and tested to empower stroke survivors in the context of SA.

Triangulating the perspectives of patients and professionals are needed to develop culturally adapted self-management interventions. Research should focus on developing the optimal format based on the perspectives of both patients and healthcare professionals. Gaps such as integrating self-management interventions into current practice, evaluating the impact of long-term self-management on health outcomes, and cost-effectiveness analysis need further investigation.

Moreover, telerehabilitation is a promising approach to enhance the availability of rehabilitation treatments for stroke survivors in SA, but further studies are required to evaluate its implementation. One main barrier identified in this research was limited awareness and familiarity with technology among stroke survivors. Caregivers can play a crucial role in bridging this gap. Thus, future studies should focus on assessing the feasibility of training caregivers to support telerehabilitation and its acceptability in SA.

Furthermore, research into stroke survivors' educational approaches in SA is necessary. These approaches need to be standardised across the country to ensure that all patients and carers receive high-quality information about their conditions. Research is needed on preferred education approaches for patients in SA. It is also essential to evaluate the effectiveness of these education sessions against the long-term outcomes and quality of life of patients with stroke.

Future research should seek to explore the role of caregivers in long-term rehabilitation with a particular focus on their needs and contributions. Such research could investigate how caregiver involvement can enhance continuity of care where caregivers have access to adequate training, resources, and support to manage their roles effectively. This could be investigated either with regard to in-person rehabilitation or through the application of telehealth.

8.6. The STP refinement

Several key enhancements could be introduced to improve the training programme. First, the training could be delivered through a web-based platform, thereby offering greater flexibility, accessibility, and scalability (Kobak *et al.*, 2013). Additionally, the content could be structured more systematically to ensure logical progression through the material. Practical elements could also be incorporated by requiring participants to complete assigned tasks before advancing to the next stage. This approach would not only reinforce learning but also facilitate easy tracking of participants' progress and completion of tasks based on pre-post testing, training modules, practical tasks, feedback, and satisfaction ratings. All of this would help to ensure a comprehensive and interactive learning experience. To facilitate recruitment, CPD credits or completion certificates should also be offered to participants. Another idea might be to extend the training duration by providing a comprehensive explanation of the modules' content and including relevant practical tasks and case studies to ensure that physiotherapists are able to use tools such as outcome measures and G-AP effectively.

An important aspect that was not initially addressed in the STP is the integration of cultural and religious elements. Cultural and religious factors play a crucial role in shaping healthcare practices in SA, and understanding these aspects can help professionals build stronger

connections with their patients to more effectively manage potential conflicts that may arise from cultural differences (Felemban, O'Connor and McKenna, 2014). Multiple studies have emphasised the beneficial impact of religious affordance on stroke recovery, particularly in terms of coping mechanisms (Temehy *et al.*, 2023; Omu, Al-Obaidi and Reynolds, 2014; Mairami and Warren, 2021). In the Islamic context, the requirement to say formal prayers can be a helpful tool and motivating factor to encourage patients to engage in motor function exercises, as almost all the muscles of the body and joints are exercised during Islamic prayer (Nazish and Kalra, 2018). Thus, training could include discussion of how to support patients' religious and cultural coping strategies while encouraging adherence to rehabilitation protocols.

The application of the STP in practice is likely to encounter various challenges such as physiotherapists' workload, resistance to change and facilities' resources. A critical first step in facilitating its implementation is thus to evaluate the effectiveness of the STP in real-world settings. To achieve this, the training must be adapted to form a practical intervention that can be delivered by physiotherapists directly to patients. This implementation must then be tested by measuring its impact on patient outcomes in order to provide evidence of its effectiveness.

To strengthen future testing of the intervention, a control group should be included to enable a thorough comparison of findings. If the training proves effective, collaboration with policymakers will then be essential to support its broader adoption in daily practice.

Policymakers must therefore play a crucial role in facilitating the integration of STP elements into routine practice by advocating for its use, providing necessary resources, and encouraging healthcare staff to implement the programme's principles effectively.

8.7. Reflection

Stroke rehabilitation in SA still requires significant improvement; however, this work can act as a foundation for enhancing care in this area. This study explored the needs of stroke patients as a crucial step in assessing the effectiveness of current practices, evaluating patient satisfaction, and guiding the introduction of new approaches that align more effectively with patient needs. Additionally, the study identified key limitations in the existing practices, providing valuable insights for policymakers seeking to address such challenges.

The STP provides guidance for physiotherapists seeking to improve care from the point of patient admission to hospital discharge, as well as during long-term support. The STP is specifically tailored to the local context and represents valuable reference for training in the future due to the fact that it was developed using the perspectives and needs of both patients and physiotherapists in SA. This makes it highly relevant to SA clinical practice and incorporated into physiotherapy training in SA. The programmes' elements that address identified gaps in stroke rehabilitation are largely informed by internationally recognised guidelines, such as the NICE guidelines, however, ensuring that the STP is grounded in evidence-based best practices. The inclusion of international guidelines also makes the programme compatible with global standards of care and ensures that SA stroke rehabilitation practices are aligned with international best practice while still being tailored to local needs.

8.8. Conclusion

This thesis aimed to enhance stroke care in SA by identifying the needs of both patients and physiotherapists and by implementing an online training programme that improved physiotherapists' knowledge to facilitate long-term rehabilitation. The findings indicated that care for these patients remains insufficient in SA, with many of their needs still unmet.

Additionally, the current care for stroke survivors in SA fails to address their long-term needs adequately. The findings identified areas where physiotherapists felt less confident and emphasised the need for targeted education and training to enhance their ability to deliver effective long-term rehabilitation.

The key message of this work is that care for stroke patients in SA can be improved in different ways, including implementing ongoing education and training programmes for physiotherapists to enhance their knowledge and skills in stroke long-term rehabilitation, establishing clear and structured frameworks to guide the process of rehabilitation, and ensuring consistency in patient care. Future research is needed on establishing and implementing guidelines for education, self-management, and telerehabilitation frameworks. The findings provided valuable information to inform targeted interventions and policies to improve post-discharge services, address patient education and needs, and enhance rehabilitation processes in the long-term.

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Appendices


Appendix 1: Paper 1

Exploring Stroke Patients' Needs after Discharge from Rehabilitation Centres: Meta-Ethnography.

Link: <https://www.mdpi.com/2076-328X/12/10/404>

Review

Exploring Stroke Patients' Needs after Discharge from Rehabilitation Centres: Meta-Ethnography

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Abstract: Healthcare providers must consider stroke survivors needs in order to enable a good quality of life after stroke. This review aimed to investigate the perceived needs of the stroke survivors across various domains of care following their discharge from hospital. A meta-ethnographic review of qualitative studies that reported needs of stroke patients after discharge from rehabilitation services was conducted. Main searches were conducted on the following electronic databases: Ovid Medline (1946 to 2021), CINAHL plus (EBSCO), AMED (EBSCO), PsycINFO (1967 to 2021), the Cochrane Library, and PubMed in June 2022. Main outcomes were related to stroke survivors' views, experiences, and preferences on physical, psychological, social, rehabilitation needs, and other identified needs. Twenty-seven studies were included in the final analysis. The findings show that existing rehabilitation provision for stroke survivors does not address the long-term needs of stroke survivors. Two main issues were revealed concerning the unmet needs of stroke survivors: (1) a lack of information availability and suitability and (2) inadequacy of care and services. It is crucial to further investigate the needs of patients in Asian countries and the Middle East as there is very limited understanding of patients' needs in the community in these regions.

Keywords: stroke; cerebrovascular disease; needs; requirements; discharge; long term; qualitative



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1. Introduction

A stroke can occur suddenly but result in chronic effects in terms of a person's physical health, emotional health, and social aspects [1]. Around 6.7 million people each year die of a stroke and a stroke is considered the second leading cause of deaths globally [2]. Strokes cause chronic disability; therefore, survivors and their families can experience consequences in the long term. For patients, these include cognitive disorders, concentration and memory difficulties, psychological issues, and severe physical disabilities [3]. The number of people having consequences following a stroke (ill health, disability, deaths) is likely to increase twofold before 2030 [4].

Around 80 per cent of those who survive a stroke are sent home from the hospital to continue to recover [5]. Following discharge, an increasing number of people who have had a stroke live with disability; in 2013, there were 113 million disability-adjusted life-years due to stroke globally [2]. Those who suffer a stroke face a difficult process of recovery, whereby they need to improve their functioning, including speech, physical, and cognitive functioning [6]. Yet, following discharge, stroke survivors have various needs that often go unmet and they feel neglected [7]. The definition of unmet needs post rehabilitation is where patients have a need for something that would help them to recover from a stroke but that which is not being provided [8,9]. For example, current research [1] has identified that only three out of ten people with strokes are receiving the recommended number of review assessments (at 6 weeks, 6 months, and 12 months) following discharge.

Practical evaluation of unmet needs can be undertaken by determining whether any help has been provided for particular needs identified by people with strokes and whether

this issue has been dealt with in a sufficient manner [9]. Qualitative research is well-positioned to detail such needs, and there is a large scale of qualitative studies which have explored the needs of people with strokes post-discharge. Studies which address stroke needs vary in the period explored, from one month [10] to ten years post-stroke [11]. The needs addressed are across various domains of care, such as rehabilitation needs [12], psychological and emotional needs [13], or perceived information needs [11,14].

A broader understanding of stroke survivors' needs has not been reviewed after they are discharged from healthcare services from the perspective of both patient and professional. Existing systematic reviews have focused mainly on specific types of needs that are perceived by both stroke survivors and carers. Examples of perceived needs include educational needs and rehabilitation needs [15–17]. Other reviews have been limited by their inclusion of particular design types or focusing on one specific group of participants. For instance, past reviews have included survey studies involving just stroke patients [6] or have included quantitative studies only of community-dwelling stroke survivors [18]. Existing syntheses [19] of qualitative evidence have not corroborated the needs of stroke survivors with the professionals' perspectives, and this review focused purely on participants from community settings only. Review-based research is needed that can triangulate the experience of different patients and healthcare professionals. This is important because the chronic nature of stroke impacts requires the collaborative input of the patient and the health professional to identify unmet needs and to work together for optimal recovery. Meta-ethnography provides a conceptual framework that goes beyond the simple aggregation of primary findings and is a particularly suitable method to provide new insights into the unmet needs of stroke survivors. To the best knowledge of the researchers of the present paper, no meta-ethnography study has summarised the literature in this area. Therefore, this review aimed to explore the needs of stroke survivors post-discharge from the hospital in aspects across various domains of care from the perspectives of the patients and professionals.

Review Question

Following their discharge from the hospital, what are the needs of the stroke survivors across various domains of care perceived by patients and healthcare professionals?

2. Methodology

2.1. Study Design

This review was previously registered (PROSPERO 2021 CRD42021256405).

Meta-ethnographic guidelines have supported the methodological reporting of this review. This includes the original guidance from Noblit and Hare [20] as well as considerations from recent guidelines [21,22]. Meta-ethnography is a systematic comparison of conceptual data found in primary qualitative research in order to establish and develop ideas, concepts, theories, and models. Cahill et al. [23] explain that a new generation of concepts is needed to explain the relationships between findings as opposed to just describing the data. To perform this, the researcher can keep a diary of questions to answer. This type of research was intended to retain the meanings and contexts in the original studies, yet create conceptual models and theories in the realm of study [20].

2.2. Search Strategy

The literature review search comprised three parts. The first part was to clarify the focus area of the study. To perform so, a scoping search was undertaken. Following this, the primary searches were carried out in June 2022 on the following electronic databases: Ovid Medline (1946 to 2021), CINAHL plus (EBSCO), AMED (EBSCO), PsycINFO (1967 to 2021), the Cochrane Library, and PubMed. The keywords used within the databases were identified using the PICOS strategy, with alternative spellings and synonyms also searched for (see Supplementary File (A)). Boolean terms 'OR' and 'AND' were utilised, along with subject headings (for example, MeSH). A librarian supported the process, and this was

checked. Following retrieval of the papers, reference lists and bibliographies were searched manually to find any further studies of interest. The grey literature of PhD dissertations and conference papers were considered. Main search terms were searched for in Google Scholar and the Science Direct website, and the first 20 pages of the results were screened. For the included studies, the researchers sought the profiles of study authors on ResearchGate and Academia.edu. Table S1 in the Supplementary File contains an example of the search carried out in Medline.

2.3. Inclusion and Exclusion Criteria

Eligibility criteria are presented according to the SPIDER (Sample, Phenomena of Interest, Design, Evaluation, and Research Type) acronym.

2.3.1. Sample

Studies were included if they represented people with strokes. The target population for the study was adults who had been discharged from hospitals after a stroke, ischaemic stroke, or haemorrhagic stroke, who had finished rehabilitation (either at a rehabilitation service or in the community). Studies that involved a mixed sample, such as patients with traumatic brain injury and stroke, were included if the data for stroke survivors could be extracted. Studies were also included that considered post-discharge needs of people with strokes from the perspective of caregivers and health professionals.

2.3.2. Phenomena of Interest

Studies were included if they were able to consider the needs of stroke survivors after they had been discharged from rehabilitation. Studies could focus on exploring various needs, for instance physical, psychological, social, political, cultural, environmental, or rehabilitation. Needs had to be reported by the stroke patients themselves and during the post-discharge, subacute, or chronic phases. Mixed method studies were included if the qualitative data could be extracted. Studies that were excluded were those where stroke patients had their needs assessed prior to discharge, those that assessed patient satisfaction rather than perceived needs, those studies which solely assessed carers' needs, and mixed studies where the qualitative data could not be extracted.

2.3.3. Design

All types of qualitative methodology were considered; for instance, this included types of grounded theory, types of phenomenology, types of narrative research, and descriptive or interpretive designs. A mixed methods study that included a clearly identifiable qualitative phase and reported that phase in a way that represented a form of qualitative design were included. Case studies were excluded.

2.3.4. Evaluation

All types of methods used in qualitative studies were acceptable; for instance, this could include interviews, observations, field diaries, vignettes, or surveys with open questions. Studies that quantised data or restricted reporting of experiences were excluded.

2.3.5. Research Type

Qualitative or mixed methods designs were included.

2.3.6. Other

Studies that were conducted in hospitals, nursing homes, or the community.

There was no limitation on dates of publishing. Only articles in English were considered and studies had to be related to humans and have an abstract.

2.4. Study Selection

Two independent reviewers carried out the study selection process. The titles and abstracts were identified following a search and screening process, where any duplicates were removed. The eligible papers were saved on EndNote. Following the creation of the abstract shortlist, the two independent reviewers (BT and GA) screened the articles using the inclusion and exclusion criteria and compared their results. Disagreements were resolved by a third reviewer. The full text of the papers were read to shortlist the relevant articles.

2.5. Quality Appraisal and Certainty Assessment

Quality appraisal was undertaken using the Joanna Briggs Institute qualitative critical appraisal checklist. The certainty assessment was carried out by using the GRADE-CERQual assessment tool. The quality of each paper was assessed using two independent reviewers (BT and GA) and a third reviewer (SR) in the case of any disagreements.

2.6. Data Extraction

A pilot data extraction was conducted on two papers [24]. Following this, the data were extracted by two independent reviewers, and any discrepancies were ratified by a third reviewer. The following data were extracted from the papers studied: author, publication date, country of study, aim, features of the sample (such as sample size, age, gender, and length of time since discharge), study setting, design, and results. Similarly extracted was information regarding patient needs in terms of the physical, psychological, social, rehabilitation, financial, and other aspects. Data were documented in Microsoft Word tables. Authors of studies were contacted in the case of missing or unclear information in the included papers.

2.7. Data Analysis

An independent reviewer undertook the meta-ethnographic synthesis according to recommended guidelines for synthesising the data [20,21]. Studies were read multiple times in chronological order by the researchers, who determined the relationship between the studies by addressing the studies' design, aims, setting, and sample characteristics, for example, age, socioeconomic status, gender, ethnicity, and the length of time since stroke event. Following this, new concepts and metaphors were identified. In this stage, line by line coding of all findings of primary studies was the technique that was used. Then, these codes were juxtaposed and brought together to create clusters and themes by grouping the interpretation of first order construct (participants' views and interpretations reported in the included studies) and second order constructs (authors' interpretations of participants' views in these studies). The relationships between second order constructs were then used to create the third order constructs. These associations between the studies occurred in two ways—reciprocal, for overlapping studies, and refutational, for conflicting studies. Tables and grids have been utilised for this purpose. A senior reviewer reviewed the findings of data synthesis (BT). An audit trail can be seen in Supplementary File (D).

3. Results

In total, 5345 records were identified from the database search. Forty-three further records were identified from searching references. Following the removal of duplicates, there were 4627 articles, of which, 127 articles were assessed for eligibility. Ninety were excluded and thirty-one were included in the critical appraisal stage (Supplementary File (B)). Four studies were excluded due to low quality. Twenty-seven articles were included in the final analysis. The results of the search and screening process are presented in the PRISMA diagram (Figure 1).

3.1. Study Characteristics

Of the twenty-seven included studies, eleven were conducted in the UK, six in Canada, five in Australia, two in the US, and one in each of China, Iran, Malaysia, and Norway. The

sample size of included studies ranged from six participants [25] to one hundred twenty-five participants [13]. Among these studies, thirteen articles [10,11,26–36] recruited stroke participants only. Mixed participants of stroke survivors and carers were recruited in nine studies [14,25,37–43]. Three studies [12,13,44] included health professionals as well as stroke survivors and carers. Nordin et al. [45] and Abrahamson and Wilson [46] recruited health professionals and patients. The characteristics of studies and patients can be found in Table 1.

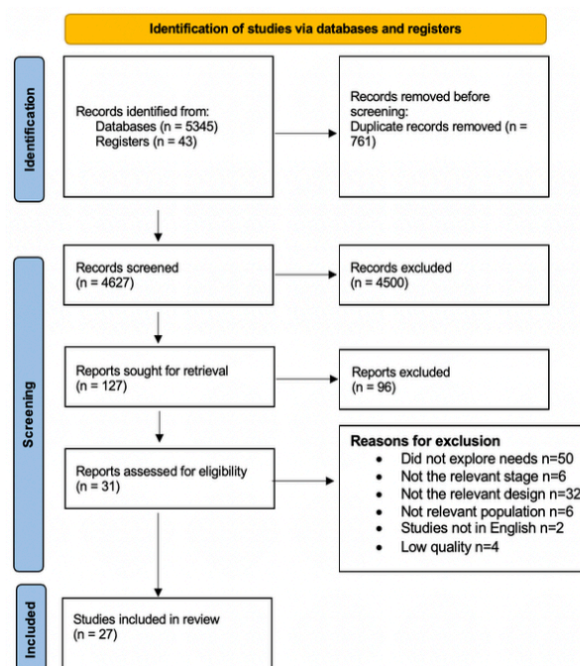


Figure 1. The PRISMA flow diagram.

3.2. Quality Assessment and GRADE

The quality assessment is included within the GRADE-CERQual assessment following the synthesis section (Table 2). A breakdown of the quality assessment can be seen in the Supplementary File (C).

Table 1. Characteristics of studies.

Authors	Geographical Location	Aim	Methodology	Participant	Time Since Stroke
[10]	China	To identify the rehabilitation needs of Chinese elderly patients following a stroke	Qualitative ethnographic approach. Semi-structured interview.	Fifteen stroke survivors Nine females Six males	One week before discharge from the rehabilitation ward and one month after discharge.
[11]	Sweden	To use patient journey mapping to explore post-discharge stroke patients' information needs to propose eHealth services that meet their needs throughout their care and rehabilitation processes.	Qualitative research. Focus groups.	Young (<65 years) and old (≥65 years) stroke patients Female: seven Male: five	One focus group included patients with strokes more than 10 years ago. Two groups included patients with strokes less than 10 years

Table 1. Cont.

Authors	Geographical Location	Aim	Methodology	Participant	Time Since Stroke
[12]	Canada	The aim of this study was to examine the rehabilitation needs of this clientele from their hospitalisation to their reintegration into the community.	Qualitative research tool was selected. The method of focus group discussion.	The patients (n = 4) Caregivers (n = 5) Healthcare providers (n = 9) Administrators (n = 7) Gender: not provided	Three patients with strokes from 2 to 3 years. One patient had a stroke from 4 to 8 years.
[13]	UK	To explore patients', carers', and health professionals' experiences of psychological need, assessment, and support post-stroke while in hospital and immediately post-discharge.	Exploratory study. Qualitative semi-structured interviews and focus groups.	Thirty-one stroke patients, twenty-eight carers, and sixty-six health professionals. Male: eighteen patients, nine carers Female: thirteen patients, nineteen carers Health professionals' genders were not provided.	Mean length of 171.23 days between discharge and interview.
[14]	Australia	To identify patients' and carers' perceived barriers to accessing and understanding information about strokes.	Semi-structured interviews at two points in time.	Initial interviews were conducted with 34 stroke patients and 18 carers, and follow-up interviews were completed with 27 patients and 16 carers. Fourteen female patients Thirteen female carers	Prior to and 3 months following discharge from an acute stroke unit.
[25]	Canada	To explore the stroke education perspectives in a Canadian rehabilitation centre to illustrate one approach for addressing this problem.	Qualitative description study was overlaid by phenomenology. Face-to-face semi-structured interview.	Three patients and three caregivers. Three male patients Three female caregivers	Not identified.
[26]	UK	To explore stroke survivors' needs and their perceptions of whether a community stroke scheme met these needs.	A qualitative study using a phenomenological approach. Semi-structured face-to-face interviews.	Twelve stroke survivors. Female: five Male: seven	Mean of 26 months post-stroke.
[27]	Australia	To explore the experiences of community-dwelling stroke survivors at one, three, and five years using a community-based, cross-sectional study.	A modified, grounded theory approach. Semi-structured interview.	Ninety-one stroke survivors at one, three, and five years after stroke. Forty-seven males Forty-four females	Cohort One: People who had had a stroke 1 year prior to recruitment. Cohort Three: People who had had a stroke 3 years prior to recruitment. Cohort Five: People who had had a stroke 5 years prior to recruitment.
[28]	Iran	To illuminate how stroke survivors experience and perceive life after strokes.	Grounded theory approach using semi-structured interviews.	Ten stroke survivors. Male: six Female: four	Patients had strokes within the past 3–6 months.
[29]	UK	To investigate how contextual factors, as described by the World Health Organisation's International Classification of Functioning, Disability, and Health (ICF), impact stroke survivors' functioning and how needs are perceived in the long term after strokes.	Semi-structured, in-depth interviews.	Thirty-five stroke survivors. Males: 49% Females: 51%	Total of 49% had strokes within 1 to 2 years. Total of 31% had strokes within 3 to 5 years. Total of 6% had strokes within 6 to 8 years. Total of 14% had stroke more than 9 years.

Table 1. Cont.

Authors	Geographical Location	Aim	Methodology	Participant	Time Since Stroke
[30]	UK	To investigate how younger stroke survivors' experiences of care are shaped by the field of stroke and how, in navigating stroke care, individuals seek to draw on different forms of capital in adjusting to life after strokes.	One-to-one, semi-structured interviews.	Thirty-one stroke survivors were interviewed. In ten interviews, carers also took part. Nineteen males Twelve females	Patient had stroke within 6 weeks and 28 months.
[31]	Norway	To explore young and midlife stroke survivors' experiences with the health services and to identify long-term follow-up needs.	This qualitative study applied a hermeneutic phenomenological approach. Two cohort, in-depth interviews.	Sixteen stroke survivors. Five females Eleven males	Patient had stroke within 1.5 to 10 years after stroke onset.
[32]	Sweden	To explore stroke survivors' experiences of healthcare-related facilitators and barriers concerning return to work after stroke.	Qualitative study. Focus groups.	Twenty stroke survivors. Seven females Thirteen males	Patient had been referred to stroke rehabilitation within 180 days after stroke onset.
[33]	Australia	To examine the unmet needs of younger stroke survivors in inpatient and outpatient healthcare settings and identify opportunities for improved service delivery.	Qualitative descriptive approach. In-depth, semi-structured interviews.	Nineteen young stroke survivors. Ten females and nine males.	Patients had stroke within 6 months to 24 years.
[34]	Canada	To identify the educational needs of older adults who have had a stroke in order to support their participation in leisure activities that promote cognitive health.	A descriptive study. Mixed-methods design was used with an emphasis on qualitative data and involving semi-structured interviews.	Twenty people. Fourteen males Six females	Mean of 8 months post-stroke. Mean of 5.9 months post-discharge.
[35]	Australia	To explore the needs and experiences of people who cease driving following a stroke with the aim of informing clinical practice.	Qualitative phenomenological approach. Semi-structured interviews.	Twenty-four stroke participants. Seventeen males Seven females	Mean of 5 years post-stroke.
[36]	UK	To develop local stroke services by involving, in a meaningful way, those affected by stroke in identifying and prioritising service development issues.	An action research framework. A combination of semi-structured interviews and focus groups with both patients and carers.	N=35 Patients recruited from hospitals (n = 30) Females: 53% Patients recruited from community (n = 5) Females: 52%	Not identified.
[37]	UK	To identify the information needs of patients and their informal carers at various stages post-stroke with the aim of developing a database from which individualised information packages could be provided.	Grounded theory approach. In-depth, qualitative, semi-structured interviews.	Nine were interviews with patients, ten were interviews with patients and carers together, and two were interviews with carers only (totalling thirty-one people in all). Eleven were male and ten were female.	Seven interviews were carried out with patients and/or carers immediately post-stroke. Five immediately post-discharge. Nine between 2 months and 1 year post-discharge.

Table 1. Cont.

Authors	Geographical Location	Aim	Methodology	Participant	Time Since Stroke
[38]	UK	To identify the long-term support needs of patients with prevalent stroke, and their carers identified from practice stroke registers.	Qualitative study. Focus groups.	Twenty-seven patients and six carers subsequently participated in the focus groups/interviews. Nineteen females Fourteen males	Median of 4 years post first stroke. Median of 2.5 years since last stroke.
[39]	US	To study the perspectives and experiences of stroke survivors and partners of stroke survivors regarding sexual issues and perceived rehabilitation needs.	Qualitative, exploratory, individual, semi-structured interviews	Fifteen stroke survivors and fourteen partners of stroke survivors. Sixteen males Thirteen females	Patients: median of 45 months post-stroke. Partners: median of 51.5 months post-stroke.
[40]	USA	To examine rural Appalachian Kentucky stroke survivors' and caregivers' experiences of receiving education from healthcare providers with the long-term goal of optimizing educational interactions and interventions for an underserved population.	Qualitative descriptive study. Semi-structured interviews.	Thirteen stroke survivors and twelve caregivers. Sixteen females Nine males	Mean of 3.6 years post-stroke.
[41]	Canada	To explore the experiences and needs of Chinese stroke survivors and family caregivers as they return to community living using the Timing it Right Framework as a conceptual guide.	Qualitative interviews In person or telephone interviews depending on the participant's preference.	Eighteen participants including five stroke survivors and thirteen caregivers. Nine females Nine males	Patients: median of 6 months post-discharge. Caregivers: median of 8 months post-discharge.
[42]	Canada	To report the experiences and perceptions of people with stroke and their caregivers in the existing continuum of stroke care, social services, and rehabilitation in the province of Québec (Canada).	Phenomenological qualitative study. Focus groups.	Sixty-eight participants were recruited and attended the ten focus groups. Thirty-seven stroke patients and thirty-one carers. Twenty-nine males Thirty-nine females	Mean of 2.6 years post-discharge.
[43]	Australia	To explore community-dwelling first-time stroke survivors and family caregivers' perceptions of being engaged in stroke rehabilitation.	An interpretive study design. Face-to-face using a semi-structured interview.	Twelve and ten caregivers. Twelve males Ten females	Not identified.
[44]	Canada	To gain insight into healthcare and social structures from the perspective of patients and caregivers that can better support long-term stroke recovery.	Qualitative descriptive design. Semi-structured interview.	A total of twenty-four participants were recruited: sixteen stroke survivors (female = five, male = eleven, aged 48–87), four spouses, (females aged 62–80), three stroke recovery group coordinators (female), and one speech pathologist (female).	Mean of 8.74 years since stroke.

Table 1. Cont.

Authors	Geographical Location	Aim	Methodology	Participant	Time Since Stroke
[45]	Malaysia	To explore the perception of rehabilitation professionals and people with stroke towards long-term stroke rehabilitation services and potential approaches to enable provision of these services.	Qualitative study using focus groups.	Fifteen rehabilitation professionals. Eight stroke survivors. Fourteen females Nine males	Patients had stroke from 1 to 2 years.
[46]	UK	This study explored needs identified by patients, how they were addressed by the six-month review (6MR), and whether or not policy aspirations for the review were substantiated by the data.	Philosophy: critical realism. Design: multiple case study design. Methods: interviews.	Forty-six patients and twenty-eight professionals. Gender was not provided.	Patients and carers were interviewed at about six weeks post-discharge after their 6MR and, where possible, after their annual review.
Authors	Findings				
[10]	Five themes: informational needs; psychological needs; physical needs; social needs; spiritual needs.				
[11]	Five themes: A holistic view of the care process; understanding the illness; collaboration with care providers; tracking the rehabilitation process; practical guidance through healthcare and community services.				
[12]	Nutrition; body condition; personal care; communication; housing; mobility; responsibilities; interpersonal relationships including sexuality; community living; leisure activities; psychological; cognitive.				
[13]	Two themes: Minding the gap and psychological expertise.				
[14]	Three themes: limited availability and suitability of information; the hospital environment; patient and carer factors.				
[25]	Five themes: secondary prevention; rate of recovery; knowledge collection; transition to home; adherence to home programme.				
[26]	Three themes: creating a social self; provision of 'responsive services' in the community ; informal support network.				
[27]	Three themes: knowledge about stroke; communication with the health system; influences on transition home.				
[28]	Two themes: functional disturbance and lack of social support.				
[29]	Environmental factors; support and relationships; products and technology; services, systems, and policies; attitude; personal factors; life experiences; social position; personal attitude.				
[30]	Four themes: healthcare professional as expert; expectation of involvement in care; social capital; variations in economic capital.				
[31]	Two themes: difficulties accessing health services and lack of tailored follow-up services.				
[32]	Two themes: requesting rehabilitation planning, healthcare information, and coordination and increased support in daily life would facilitate return to work.				
[33]	Three themes: inadequately addressed psycho-emotional and cognitive needs after young stroke; isolation from lack of information and structured support; failure to deliver age-relevant patient-centred care.				
[34]	Three themes: activities perceived to be beneficial in promoting cognitive health; continuity versus changes in participation post-stroke; factors influencing leisure participation.				
[35]	Four themes: life without driving; key times of need; alternatives and other ways; carer support and assistance.				
[36]	Four themes: prevention; immediate care; early and continuing rehabilitation; transfer of care and long-term support.				
[37]	Three themes: clinical information; practical information; information on continuing care and resources in the community.				
[38]	Three themes: psychological and emotional problems; information needs; contact with services.				
[39]	Seven themes: sense of loss and functional changes affect sexuality; relationship changes affect sexual functioning; difficult to talk about sex; little or no discussion of post-stroke sexuality by rehabilitation professionals; need to tailor education about sex to the individual/ couple; timing is key in presenting information about sex after stroke; provider rapport and competence is vital to discussing sexual issues.				
[40]	Five themes: providers of education; receivers of education; content of education; delivery of education; timing of education.				
[41]	Two themes: information and training needs of stroke survivors and caregivers change over time, and Chinese resources are needed across care environments.				
[42]	Four themes: accessibility of care; appropriateness of care; expertise of the healthcare workers and continuity of care				
[43]	These themes: readiness to return home; coping with care transition; dealing with fragmented rehabilitation services and uncertainty about ongoing rehabilitation.				

Table 1. Cont.

Authors	Geographical Location	Aim	Methodology	Participant	Time Since Stroke
[44]		Two themes: experiences of managing stroke and resources for support.			
[45]		Four themes: the needs for continuity of care; beliefs about long-term rehabilitation; perceived barriers to long-term stroke rehabilitation; approaches to long-term rehabilitation.			
[46]		Two themes: perceived needs for community stroke rehabilitation and perceived need for information, education, and support.			

Two major themes related to the needs of stroke survivors emerged from the data. These included: (1) limited availability and suitability of information, (2) Adequacy of care and services.

3.2.1. Major Theme One: Limited Availability and Suitability of Information

This theme contained three subthemes including:

Subtheme One: information needs related to stroke pathology.

This includes stroke definition, symptoms, signs, causes, treatment, complication, and stroke recurrence.

The finding in this review revealed a lack of pre stroke information of stroke-risk factors and warning signs [27,36,38,41]. Poor pre stroke information leads to failure of participants to respond to their stroke symptoms [27]. Yueng et al. [41] described educational resources can help stroke survivors and families learn about stroke including TV, radio, flyers, and newspapers.

I cannot understand what caused it to happen . . . I did not know what a stroke was. [27] (p. 85)

After stroke, detailed information on prevention of stroke recurrence was desired [32,36,37,46].

That [information] was fairly zero, actually! I would have liked more information about how to prevent another stroke and also . . . any alarm signals. [46] (p. 5)

Subtheme Two: information needs regarding stroke recovery.

Participants needs information on stroke treatment including information related to emergency intervention, medication, medication side effects, treatment plan, recovery rate, recovery facilitators, and guidance on available health services.

Participants in the included studies explained that, during the immediate post-stroke phase, they needed a great deal of information regarding the subsequent course of action and details of those who can be contacted for help [36,40].

"I would like to know what services were available, you know." [27] (p. 87)

Subtheme Three: the means of information delivery, including, the amount, relevance, time, format, and language of information.

Information Delivery Methods

Amount: One study revealed that healthcare professionals provided insufficient amount of information to stroke patients. Although some information is provided, it was often vague or lacked information specific to the nature of their health status [14].

Relevance: In terms of information content, participants indicated that the standard information packs that they were given had limited relevance, with some patients being given information about acquired brain injuries or all-age stroke groups. Most participants reported a need to receive information that was more relevant to their age group and health diagnosis [14,26,33].

"didn't have relevant brochures . . . not a lot of detail." [14] (p. 72)

Timing: Participants expressed needs for receiving information multiple times across the continuum as information can be difficult to absorb immediately post-stroke due

to the stroke side effects, feeling overwhelmed, a chaotic environment, rehabilitation commitments, and memory deficiencies [14,35,46].

“Participants described the need for multiple repetitions of education over time, across the continuum of care, and into the chronic phase of stroke.” [40] (p. 20)

Format: There was a need for different types of education resources, such as written information (pamphlets, brochures, and binders), verbal information using group discussion and guest speakers, and visual teaching using videos and technology. Verbal delivery was the favoured mode for information delivery as it was suggested as easy to remember [40]. The information needs to be simple and presented clearly without using medical terms [14]. Further, stroke survivors expressed their needs to have access to their health records; patients wanted access to information post-discharge including the diagnosis, treatments, medications, lab results, referrals, appointments, and home visits [11].

‘I need to learn, sometimes on radio and television they have programs about stroke recovery. I listen and use the information. Some guidelines are very important and can help us to improve our life style after stroke.’ [28] (p. 251)

Challenges for Information Delivery

After accounting for the need to tailor information, further factors that influenced stroke patients’ experience of care were reported. These factors can be divided into patient factors and staff factors. Participants preferred healthcare providers who were proactive in their initiation of education. Participants did not seek information because they do not know what to ask, forgot to ask, felt they did not need information, or assumed that information would be given to them [14,40,46]. Poor health and stroke-related impairment also led patients not to seek information [14]. A lack of knowledge on behalf of staff and staff time constraints were the most reported barriers to deliver information [11,13,14,43].

“You were lucky to get a doctor to come and speak with [you].” [14] (p. 74)

“The doctors always said . . . please feel free to ring up . . . But it’s like all these things, you don’t know the questions to ask. You’ve no idea.” [46] (p. 5)

“The physicians here at the hospital did not agree with the stroke rehab physicians about when I was going to start working.” [32] (p. 745)

3.2.2. Major Theme Two: Adequacy of Care and Services

Rehabilitation process experience: In order to return to motor activity as well as a better quality of life, rehabilitation is critical. Several patients indicated that they felt anxious and distressed about the therapy processes that they went through during rehabilitation. In general, they seemed to perceive that rehabilitation services were fragmented and disorganised [11,33,43].

“They don’t really help you get back into life, do they? They just sort of, you have a stroke, you have physio and that’s it.” [30] (p. 1915)

Transition experience at discharge: It was found in the papers that the transition in care from hospital to home was poor, disorganized, and fragmented [25,27,43]. Patients worried about coping, receiving support, and about whether they were ready to be discharged from the hospital [36]. To communicate their needs regarding education, patients needed to conduct a trial stay at home. This enabled them to resolve any issues, including with equipment [25]. In the study by Chen et al. [43], it was revealed that patients were exposed to a potential lack or breakdown of care as a result of ineffective handover among clinical providers/staff [43]. Patients feared that interrupted rehabilitation would thwart their recovery and stop them from becoming rehabilitated [43].

“What they did was they sent me home a couple of weeks before time and they figured that . . . I would realise, you know, exactly what I would need so and that’s why they did it.” [25] (p. 283)

Participants had coping issues when transferred back into the community including physical restriction, cognitive issues, and feelings of abandonment and being a burden on others [10,28,42,43]. Participants were frequently unsatisfied due to various unmet needs.

Subtheme One: Intervention needs

It was reported that rehabilitation programmes need to be more frequent, intensive, long-term, and flexible to meet participants' goals and be appropriate for their age and health situation. Participants wanted return to work preparation, driving assessment, individualised sex intervention, and resources to support social participation.

"there's no way [the] one hour a week that the government gives you is going to fix people." [33] (p. 1701)

Further, there was a reported shortage in cognitive and psychological support. A lack of psychological support was reported in many of the papers [10,12,13,28,30–33,42,43]. Participants expressed the need for early and formal cognitive support, with rehabilitation not solely being focused on physical performance. In Harrison et al.'s [13] study, participants commented that a lack of formal psychological support early on could influence how much patients are rehabilitated and consequently recover.

"it should have been a formal process to gain access to a psychologist" and it would have been beneficial from an earlier time point, such as from the acute hospital." [33] (p. 1700)

Subtheme Two: Social needs

Most stroke survivors indicated that they had unmet social needs. Specific social needs after discharge included motivation, income support, and travel support.

1—Motivation: Several participants asserted that they looked for hope in their situations. They also highlighted the need for more positive discourse from healthcare professionals to help them recover as much as possible [28,31,33,35,44]. Many participants explained that, as their stroke became chronic, their motivation to carry out their previously learned exercises at home decreased [45].

"Initially, I was motivated. After several months, I don't feel that excited anymore." [45] (p. 6)

1:1—Family support: A key part was played by participants' families, who participated in caring roles, rehabilitation, and advocacy for improved services [26]. Carer training was one of the most reported needs [37,43,45]. However, difficulty identifying the main carer and being busy with their lives were barriers to caregivers' training [45].

"it was almost like [being] throwing in the deep end. I've never showered anyone in my life beforep . . . we just sort of muddled through . . . maybe like when you're leaving rehab inpatient, someone probably should go through with the partner of the person about showering, medications." [43] (p. 78)

1:2—Peer support: Stroke survivors stated that stroke recovery groups were an important factor for stroke recovery. Peer groups helped with psychological and emotional factors by having someone to talk to, sharing, understanding, learning from each other, and setting goals [33,44]. In spite of the advantages offered to patients by stroke recovery groups, survivors found that they had trouble accessing such groups after they had been discharged [44]. There are specific needs regarding stroke peer groups including age relevance and peers with similar conditions and interests.

"I wish that there would be a therapy group for people who are in the same situation . . . how we can help each other, what kind of demands can I make at work. I would be open to that after 4 months, when I have come to terms with my situation a bit and it would've been OK to share it with others." [32] (p. 744)

2—Income support: Many stroke patients lacked stability as a result of poor support from insurance or a lack of financial help [28]. The reported financial needs were divided into two. In terms of health insurance, stroke rehabilitation costs are high and not all patients were able to pay for the stroke rehabilitation aspects that they felt were required [44].

In addition, stroke survivors had financial needs in terms of mobility aids and house adaptations (wheelchairs, scooters, walking sticks, and frames).

“Definitely, one of the most important necessities for every human being in the world is social insurance that supports people with stroke so they have a stable community.” [28] (p. 251)

3—Travel support: Another important issue highlighted by participants was a lack of transport; survivors lacked access to public transport to different locations or experienced long waiting times for public transport and often the seats were full [35]. Alternative transport options were found to be inconvenient due to high costs. Of those with their own transport, there were few parking spots at hospitals and the disabled spaces were often full [35,45].

“often the seats on trains and buses were full, disabled parking spots were often taken and that there was increased waiting time associated with public transport.” [35] (p. 277)

Subtheme three: Planning

Patients reported needing a clear treatment plan. These plans need to be individualised and relevant to their age and personal history [26]. Further, participants want to be involved in planning and setting goals.

“It would have been good to get a plan earlier. To receive [a rehabilitation] contact earlier.” [32] (p. 744)

Subtheme Four: Care continuity

1—Ongoing care: One of the most reported needs was continuity of care—participants expected care to be continued post-discharge. However, long waits for rehabilitation to commence post-discharge were reported in a number of the studies [11,26,28–31,33,38,42,43,45,46]. A primary barrier to continued care was seen as the inadequacy or lack of equipment/preparedness in rehabilitation wards and community rehabilitation [45].

“It’s a long time to wait before they came round, I wanted to get moving because the physio was so good in hospital . . . but then when you come home there’s nothing . . . I wanted to just get going and build on what I was doing in the hospital.” [46] (p. 3)

2—Follow-up: Post-discharge follow-up was one of the most reported needs. Patients needed follow-up services to have feedback on their progress, to be closely assessed, and receive guidance on performing activities appropriately and safely [31,34]. Although some participants received follow-up services, the quality of the follow-up was not as expected; some regular meetings did not occur, there was a delay in replying, questions were not being addressed due to lack of expertise, and the follow-up was not tailored to their specific needs [31].

3—Communication: Stroke survivors have difficulty in contacting healthcare professionals to obtain support. Participants felt it would benefit their rehabilitation outside of the hospital setting if they had a coordinator they could discuss services and concerns with [43]. In addition, there was a need for trained healthcare professionals to deliver their diagnoses in a sensitive manner, as well as perform psychological assessments, sex assessments, and active listening, and respect the patients and their word choices. There was a lack of congruity between different healthcare actors [27,32].

“You should get some kind of contact person . . . someone who calls and checks on you “how is it now, are you experiencing any problems?” could refer you to, well, here or there.” [32] (p. 744)

“No automatic follow up on what I am doing. That’s the biggest problem. You’ve got to have some input . . . There is no follow up unless you do it yourself.” [43] (p. 80)

Needs of Younger Patients

Regarding younger participants' rehabilitation needs, three studies [30,31,33] recruited younger participants (mean ages of 46, 48, and 41). In these three studies, participants express needs for psychological and emotional support, care continuity, return to work, and follow-up. Younger stroke survivors found rehabilitation care irrelevant to their individual goals and to be generic, fragmented, and designed for old patients [33]. Those participating in the study indicated the requirement for rehabilitation services that were age-relevant. In addition, some participants were not able to receive outpatient rehabilitation because their deficits were mild, or the majority of participants had to wait three to six months for an outpatient clinic appointment [33].

"they just treated me like I was 70 years old but I'm actually 35" and "it's like they put you into a box; you had a stroke, so this is how we deal with people that had a stroke." [33] (p. 1701)

Carer Needs

Three studies [12,25,42] separated the needs for patients and carers. Although strokes have an impact on caregivers' personal lives, they had difficulty in expressing their needs [42]. Most carer needs were equivalent to patients' needs. However, training courses and psychological support were needs repeated by carers.

Table 2. CERQual assessment.

Review Finding			CERQual Confidence
Limited availability and suitability of information	Needs for information on stroke pathology	Pre stroke information	High confidence
		After stroke information	
	Needs for information on stroke recovery	Need for information on stroke rehabilitation	High confidence
		Need for guidance on health services	Moderate confidence
		Amount	Moderate confidence
	Adequate information delivery	Relevance	Low confidence
		Time	Moderate confidence
Format		High confidence	
Programme Intensity		Low confidence	
Intervention needs	Return to work	Low confidence	
	Driving rehabilitation	Low confidence	
	Sex rehabilitation	Low confidence	
	Leisure activities	Low confidence	
	Psychological support	High confidence	
	Social needs	Motivation	Peer support
		Family support	High confidence
Income support			High confidence
Travel support			High confidence
Clear plan			Low confidence
Engagement in goal setting	Individualised plan		Low confidence
	Ongoing care		High confidence
	Follow-up services		High confidence
Care continuity		Contact with health services	High confidence
	Communication	Coordinator	Low confidence
		Trained professionals	Moderate confidence

4. Discussion

In order to enhance post-stroke care, many researchers have turned their attention towards understanding the needs of stroke survivors and caregivers. Thus, the key objective of this review was to investigate the unmet needs of stroke survivors after discharge from the hospital. Throughout this review, two key themes emerged: (1) limited availability and suitability of information; (2) adequacy of care and services.

The findings of the present review indicate that stroke survivors have a number of diverse educational needs, and many of these needs are currently being unmet. The findings are very much in line with those revealed in Hafsteinsdóttir et al.'s [15] study. Patients who have suffered a stroke must be educated carefully because strokes can cause ischaemic injuries that have a significant impact on learning. One potential solution to meet the information needs of stroke survivors could be to assign a nurse as a personal educator. However, the nurse must be suitably trained in understanding risk factors, pathophysiology, the impacts of a stroke, the availability of community resources, and the emotional needs of patients and their families [47]. Participants in this study pointed out that professional expertise was required to manage their situations [27,31]. Thus, if a nurse does not have thorough and comprehensive knowledge of strokes, they may be unable to give the patient and their family the individualised education and care that they require [48].

Moreover, the importance of presenting information in an appropriate way is well-recognised in the literature [15]. The results of our review indicate that combining different methods of patient education can be very effective. In the review, participants highlighted the importance of obtaining information both verbally and in written form. Written teaching methods were found to be a beneficial resource for stroke patients during the chronic stroke phase [40]. If the patient identifies their favourable learning styles, professionals can educate them in a suitable manner. They can also supplement this by incorporating other types of educational materials such as online resources.

Education is paramount in ensuring effective communication. In the present study, participants reported difficulty in finding channels to contact the health services to acquire relevant information on how to manage their lives after suffering a stroke [31]. The participants highlighted dissatisfaction with healthcare providers' communication skills in terms of clarity and effectiveness. Such communication issues can cause patients to feel uncertain and anxious. To address this, Smith et al. [49] recommend that patients and caregivers should be actively involved in the care process and should be given sufficient opportunities and follow-up to provide feedback and clarify information. Additionally, the findings indicated that long-term services, such as monitoring, assessment, and therapy, are required to improve the patients' physical and psychosocial functioning. Martinsen et al. [31] thus suggest that follow-up services should be intensified and adapted to suit the needs of the individual patient. Moreover, as health services for stroke patients continue to be developed around the world, information and communication technology (ICT) and mobile technologies can be used to create suitable eHealth services that can ensure that patients' care and rehabilitation needs are met [11].

Long-term care is generally considered to be more fragmented than acute stroke care [50]. Several participants have explained that, although rehabilitation services should address physical impairments, psychosocial, and social participation needs, they generally only address biomedical needs for a limited period of time [30]. A lack of healthcare resources was identified by participants as a key issue impacting the discontinuity of therapy [45]. Most participants reported that, when returning to life in the community, they found it difficult to access services, including rehabilitation services. They, thus, indicated feeling a sense of abandonment [42]. Moreover, a lack of staff was highlighted as a key factor influencing the lack of long-term care and rehabilitation options for stroke patients; the intensity of therapy programmes is directly affected by staff shortages. Moreover, the amount of time that a therapist spends with each patient ultimately determines the outcome of stroke rehabilitation. Tele-rehabilitation may be an alternative for stroke survivors who

want to continue treatment and improve their quality of life [51]. Furthermore, self-management treatments, which differ from simple patient education or skills training because they are designed to motivate those with chronic conditions to take an active role in their own health management [52], can be employed. Specialised training courses for formal and informal carers are also required to enable stroke survivors and their relatives to live a healthy life [28]. In this study, stroke recovery groups in the community were identified as important and equitable resources as they give stroke survivors an opportunity to create new social networks and participate in learning, educational, and therapeutic activities [44].

4.1. Limitations

It is important to note that this systematic review has a number of limitations. Firstly, it is a qualitative review that generates issues such as limited generalisability. This is because most studies in the review were conducted in developed countries. Thus, it is incredibly difficult to generalise the findings to developing countries or countries with a non-Western culture. There is a lack of research that has examined the unmet needs of stroke patients in Asia which contributes to poor awareness regarding the needs of stroke patients beyond hospital settings in general, as well as poor care provisions post-discharge. Additionally, the incidence of strokes is very different between developed and developing countries, and they have different healthcare systems, policies, and challenges when it comes to stroke care provision; thus, the extent of reported unmet needs may differ substantially. Nevertheless, a wide range of stroke patients' needs were shared across developing and developed countries, such as information needs. Further, it is also important to consider that caregivers are constantly involved in caring for the stroke patient and thus, they often provide unique perspectives. Further, strokes affect patients and caregivers differently and thus, may have different needs. Despite the importance of caregivers, their perceptions were not considered in this systematic review. Further reviews could consider integrating evidences on unmet needs from different stake holders. In addition, the review was not able to determine how the unmet needs are affected by various levels of physical, intellectual, and personality defects. Research is needed that takes on critical stances to reveal important social, educational, ethnic, and culturally sensitive information that will improve the ability to transfer these findings to different groups of people. This is especially important since socioeconomic and cultural factors influence the outcomes and, hence, the unmet needs of stroke patients.

4.2. Implication for Practice

To ensure that education is sufficient and effective, healthcare workers must provide patients with relevant information on a regular basis. To achieve this, several different methods of patient education can be combined. It is also important that stroke patients are assigned a contact person who can help them to locate important information and resources, as well as answer their practical questions and concerns. Medical professionals must provide stroke survivors with discharge plans including follow-up appointments. Ideally, these follow-ups should initially take place six weeks after the discharge and then at the six-month stage. From then on, a yearly follow-up is sufficient [1]. Moreover, it is also recommended that a system for annual reviews be developed to enable changing needs to be identified and addressed. Stroke survivors and caregivers can also be given specialised training courses to promote care continuity. The data revealed in this study indicate that patients require more psychological support during the care process.

5. Conclusions

In this review, the needs and desires of stroke patients have been examined. The findings have indicated that the long-term needs of such patients are not being fully met at present. Moreover, the findings show that existing care plans for stroke survivors do not address the long-term needs of stroke survivors. Thus, continuous treatment and therapies

are required as well as specially designed programmes that meet the long-term needs of stroke survivors. However, only three studies were included in this review, all of which were carried out in Asia and, thus, it is important to explore the topic in other continents and other settings in order to fully understand the issue at hand.

Supplementary Materials: The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/bs12100404/s1>, Table S1: Example of search carried out in Ovid Medline (1946 to 2021); Table S2: Joanna Briggs Institute qualitative critical appraisal checklist; Table S3: example of analysis.

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Appendix 2: Paper 2

Exploring the needs of stroke patients after discharge from rehabilitation centres in Saudi Arabian communities: An IPA qualitative exploratory study design.

Link: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0291263>

RESEARCH ARTICLE

Exploring the needs of stroke patients after discharge from rehabilitation centres in Saudi Arabian communities: An IPA qualitative exploratory study design

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Abstract

There are about 29 strokes per 100,000 people, annually, in the Kingdom of Saudi Arabia (KSA). These patients require long-term rehabilitation services to enhance recovery and independence in the community. Currently there are limited long-term rehabilitation services in KSA and research is needed to establish pathways for provision of community-based rehabilitation (CBR). To develop effective new CBR models, understanding the experiences and needs of stroke patients in KSA who have undergone poststroke care services is essential. This study aims to gain insight into stroke patients' needs after their discharge from rehabilitation centres in Saudi Arabia. An interpretive phenomenological analysis (IPA) study was undertaken using semi-structured interviews. Participants were eligible if they had a stroke, completed their in-hospital rehabilitation sessions and had been discharged within the past three years. Semi-structured interviews were conducted using interview guides. Transcripts were translated and analysed using interpretive phenomenological analysis. Twenty-four (15 males and 9 females) participants were recruited from two hospitals in KSA. The key findings suggested that patients experienced limited community rehabilitation services postdischarge unless they were financially able to pay for private therapy. Coping barriers including Medical, Psychological, Social, and Financial and facilitators including Faith, Recovery, Social support and leisure were identified. Participants suggested strategies to improve services within hospital and community for rehabilitation, needs of staff, access to services and ongoing care. Further work is required to develop, implement and evaluate a community rehabilitation intervention that includes education, and self-management elements to support stroke survivors in the community in KSA.

Introduction

Worldwide, stroke is the third leading cause of death and second leading cause of disability [1]. According to the World Health Organization, stroke is Kingdom of Saudi Arabia's (KSA) second leading cause of death [2]; the incidence rate of stroke in the KSA is 29 strokes per 100,000 people annually [3]. However, this rate is lower compared with Western countries. In the United Kingdom (UK), there are more than 100,000 strokes annually (162/100,000 in 2020/21) [4]. In United States (US), 41.1 per 100,000 died from a stroke in 2021 [5]. Part of the reason for this is because two-thirds of the population in the KSA is under 35 years old [6].

There is a need to provide rehabilitation services to an increasing number of people with impairments following stroke. Evidence suggests that coordinated care for individuals with a stroke can decrease mortality and promote independence [7]. Rehabilitation services in the KSA can be obtained free through the country's public healthcare system or privately. The Ministry of Health is responsible for providing 60% of healthcare services, and the other 40% is split among other government agencies, such as the Ministry of Defence, the National Guard, universities and the private sector [8]. A multidisciplinary team of physiotherapists, occupational therapists, speech therapists, orthotists and prosthetists are usually included in most stroke rehabilitation programmes in the KSA [9].

Rehabilitation is provided in a hospital over a period of 45 days in the KSA [10]. However, one key limitation in stroke care services in KSA is that 95% of stroke patients receive treatment in nonspecialised stroke hospitals [11]. Only three hospitals, all located in Riyadh, have stroke teams and stroke units [12]. This limited availability of stroke care services in the KSA warrants specialist stroke rehabilitation services involving multidisciplinary team collaboration, stroke units, and specialised stroke training programmes for professionals [13]. More importantly, in the KSA, once a patient completes therapy sessions in an outpatient department, there is limited follow-up rehabilitation in the community. They do not receive the recommended evaluation at six weeks and six months after being discharged from outpatient clinics, nor annual reviews [14]. Hence, they lose the opportunity to have follow-up assessments of their medical, physical, emotional and social requirements, as well as caregiver needs [15]. Hence, patients either seek private sectors to continue rehabilitation or give up rehabilitation because of financial constraints. Ultimately, there is a lack of evidence regarding long-term care approaches in developing countries, including the KSA [16].

To create an effective rehabilitation model for stroke patients extending into the community, the first step is to understand patients' needs beyond inpatient care [17]. Patients' unmet needs are the 'expressed needs not satisfied by current service provision' [18]. Unmet needs are associated with lower levels of satisfaction with the services and knowledge offered, as well as a lack of knowledge about life after a stroke [19]. Moreover, assessing needs is vital to evaluate the effectiveness of rehabilitation services [20]. Hence, in a context where there are limited follow-up services for patients postdischarge, it is important to explore areas where requirements remain unfulfilled [21].

Exploring unmet needs is a key research priority; for instance, around half of stroke patients in the UK have reported not having their needs met [21], whereas around 96% of people with stroke in Australia reported at least one need not being fully met [22]. Needs should be reviewed periodically to ensure effective intervention and appropriateness of support [23]. Professionals can make the rehabilitation procedure more responsive to patients based on their needs.

Research in Western countries has acknowledged the significance of evaluating patients' needs [24, 25]. However, patients' needs in the West is difficult to transfer to the KSA context because

of cultural, political and social differences. Further, the focus of previous research has often been narrow; for instance, some studies have solely focused on psycho-emotional needs [26, 27].

Despite the necessity for a needs assessment, to the best of the authors' knowledge, limited research has explored the experiences and needs of people with a stroke in the KSA. A thorough search of the literature yielded only one prior study evaluating the needs of Saudi Arabian patients undergoing rehabilitation [28]. A survey was utilised to assess the needs of 280 neurological patients in inpatient and outpatient clinics who had experienced stroke (37.1%), spinal cord injury or brain injury. The survey did not acknowledge the needs postdischarge. The survey did not reflect the lived experiences, and the depth and breadth of the research into actual needs were limited. When patients return to the community after hospital-based rehabilitation, challenges arise, with patients still having several requirements that need to be met. In addition, health resources available throughout the rehabilitation process are less accessible, particularly in the KSA, where community-based rehabilitation is lacking [29]. Thus, patients may develop their own adaptation strategies. Identifying these patterns of coping enables practitioners to provide the best possible support to patients. Furthermore, understanding stroke patients' needs will provide adequate preparation for patients and caregivers to cope in the community. During the transition period from hospital to home, patients and their families need to be prepared for life after discharge via appropriate intervention to reduce associated burdens and prepare them for successful reintegration into the community [17].

To the best of the authors' knowledge, no research has considered the experience of stroke survivors in Saudi Arabia to explore their unmet needs in a holistic manner, which requires an in-depth data collection method. The present study will be the first step in developing an understanding of patients' needs and service measures to support patients after discharge, leading to future community-based rehabilitation/support services in the KSA.

The current study aims to identify problems that impact stroke survivors' adaptation to daily life in the community after discharge from hospital, the factors that influence their adaptation and patients' needs after their discharge from rehabilitation services.

Methods

Study design

The present study adopted an interpretive phenomenological analysis (IPA) qualitative exploratory study design [30]. IPA is a qualitative approach that investigates how individuals make sense of their life experiences [31]. Phenomenology was identified as appropriate since it deals with the interpretation of individual lived experiences. Given the aim of the study and the focus on exploring patients' experiences after a stroke, further consideration to other approaches was not undertaken. For instance, alternative methodologies were not considered like Ethnography focuses on observing shared beliefs and behaviours within a certain culture or Grounded Theory aims to elucidate social processes and develop a theory. IPA is philosophically positioned as a minimal hermeneutic realist [32]. This suggests that an external reality exists, but one must access it through an individual's personal world. Standards for reporting qualitative research were followed [33]. Ethical approval was provided by two hospitals' ethics committees, one in the central of KSA, King Fahad Medical City (Institutional Review Board at King Fahad Medical City, Ref: 21-309E) on 10/08/2021, and the other in the south, King Fahad Central Hospital (Jazan Health Ethics Committee, Ref: 2167) on 21/09/2021. Additional review and approval were needed from the University of Birmingham since the first author is a student here (Technology, Engineering and Mathematics (STEM) ethics committee, Ref: ERN_20-1836) on 19/10/2021. Additional information regarding the ethical, cultural, and

scientific considerations specific to inclusivity in global research is included in the Supporting Information (S1 Checklist).

Participants

Participants were recruited if they met the following criteria: (a) were adults (> 18 years of age) who had experienced a stroke (ischaemic strokes and haemorrhagic strokes), (b) had been discharged from the hospitals within the past three years to minimise recall bias and to be relevant to current practice and (c) had completed their rehabilitation sessions in an outpatient clinic. Patients were excluded if they had (a) cognitive disorders (screened using Mini-Mental Status Examination (MMSE) ≥ 24 on zoom [34, 35]), (b) language/communication deficits (identified by a clinician who referred patients to the lead researcher BT) or (c) lived in nursing homes and have paid caregivers who helped with their functional activities.

Sampling

The study adopted purposive stratified sampling. This non-random sampling method allows researchers to choose individuals with a deep understanding of the issue and who can provide the richest information and insights [36]. Stratification of samples was based on age as it has been identified that patients in working age have different needs compared to patients who are older [37]. Hence two groups were aimed for during data collection. Working age adults was between 18 to 65 years and older patient group was above 65 to 99 years.

Procedure

Patients who were previously admitted to hospitals were identified based on the eligibility criteria by two rehabilitation specialists from the hospitals' existing database of patients. Both professionals approached patients who met the inclusion criteria via phone or email to determine interest. The interested individuals' contact details were passed on to the lead researcher (BT), who is a registered therapist in Saudi Arabia. Individuals who expressed interest received participant information from the lead researcher (BT). The researcher gave them 48 hours to consider participation and offered them an opportunity to ask questions. Individuals who agreed to participate were asked to provide written informed consent in Arabic online. Consents were signed and sent by email or WhatsApp by participants or their relatives.

Data collection

A semi-structured interview was used [38]. The interviews explored patients' feelings, knowledge, values and beliefs about their lives postdischarge, starting with simple questions before progressing to in-depth ones.

An interview guide was created based on similar studies [24, 39] (S1 File). The questions covered the interviewee's life poststroke, support received after discharge, any issues and concerns that reduced their ability to cope, their needs, the type of support offered to manage these needs and any suggestions to improve the quality of the services provided.

Data to define participants' characteristics such as type of stroke, age, gender, time since stroke, functional ability (Rivermead Mobility Index (RMI) [40]), Barthel Index (BI) [41], Stroke Specific Quality of Life Measure (SSQoL) [42] and MMSE [35] were collected on zoom before conducting the interview.

The interview guide was translated into Arabic by authorised services and was then reviewed and revised by the authors. The questions were tested on one patient who was accompanied by the caregiver and three of the study's authors via zoom. The cognitive

interview was undertaken to test potential issues in the interview questions [43]. The patient was asked to tell us his understanding of the question and to think aloud to analyse his answer and if it was related to the question. Some questions were found to have similar answers, while others were not understandable. Hence, questions were modified following this step. Furthermore, to test the applicability of this schedule, a pilot interview was conducted. The pilot interview demonstrated that it would take over 30 minutes to complete and would likely fall within the current recommendations of between 45 and 60 minutes [44]. Nondirect probing, such as tell me more, keep talking and can you say more about that, was added to obtain in-depth information.

The interviews were in Arabic, which is the mother tongue of both the lead researcher and interviewees. Patients were invited to choose their preferred time and place to undertake the interview, such as face to face in their homes, in the hospital or via phone/zoom. The participants were assured of anonymity and confidentiality to ensure ethical rigour [45]. The study used pseudonyms and removed any identifiable information, such as the participant's name, profession and organisation, to ensure anonymity and confidentiality. In addition, the subjects were informed of their right to ask questions and to take a break whenever they needed one. The data were recorded using zoom and digital recorders with their permission and transcribed verbatim to minimise the risk of losing data. After each interview, the first author (BT) transcribed the audio tape verbatim. The transcripts were sent to an official translation service to be translated into English. All English transcripts were checked by the lead researcher against the Arabic version to ensure that the translations reflected Arabic meanings; the meaning of the spoken language phrases in the translated transcripts was checked to see if they reflected the original spoken language [46].

Sample size

The sample size aimed to achieve data saturation and richness of data as is the strategy for qualitative studies [47]. Previous IPA studies found saturation after as few as 12 interviews [48], while others were between 1 and 30 up to 48 individuals [49]. However, in the present study, this occurred at 19 interviews, at which point lead researcher (BT) continued with five more interviews to ensure saturation.

Analysis

Data were analysed using the IPA analysis tool of qualitative studies [30]. The interviews were read multiple times while listening to audio recordings to create initial notes. The analysis involved writing initial notes about the participants' sense of person and language used. Exploratory comments involving descriptive, linguistic and conceptual comments were used to create the initial notes. The next step was to code each interview transcript using line-by-line coding about the participants' context and stance. Then, we established relationships between the clusters of the different interviews one at a time. Specific methods were used to look for patterns and connections between themes [30]. Abstraction is one way in which the cluster is developed by grouping similar codes and then developing a new name. These clusters were added to the main analysis table (master table), which was summarised under themes. The themes were well defined, and the clusters within were checked for appropriateness to fit within these themes. Themes were triangulated between different participants. An example of the coding can be seen in S1 File.

Rigour and trustworthiness

All interviews were conducted by the lead researcher (BT), a PhD female student at the time of the study and registered physiotherapist in the KSA who had no prior relationship with the interviewees. Investigator triangulation took place: three independent analysts coded five interviews, and their interpretation codes were compared with the main analyst's coding/interpretation. Once the themes had been developed, the master table was presented to senior researchers for peer examination. The senior researchers refined the wording of the themes and checked for fit between codes and clusters. Furthermore, one interview transcript was checked by a participant (member checking) for accuracy. The logical flow of questions was shown to be adequate, so further interview transcripts were not shared with other participants. A summary of each interview thought/interpretation was made by the researcher. This helped to look for data saturation or additional guiding questions as the data collection progressed. To improve transferability, the context and characteristics of participants are described elaborately. Further, a completed COREQ checklist is attached in [S2 File](#).

Results

There were 24 participants recruited from two hospitals in the KSA, 10 participants from site 1 (male = 7; Females = 3) and 14 from site 2 (male = 8; Females = 6). The age range of the participants was 29 to 75 years, and the time since their stroke varied from 7 months to 11 years (see details in [Table 1](#)). The interviews took place between October 2021 and January 2022 online via zoom. Only one participant expressed willingness towards conducting an in-person meeting; however, this intent could not be carried out due to some constraints, leading to the adoption of an online format for the interview. Other participants expressed a preference for zoom interviews. The interview time ranged from 21 to 49 minutes. Caregivers assisted in the process of arranging the interview if the participants were not able to join. Caregivers were present for 10 interviews and were involved in two interviews. The two caregivers' data was included in the final analysis.

The data revealed three themes: 1) therapy experience, 2) coping poststroke and 3) the need for adequate services. A summary of the themes can be seen in [Table 2](#).

Major theme 1: Therapy experience

This theme discusses the experiences of participants regarding the services provided by hospitals from hospitalisation to postdischarge. This theme contains three subthemes: 1) perception of care, 2) postdischarge experience and 3) COVID-19 influence.

Subtheme 1: Perception of care. This subtheme illustrates the experience of care participants when within the system. Five participants experienced a wrong or delayed diagnosis and thought that if the diagnosis had been earlier, the long-term disabilities would have been limited. At one site, most participants experienced a delay in starting physiotherapy in outpatients and reported that they waited a long time after discharge from the stroke unit. This made them worry because they thought the delay might hinder their recovery and have a long-term effect on their level of functioning and quality of life. Furthermore, the intensity and frequency of physiotherapy were suggested as being limited in both institutions; patients with moderate and severe strokes wanted intensive therapy. Participant 7 stated, *'I was undergoing physical therapy sessions at [hospital], but only one session per week, as you know, one session per week will not work because of my condition . . . it is not enough, the patient needs more time, one or two sessions of half an hour each week is not enough'*.

The patients sought physiotherapy input from private clinics or had therapists come home to avoid delaying the start of physiotherapy and increasing the intensity of therapy. Another

Table 1. Participants' characteristics.

Participants	Gender	Age	Time post stroke	Type of stroke	Rivermead Mobility Index	Barthel Index	Specific Quality of Life scale	Work
1	M	43	1 year	Ischemic	7	90	92	No
2	M	53	1 year	Ischemic	2	50	88	Nurse on sick leave
3	F	51	1 Y, 2 M	Ischemic	8	70	132	Unemployed after stroke
4	F	70	1 year	Ischemic	2	30	126	Unemployed
5	M	48	10 years	Not identified	13	65	150	Unemployed
6	M	65	9 months	Ischemic	14	95	205	Doctor changed to less intense role
7	M	56	1 year	Ischemic	12	75	211	Unemployed after stroke
8	M	74	9 months	Ischemic	10	75	173	Unemployed
9	F	72	11 years	Haemorrhagic	1	10	89	Unemployed
10	F	50	1 year	Ischemic	5	100	134	No
11	F	42	3 years	Haemorrhagic	2	20	104	Teacher has asked for retirement
12	M	54	2 years	Ischemic	13	100	229	No
13	F	64	2 Y, 6 M	Ischemic	13	100	196	No
14	M	63	3 years	Hemorrhagic	14	95	221	No
15	M	62	7 months	Haemorrhagic	6	80	182	Hospital administration, has retired
16	M	65	1 year	ischemic	7	50	143	Retired
17	F	59	7 months	ischemic	12	85	153	Unemployed
18	M	56	7 months	Ischemic	8	90	143	Private sector, on sick leave
19	F	29	8 months	Ischemic	15	100	230	Unemployed
20	M	55	1 Y, 2 M	ischemic	3	55	101	Unemployed
21	M	62	9 months	Hemorrhagic	11	70	141	Unemployed
22	M	41	9 months	Hemorrhagic	11	95	144	Private sector, on sick leave
23	M	51	1 year	Ischemic	15	100	237	Private sector
24	F	56	1 Y, 6 M	Hemorrhagic	0	0	59	Unemployed

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participant stated, 'My health condition has improved a lot . . . but the number of sessions must be increased to get recovered, and if the specialist was not at my home, my condition would not have improved as required' (Participant 1).

Subtheme 2: Postdischarge experience. The experience that participants had after being discharged from the outpatient facility is described here. Most participants admitted that they had trouble accessing services when they returned to community life; they felt alone post-discharge because there was no support offered and their rehabilitation ended unless they were financially able to access private clinics. One participant stated, 'They provided me with all the services while I was in the hospital, but after I left the hospital, there were no longer any services provided to me, and I felt alone, there is not enough guidance' (Participant 22).

Subtheme 3: COVID-19 influence. The participants were unable to access services during this period. For some, their condition worsened. This was illustrated by participant 13: 'But in the beginning, I did not get treatment because of Corona and the Corona crisis. On the day when Corona infections began, they closed the outpatient clinic and closed the physiotherapy department, so I went there twice, and they told me that it was closed'.

As alternative methods to seek treatment during this period, the participants either sought private therapy or virtual rehabilitation. However, the participants believed that virtual rehabilitation sometimes was not beneficial because they had no experience, no tools and were

Table 2. Summary of the themes and subthemes.

Major theme	Sub-themes	Codes	Definition
Therapy experience	Perception of care	Delay diagnosis	This theme illustrates the experience of participants of care with current system.
		Delay in starting physiotherapy	
		Unsatisfied intensity of care	
	Postdischarge	Limited services	The experience that participants had after being released from the facility is described in this theme.
		Loneliness	
	Covid 19 influence	Inability to access services	This theme described how Covid 19 affected on participants care process.
Progression of condition			
Seeking private care			
Coping poststroke.	Coping barriers	Medical	In this theme, the barriers that affect participants adaptation were described including medical, psychological, social, financial and lack of guidance.
		Psychological	
		Social	
		Financial	
		Lack of guidance	
	Coping Facilitators	Faith	This theme described the factors that helped participant to adapt poststroke.
		Recovery	
		Social support and leisure	
Need for adequate services	Intervention needs	Rehabilitation program	This theme represented the services needed by participants that related to the care programme.
		Staff needs	
		Access to services	
		Hospital needs	
	Care continuity	Ongoing care	This theme demonstrates the services participants require to ensure they can continue therapy after discharge.
		Communication	
		Follow ups	

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unable to understand the exercises. Participant 7 stated, *'They were explaining to me how to do the exercises through the screen; I did not understand the instructions very well. And it didn't work'*. Another said, *'Sometimes you undergo an exercise on the screen, but the tools are not available, and sometimes the patient's application varies'* (Participant 6).

Major theme 2: Coping poststroke

This theme illustrates the facilitators and barriers and factors that influenced participants' adaptability poststroke. This theme involves two subthemes: 1) coping barriers and 2) coping facilitators.

Subtheme 1: Coping barriers. Several barriers to coping were identified.

- a. *Medical barriers.* This included issues experienced poststroke, such as physical weakness and inability to do activities of daily living, pain, dizziness, eye issues, sexual issues, sensory issues, shortness of breath, and inability to talk, which limited their adaptation. Participant 22 stated, *'My walking is slow, and I cannot leave the house, and I perform the prayer on the chair . . . the eyes are one of the sufferings that I complain about, I cannot drive, I cannot watch TV, or read'*.
- b. *Psychological barriers.* Psychological barriers were identified poststroke, such as depression, an embarrassment of stroke, being a burden on others and the anger of having a stroke.

The participants expressed negative emotions such as hopelessness, helplessness, uselessness and frustration with the inability to control things that were no longer under control. Furthermore, the patients described being self-conscious, and they did not want to be pitied. Two participants divorced after having their stroke. One participant illustrated this by stating, *'I was okay before the stroke, and I was married and so happy. However, today, I feel bad. Literally, I am between life and death waiting for death . . . unfortunately, my wife left me alone'* (Participant 1).

Furthermore, those participants with a high level of education and who were currently working were more worried about their recovery and trying to return to their previous life. Three participants, including a doctor and teacher, had travelled and spent a substantial amount of money receiving proper rehabilitation. Participant 22 stated, *'I have one last point, which is that from the day I was discharged from the hospital until today, there has been no improvement in my condition, only very simple improvement . . . but I will return to work, whether I am well or not. However, I hope my condition improves'*. Another doctor said, *'I hope to be a surgeon again . . . I no longer have this ability, so I'm trying to improve my hand movement'* (Participant 6).

- c. *Social barriers.* Many people with stroke identified that social participation was limited because of physical weakness, limited transportation, and places not being designed for people with disabilities. For instance, one participant stated, *'Even if I need something from the market, I can't go get it, my sisters help me with that. I stay in the car, and they get me what I want because there are no special places for wheelchair'* (Participant 10).
- d. *Financial barriers.* One patient retired because of stroke, three took sick leave from work and had not returned yet, and three were unable to continue working because of physical weakness and had various financial issues. However, most patients' workplaces were supportive in terms of giving sick leave or changing their responsibilities to what they were able to do. One participant stated, *'I buy things and then sell them, and I have obtained loans from the Jana Foundation to trade, but from the month of Rajab until today, all my work is suspended, and my salary is little, and I have an orphaned son and daughter'* (Participant 3). Despite this financial pressure, the participants purchased their own walking aids and home modification items to avoid lengthy waits or a lack of response. Participant 15 stated, *'They told me to log on the internet and fill a form on their website and send it. I already sent it, but nobody replied'*.
- e. *Lack of guidance.* The patients suggested that they lacked guidance on what services were available to them, adequate guidance on how to do self-management and what financial supports were available, including aids and home modification support. A few young patients were aware of methods to seek information, such as calling toll numbers and the Ministry of Health. Four participants consulted an expert in the family if they needed guidance, but most waited to ask staff or doctors for follow-up appointments. Sometimes, the internet was used to find information. However, the internet was not a reliable source of information and provided only general information. One participant stated, *'If I had obtained these special instructions from the hospital directly, it would have been better than going to search for this information on the internet because we did not get the appropriate and correct instructions from the internet'* (Participant 23).

Subtheme 2: Coping facilitators. There were many facilitators that helped coping.

- a. *Faith*. Faith that the stroke is a matter of God and that illness is controlled by God helped them cope. The participants also thought that patience and praying to God helped in achieving inner peace. One participant stated, *"When God loves someone, he afflicts him, and I shall submit to God's will and be patient and believe in my fate and destiny, never to feel sorry for that"* (Participant 1).
- b. *Recovery*. A better rate of recovery and comparing stroke severity with others helped participants adapt better. One participant stated, *"There are patients whose condition is worse than mine, so I say thank God"* (Participant 7).
- c. *Social support and leisure*. Social participation and family support, leisure, gardening and reading the Qur'an helped participants improve their psychological status. This theme was illustrated by one participant who stated, *"My good family dealing with me helped me a lot, they always help me to walk, they insist for me to walk and go out to the garden or our farm and raise my psychological spirit and they have a great role in psychological support"* (Participant 16).

Major theme 3: Need for adequate services

Two subthemes under this theme included 1) interventional needs and 2) care continuity.

Subtheme 1: Intervention needs. This theme represented the services needed by participants related to their care.

- a. *Rehabilitation programme*. The patients suggested needs regarding their rehabilitation content: diet advice, speech therapy, psychological rehabilitation, return to work, driving assessment, intensive rehabilitation and providing a short- and long-term treatment plan to keep them informed about their recovery progress. Participant 6 stated, *"I must receive the necessary treatment through a standardised treatment plan in which all patients are treated equally"*. One caregiver said, *"I would like the hospital to understand his psychological condition and the degree of frustration he suffers from. He does not have any spirit of optimism about tomorrow. The psychological state affects the response to treatment; it is half of the entire treatment"* (Caregiver of participant 2). Participant 23 stated, *"I was hoping that they would put me on a diet programme in the hospital, a good diet programme in accordance with my condition because most of those who have had a stroke have a diet programme that must be followed"*.
- b. *Staff needs*. The participants stated that there were not enough staff in the hospital; thus, they had to rely on trainees with little expertise. Patients preferred to be treated by expert staff. Participant 15 stated, *"Physiotherapists always bring trainees from university and tell them to check patients because they claim that they are busy"*. One participant said, *"The number of doctors is few, while the number of patients is large, so there is no proportion between what is available and what is offered"* (Participant 6). Furthermore, the patients were concerned about staff rotation because they believed that changing their therapist each time wasted their time because the new therapist did not have complete knowledge about their status. Participant 2 said, *"Physiotherapists change constantly, and that's definitely having a negative impact on the patient"*. Furthermore, at one site, there was no female occupational therapy staff because the female participants wanted female therapists to treat them and not be touched by men for religious reasons. Participant 10 stated, *"Occupational therapy at the hospital is a men's section only, and I am a woman"*.

- c. *Access needs.* Not all patients were able to access physiotherapy in their cities because of a lack of physiotherapy departments or because there were no specialised stroke units. Therefore, these patients always sought therapy outside of their cities. Another reason for seeking therapy outside was that they believed therapy in larger cities was more professional and advanced, as evidenced by the fact that the majority of participants had travelled to receive treatment.

Furthermore, nearly all the participants had not received any postdischarge services apart from private therapy if they were financially able to afford treatment. One participant stated, *'I went to the Saudi German Private Hospital my family transfer me to them . . . then I went to Abdulatif Gameel Rehabilitation Centre in Jeddah, after that I travelled to Egypt'* (Participant 11). The participants wanted occupational therapy and physiotherapy sessions to be held on the same day. Furthermore, people residing outside of the city need to be scheduled for follow-up visits at several clinics on the same day because travelling for each appointment separately is difficult and expensive.

- d. *Hospital needs.* *'The hospital is ill equipped and needs expansion'* was raised by the participants at one site. Furthermore, the aids provided by the hospital were not advanced, and there were no clear methods of aid assessment. The participants were unhappy about the very long waiting times for medical appointments and follow-ups. Participant 12 said, *'I have suggestions in terms of physical therapy staff, expanding the place, bringing modern equipment, all the devices in the physiotherapy department are old; even medical splints are not suitable'*.

Subtheme 2: Care continuity. This theme demonstrates the services that the participants required to ensure they could continue therapy after discharge.

- a. *Ongoing care.* The patients wanted to extend their treatment in the outpatient department mainly because of the lack of postdischarge services. Furthermore, the participants had difficulty with transport going to the hospital for sessions and needed more home visits. They wanted themselves and their families to be trained in self-management. Those participants who wanted to continue treatment postdischarge either brought in private therapists for sessions at home, performed what the hospital therapist did in the sessions at home or sought out private clinics; however, they viewed factors such as high cost as barriers to continuing treatment in private clinics and barriers to self-management such as the need for motivation, need for training, supervision, confidence and fear of falling. One participant stated, *'I did not get support or services, and as soon as the sessions ended, I had no choice but to implement the exercises myself, because they did not provide services after the end of the physiotherapy sessions'* (Participant 23). Another participant stated, *'No, I haven't. I have no money to be treated in a private hospital. If I had enough money, I would go to a private hospital to be treated there'* (Participant 1).
- b. *Communication.* Patients had difficulty scheduling appointments and were upset because of delays in sessions and the gap between appointments. Furthermore, there was no clear communication channel. Participant 22 stated, *'But there is no open channel, and there is no communication method that enables me to contact directly'*.
- c. *Follow-up.* The patients wanted continuous follow-up for psychological support. One participant said, *'No, I no longer go to the physical therapy clinic, I just refer to the consultant doctor in the neurology clinic'* (Participant 22).

Discussion

The current study was able to reveal the needs of patients with stroke following discharge from rehabilitation centres, illustrating the participants' experiences with the current health system, the factors that enabled their coping, facilitators and barriers for recovery, and need for further services.

Stroke survivors in the UK receive around 70 hours of multidisciplinary rehabilitation [50], and a minimum of three hours daily in Australia [51]. Our findings found that the patients in the present study received rehabilitation for two days or less per week. However, most of the study participants claimed that two days per week was insufficient to achieve their target goal of improving physical function. They expressed the need for a more intensive and comprehensive rehabilitation schedule, but staff shortages and heavy workloads were an issue. Current services are insufficient to handle the projected increase in stroke cases because only 5% of strokes in the KSA are admitted to acute stroke units with specialised staff [11]. A survey of staff availability in 2019 showed that there were only 240 physiotherapists working in the KSA at the time, which might be inadequate to care for the rising stroke population [11].

In UK stroke guidelines, all patients should be discharged from the hospital with individualised care plans to provide support by local services to facilitate their reintegration into the community and enhance their quality of life. Furthermore, 95% of stroke survivors are reviewed 12 months postdischarge to assess their needs [52]. However, in practice, nearly half (45%) of patients with stroke in the UK felt unsupported post-discharge from the hospital. Additionally, another 40% are released from the hospital without any further rehabilitation plans [53]. In Australia, one-third of stroke patients are discharged without a care plan [54].

The current study's patients had limited access to services postdischarge. Community-based rehabilitation services are a necessary component in managing people's chronic conditions that would enable them to continue to maintain and improve their recovery and help in releasing the pressure on hospitals. However, in developing countries like Saudi Arabia, there are only a few of these publicly funded services, leaving stroke patients limited choices and looking to private healthcare institutions. One effective strategy that can be applied in communities where there is a lack of community-based services is self-management [55]. Self-management training is an effective strategy to meet most needs including a) intensity of care b) long term care continuity c) staff shortage and d) limited post discharge service. Self-management training may be cost-effective in the long term, benefitting both stroke patients' independence and improving health services [56]. This strategy can ensure that all patients, regardless of their socioeconomic status, receive sufficient treatment. Wang et al. pointed out that mastering self-management skills by acquiring stroke-related knowledge and know-how could lead to positive outcomes [57]; here, setting goals and monitoring progress were found to be the two most common strategies [58]. Professionals need to provide patients and families a clear plan of their rehabilitation. Setting goals in collaboration with the patient, family members and professionals has been suggested as the most advantageous approach [59]. Rehabilitation professionals in the KSA might benefit from using this approach to encourage stroke survivors to pursue their goals.

Another potential approach suggested by a similar community context in Malaysia was to involve family in providing care [60]. Family members who acted as the patient's caregiver played a significant role in the patient's successful recovery process [61]. Saudi patients' psychological well-being was greatly enhanced by the presence of familial social support and was mentioned by 17 participants in the present study. The elderly population of Saudi Arabia would rather obtain care and support from their own families than from other individuals or institutions; it is uncommon for Saudi families to send their elderly relatives to long-term care

institutions because it is considered a dishonourable practise. Stroke patients in Saudi Arabia are almost always accompanied by their caregivers when they attend therapy. However, caregivers rarely have the opportunity to understand or acquire the necessary knowledge and skills specific to stroke management and rehabilitation. Further, individuals who have survived a stroke may find it hard to absorb and interpret information and advice, which may explain why some patients have repeatedly asked for information or feel inadequately educated [56]. Many participants in the present study were unable to read (12 participants), so giving instruction and education and training family members, who are acting as caregivers might support rehabilitation efforts. According to Kalra et al., caregiver training not only lowers the cost of care but also greatly enhances the patient's quality of life [62]. Hafsteinsdottir et al. showed that caregivers should be given training that is targeted, timely, client centre, and tailored to their individual needs and situation. The training should begin at entry time and continue throughout their stay with the patient [63]. Thus, a family-supported treatment could help maintain long-term rehabilitation of stroke patients in the KSA.

For stroke patients to regain optimal health, they need to change and adapt certain health-related behaviours to enhance their recovery [64]. The patients in the current study had limited guidance on various aspects of the recovery process. One solution to meet this need can be in the form of booklets that provide detailed information, as well as answer questions that stroke patients may have about their care, recovery and rehabilitation [65]. However, Rodgers et al. (2001) showed that giving stroke patients and their caregivers booklets was not nearly as effective as enrolling them in an educational programme that gave more in-depth knowledge and know-how of treatment and rehabilitation procedures [66]. These programmes not only raised the quality of the services, but also resulted in better adjusted patients and their families living more satisfactory and functional lives. Furthermore, when information was delivered in a way that actively engaged patients and caregivers, such as by providing multiple opportunities to ask questions, it had a greater impact on patient mood than information delivered on a single occasion [67]. Future predischarge programmes could be introduced into the KSA's healthcare system, and patients should be adequately and properly equipped before discharge from the hospital into their own homes.

Limitations

To evaluate the results, some methodological considerations must be taken into account. The study took place in two hospitals, so the findings might not be transferable to other regions. The fact that the study excluded people with severe cognitive impairments and communication disorders is a limitation to the external validity. The findings are less applicable to patients with severe stroke because most had difficulty speaking poststroke. Further, although we aimed to recruit two groups, working age ranging from 18 to 65 years old and older patients from 65 to 99 years old, we recruited only a few patients above 65 because this group was mostly not able to read and did not have contact details, so reaching them was difficult. However, we covered both groups because 11 participants were working while the rest were not. All interviews were not face to face, which may have led to missing signals and clues from facial expression and body gestures [68].

Conclusion

This phenomenological interpretive study provided an opportunity to explore the needs of Saudi patients with stroke postdischarge. Our findings have indicated a need for greater community access to educational and healthcare resources. These results are crucial in developing and implementing a community intervention to support stroke survivors after discharge.

Future qualitative studies need to consider the perceptions and experiences of caregivers because stroke could have different effects on patients and caregivers. This could provide further contributions to creating recommendations for better preparation of stroke survivors supported by their caregivers. Additionally, capturing the changes in individuals' needs across the care continuum is required to understand the development and meeting of patients' evolving needs at each stage.

Supporting information

S1 Checklist. Inclusivity in global research.

(DOCX)

S1 File. Interview questions and example of analysis.

(DOCX)

S2 File. Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist.

(DOCX)

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Appendix 3: Paper 3

Exploring physiotherapists' perspectives and training needs for stroke patient care continuity in Saudi Arabia (SA): A qualitative study.

Research article

Exploring Physiotherapists' Perspectives on and Training Needs for Stroke Patient Care Continuity in the Kingdom of Saudi Arabia (KSA): A qualitative study.

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Abstract

Stroke is a significant global health issue that frequently results in long-term disability and the need for comprehensive rehabilitation care. Therapists play an important role in meeting the complex clinical and social needs of stroke survivors, which necessitates comprehensive training and ongoing education. In Saudi Arabia, there is a critical need for improved stroke rehabilitation services and education programmes to increase professionals' skills in stroke rehabilitation. This study investigated the training needs of physiotherapists and their perspectives regarding the continuity of care post-discharge for patients with stroke in the KSA. An exploratory qualitative study was conducted using semi-structured individual interviews or focus groups. Participants were eligible if they were physiotherapists of either gender in the KSA providing therapy for stroke patients. Twenty-six physiotherapists, 14 females and 12 males, participated in this study. They were distributed across three focus groups, which had five, six and six participants each, and nine individual interviews. The findings provided an overview of post-discharge services and physiotherapists' perceptions of long-term approaches. It also indicated a need for training for physiotherapists to improve the

level of care provided to individuals recovering from stroke. This study recommends collaboration between healthcare organisations and policymakers to establish structured and standardised post-discharge services and improve access to community-based rehabilitation for stroke survivors.

Introduction

Stroke rehabilitation is a dynamic, goal-oriented process that helps people with stroke achieve their highest levels of physical, cognitive, emotional, linguistic, social and functional activity [1]. In the KSA, rehabilitation commonly begins in the hospital inpatient unit in the early phases of stroke rehabilitation. Patients then undergo supervised rehabilitation exercise sessions that are delivered by a multidisciplinary team, including physiotherapists, in outpatient units. Physiotherapists interact closely with stroke patients daily to observe the effects of stroke on the physical, cognitive, emotional and social well-being of patients. They enable the recovery of movement by enhancing strength and mobility, increasing independence post stroke [2].

Given the varied clinical and social needs of stroke survivors [3], therapists must be trained in holistic care to address these diverse needs effectively. Delivering stroke-specific education for continual professional development is crucial to improving care quality and outcomes for stroke survivors. Such education equips physiotherapists with the necessary skills and knowledge for optimal care throughout the stroke journey [4]. Furthermore, training has been recognised as a crucial factor influencing the successful implementation of evidence-based practice [5].

In the KSA, there is a pressing demand for improved stroke rehabilitation services and education programmes to enhance professionals' knowledge of stroke prevention, management and rehabilitation [6]. There are no standardised care approaches to stroke in the KSA [7]. Another limitation is that ongoing care following discharge from hospital-based rehabilitation poses a challenge in Saudi Arabia due to the limited nature of community-based rehabilitation services [8]. Therefore, it was important to conduct research in the KSA to better understand the challenges that stroke survivors face in their daily lives, thus helping guide policy development to support stroke patients' post-discharge recovery. The findings of our recent qualitative study on Saudi Arabian stroke survivors' needs post discharge suggest that stroke survivors have a number of diverse rehabilitation needs and that many of these needs are currently being unmet [9].

In addition to the growing need for stroke rehabilitation services, there is a lack of trained physiotherapists specialised in stroke care [10]. The Ministry of Health in Saudi Arabia has made efforts to enhance the competencies of its workforce through training and skill development initiatives [11]. Nevertheless, these efforts are complicated by limited funding. For example, while the United Kingdom and Malaysia allocate 5% of their total budgets towards training, Saudi Arabia allocates only 0.4% [12].

To ensure the delivery of effective training, it is vital to assess the current knowledge and skills of physiotherapists in the KSA. A study conducted by Alanazi and Alrwaily [13] aimed to assess the knowledge and skills of 149 new graduate physiotherapists utilising a comprehensive examination test composed of seventy questions, and the passing score of the test was set at 55%. This competency test has been modified from a commercially available practice test and designed to closely simulate the National Physical Therapy Examination

(NPTE). Only six participants passed the test, indicating poor knowledge and skills among newly graduated physiotherapists in the KSA.

There has been a notable focus on the implementation of evidence-based practice (EBP) within the physiotherapy community in the KSA. A survey investigating physiotherapists' behaviour, attitudes, awareness, and knowledge regarding implementing evidence-based practice in the KSA was distributed to 385 physiotherapists. The research found that 70.2% had no formal training in universities or any other authorised centres [14]. Another study surveyed 64 physiotherapists, and it found that those physiotherapists who trained overseas had positive attitudes towards the findings in the literature [15]. This is important, as they must keep themselves updated with the latest research and incorporate evidence-based practices into treatment plans for patients.

The adoption of emerging practices, such as telerehabilitation, remain limited in the KSA. One study surveyed 347 physiotherapists about their knowledge, attitudes and barriers regarding the implementation of telerehabilitation in physical therapy settings. This research found that only 19.9% had tried telerehabilitation [16]. Moreover, the utilisation of outcome measures in physiotherapy practice is pivotal in assessing rehabilitation efficacy and patient progress. One study investigated the use of outcome measures of 180 physiotherapists in the KSA. The project found that 38% did not use outcome measures, while 86% reported that they would use outcome measures in the future; of these, 35% stated they required specific training to improve the usage of such [17].

Despite these insights into general rehabilitation practices in the KSA, the literature review highlights significant deficiencies regarding the training needs of physiotherapists

specialising in stroke treatment in Saudi Arabia. None of the above studies focused explicitly on stroke care or addressed the training needed to deliver high-quality rehabilitation services to stroke patients. Therefore, it is essential to bridge this knowledge gap and create holistic rehabilitation strategies specifically designed for stroke patients in the area. Integrating physiotherapists' perspectives with the needs of patients with stroke can inform the development of rehabilitation training modules in a relevant and effective way. Consequently, this will facilitate long-term rehabilitation for patients who have suffered a stroke.

Aim

This study aimed to investigate physiotherapists' perspectives and training needs regarding the continuity of care post discharge for patients with stroke in the KSA. The objectives include exploring care continuity, identifying local transition strategies and assessing gaps in the knowledge and skills of physiotherapists who treat stroke patients in the KSA.

Methodology

Design

This paper adheres to the Standards for Reporting Qualitative Research (SRQR) guidelines in reporting the findings of the study [18]. A qualitative exploratory approach, situated with critical realism [19] was considered the most appropriate method via which to achieve this objective. Ethical approval was provided by the Ministry of Health ethics committee, (Jazan Health Ethics Committee, Ref: 2377) on 31/08/2023. Additional review and approval were provided by the University of Birmingham on 25/09/2023 because the first author is a student there (Technology, Engineering and Mathematics (STEM) ethics committee, Ref: ERN_20-1836). Consents were signed and sent by email or WhatsApp by participants themselves.

Participants

The population of interest was male and female physiotherapists working in the KSA who were providing therapy to patients following stroke. Subjects were excluded if they are not registered to practice in the KSA and do not work patients with stroke.

Data collection

The development of the interview guide was based on insights from a prior review of stroke needs [20], and previous studies exploring the needs of patients with stroke in the KSA specifically [9] and other similar studies [21,22]. The question guide explored therapists' views and perspectives on three elements to meet the study objectives: (1) gaps in current practice for stroke care in the KSA (to address stroke patients' needs), (2) strategies that can be applied in a local context to improve the reintegration of patients into the community and (3) strategies via which to improve the skills, knowledge and attitudes of therapists regarding delivering services that enhance the continuity of care after discharge from the hospital. In addition, demographic information, including age, gender, work setting, education level and years of clinical experience, were collected (S1 file).

To evaluate the interview questions, a cognitive interview was conducted with one participant [23]. However, it was not included in the final analysis. Additionally, to assess the interview schedule, a pilot interview was conducted with the same participant. After the pilot interview, the interview questions guide was revised for clarity and relevance. Yes/no questions were changed to open-ended ones to encourage more detailed responses, similar questions were

merged, and ambiguous questions were clarified based on participant feedback. I also added new questions to capture important information about patient assessment tools, goal setting and the desired training areas. The questions were rearranged to align better with the research objectives.

Procedure

The head of the department in seven hospitals was informed of the study requirements and requested to provide the principal investigator (PI) with a list of therapists who worked with stroke patients. Therapists were selected randomly from the list and contacted by the first author. They were given a participation information sheet if they were interested and eligible. Potential participants had 2 days to consider whether to participate, during which they had the opportunity to ask questions. If they decided to participate, the PI obtained informed consent. Consents forms were signed and returned to the PI by the participants themselves. The project was carried out in the KSA, and physiotherapists who worked with stroke patients were recruited.

Physiotherapists were invited to participate in semi-structured online interviews or focus groups. The interviews took place between October and December 2023. All focus groups and individual interviews were conducted online via zoom. Therapists were able to choose their desired times for the interviews and focus groups. While the therapists were proficient in English, the researchers preferred to conduct the interviews and focus groups in Arabic, the participants' native language. This choice was intended to reduce potential limitations and communication barriers, facilitating a more effective and accurate exchange of information. In addition, it ensured that all participants could fully comprehend the instructions and questions presented to them. Therefore, the interviews and focus groups were conducted in

Arabic. Subjects were also told about of their right to ask questions and take breaks anytime they liked.

The interviews were recorded (with the participants' permission), transcribed verbatim and translated into English, and the participants' anonymity and confidentiality were ensured [24]. Pseudonyms were used in the study, and any personally identifiable information, such as the participant's name or organisation, was removed. Data protection was ensured through adherence to the Data Protection Act [25].

Sample size

The sample size chosen was aimed to achieve data saturation. The exact size was informed by information power [26]. Given the focused nature of the interviews, this is expected to be similar to past studies [27,28] at 27 and 33, respectively. For the focus group, as it suggested to conduct at least two focus groups for each defining demographic characteristic [29]. Each focus group could include six to 10 participants [30]. However, a smaller number of participants can work as well [31].

Data analysis

A reflexive thematic analysis of the qualitative data was undertaken [32]. Thematic analysis involves six stages: becoming familiar with the data, generating the initial codes, searching for themes, reviewing potential themes, defining and naming themes and producing the report. The findings derived from the interviews and focus groups were subjected to a blind open coding process by two authors and the PI. The PI was required to present a defensible case for each stage of the analysis.

Rigor and trustworthiness

All interviews were carried out by the principal investigator (BT), a female PhD student at the time of the study and a registered physiotherapist in the KSA. There were no pre-existing relationships between the interviewer and the interviewees. The rigor of this study was maintained via various approaches. The researcher engaged in thorough note-taking during interviews to facilitate comprehensive data documentation and analysis. Furthermore, the analysis was conducted by the PI (BT) concurrently with the data collection stage, which enabled immediate feedback and the in-depth exploration of emerging themes. Further, this approach facilitated the exploration of data saturation. The credibility of the study was ensured via triangulation, as the analysis was conducted by three analysts (BT, AS and SR). The three focus groups were independently coded by AS, and five individual interviews were coded by SR. Their coding and interpretations were compared with those of the primary analyst (BT). The master table of the themes were sent to senior researchers for peer examination. The maintenance of an audit trail throughout the research process ensured transparency. Additionally, a completed COREQ checklist is attached in S2 file.

Findings

Overall, 26 physiotherapists participated in this study, 14 females and 12 males, with five, six and six participants in the three focus groups). There were nine individual interviews. The mean age of the participants was 32.4 years, and the mean years of clinical experience was 9 years. The interviews and focus groups time ranged from 18 minutes to 1:05 hour. The interview transcripts were written in Arabic and sent to an authorised translation services to be translated into English. The PI reviewed all English transcripts with the Arabic to confirm the accuracy of the translation. Additionally, the researcher verified whether the translated transcripts accurately represented the original spoken language phrases.

Synthesis

Two major themes were identified (1) quality and continuity of care (2) training needs. Table 1 provides details of the thematic structure. Details of each theme are provided below.

Table 1: Summary of the themes.

Major theme	Sub-themes	Codes	Definition
Quality and continuity of care	Limited post-discharge support	Lack of a post-discharge plan	This theme illustrates the lack of structured and organised post-discharge support for stroke patients.
		Therapists neglecting post-discharge factors	
		Limited social support	
		Insufficient home assessment	
	Perceptions of telerehabilitation	Uses of virtual clinics	In this theme, the current uses of virtual clinics and the facilitators of and barriers to telerehabilitation were described.
		Barriers to the successful implementation of virtual clinics	
		The need to establish trained tele-rehabilitation teams	
	Perceptions of self-management and home exercises	Lack of patient commitment to home-based rehabilitation programs	In this theme, the facilitators, limitations, and absence of a standardised protocol regarding self-management education for both patients and caregivers have been identified.
		Self-management facilitators and barriers	
		The need for patient education approaches	
	Overarching limitations of care	Absence of specialised rehabilitation centres	The limitations of rehabilitation care in the KSA are described in this theme.
		Lack of standardised clinical practice guidelines	
		Insufficient sessions and high workload.	
Absence of follow-ups			
Training needs		Limited training in stroke rehabilitation	This theme demonstrates the training needs regarding stroke assessment and management.

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	Training on stroke assessment and management	Need for comprehensive training in neuro assessment and outcome measures	
		Need for training on psychological interventions	
		Need for training on social support	
		Limited awareness of goal-setting process	
	Improvements in training and education for patients and carer	Lack of standardised guidance for patient education	This theme illustrates the need for standardised patients' and caregivers' education and training.
		Need for structured caregiver training	

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Major theme 1: Quality and continuity of care

This theme provides an overview of the post-discharge support and long-term rehabilitation care approaches provided to stroke patients in Saudi Arabia. This theme contains four subthemes: 1) limited post-discharge support, 2) perceptions of telerehabilitation, 3) perceptions of self-management and home exercises and 4) overarching limitations of care.

- Subtheme 1: Limited post-discharge support

This theme illustrates the lack of structured and organised post-discharge support for stroke patients. According to the participants, the time that elapsed before outpatient rehabilitation began varied widely, ranging from one week to two months, with some experiencing a gap in rehabilitation services between inpatient and outpatient care. This was illustrated by

Participant 17: *'The gap between inpatients and outpatients was usually from 1 to 3 weeks or up to a month. It depends. I mean, where did they come from? Was it from the same hospital or not?'* Participant 2 said, *'they might leave the hospital, and then, after a month or even 2 months, they start as outpatients because of the appointment availability. Yes, it's because of the availability; there might not be any available slots initially.'* Participant 2 also said, *'In some instances, it appears that therapists may not give sufficient attention to the patient's life post-discharge, leaving them to navigate their recovery largely on their own.'*

Participant 7 stated that *'Once the patient is discharged, whether with a wheelchair, cane or anything else, they're discharged. There's not much emphasis on these issues like how they manage at home, how they walk around their home and how they handle things at home. To be honest, there isn't much attention given to this aspect.'* Another notable gap was highlighted in the therapists' assessment of the patients' home environment. Participant 26 stated that *'therapists should pay attention to the social aspects, such as assessing the patient's home environment for accessibility.'* Participant 9 stressed the importance of

therapists expanding their attention beyond functional issues and taking into account the social dimensions of a patient's life: *'But from a social perspective, there isn't much support. Most of them do not have access to social services.'*

- Subtheme 2: Perceptions of telerehabilitation

In this theme, the current uses of virtual clinics, as well as the facilitators of and barriers to telerehabilitation, were described. The physiotherapists' perspectives on the benefits of using virtual clinics varied. While majority of them find telerehabilitation beneficial if implemented in the correct way, some consider it ineffective. Participant 17 claimed that *'They can be effective in some cases when needed, but as a substitute for in-person sessions, I don't see them as effective for therapeutic sessions. However, as a form of consultation, they might have some benefits.'* According to the therapists, virtual clinics currently primarily act as platforms for patient consultations and communication, rather than being utilised for the delivery of rehabilitation services. This is mainly because therapists are required to keep certain records of virtual sessions for annual evaluations, which are crucial for their promotion, rather than focusing on delivering rehabilitation services in more efficient way. Only a limited number of therapists had employed virtual clinics to deliver therapy, and these did not involve stroke patients. Participant 24 stated, *'It's more about maintaining communication. When it comes to physical exercises and telling the patient to do a certain exercise, it is quite challenging.'*

The identified barriers to the successful implementation of virtual clinics included the need for education among both therapists and patients, the need to ensure access to the internet and concerns related to the elderly population's limited awareness of technology. Moreover, the sense of security patients feel with their therapists plays a crucial role in this regard. The participants emphasised the importance of providing training in telerehabilitation, and they

recommended the establishment of dedicated telerehabilitation teams to enhance telerehabilitation implementation. Participant 24 stated, *'I think there are studies, as you know, that show the service can be provided if you train therapists specifically for it. I don't think therapists here have been trained or solely dedicated to telerehabilitation.'*

- Subtheme 3: Perceptions of self-management and home exercises

In this theme, the limitations and absence of a standardised protocol for self-management education for both patients and caregivers have been identified. Therapists expressed a common concern regarding patients' lack of commitment to home-based rehabilitation programs. Participant 6 stated, *'After 10 years of experience, the majority, around 80%, of patients, don't adhere to the instructions or exercises you give them.'* Several self-management facilitators and limitations have been identified in this context. Psychological factors, such as depression and anxiety; patient motivation and family cooperation and support, or the absence thereof, play pivotal roles in determining the success of home programs. Moreover, a few therapists noted that patients may not always follow caregiver instructions. Additionally, challenges from the patients' perspective, such as resource constraints, busy schedules and the fear of exercising without supervision further complicate home-based exercises. Participant 24 highlighted that *'Sometimes, patients may not have enough education, some resources are not available to them at home or they might lack assistance.'* Participant 8 stated, *'We try to involve the patient's family. Sometimes, the patient may be in a state of depression and doesn't want to come or do exercises. The patient lacks internal motivation. In such cases, the family plays a crucial role.'* In some cases, caregivers were not supportive enough during the process of rehabilitation. This was illustrated by Participant 26, who stated that *'Caregivers are often busy, so the patient may not have anyone to assist them. Social support may be lacking.'*

To address these limitations, therapists emphasise the need for mandatory patient education approaches, highlighting the absence of a standardised protocol for self-management education for both patients and caregivers. Participant 4 stated, *'I personally give them guidance and instructions that they should adhere to. There's no specific model, and if they need something else, we tell them to come back.'* The participants stressed the importance of providing ongoing support, such as proper patient education, involving caregivers in the educational process and educating patients about the significance of adhering to home rehabilitation programs. Participant 8 emphasised that *'They need to show interest, ensure the patient attends their sessions and emphasise the importance of treatment and the current phase of recovery.'* Participant 17 stated, *'We're also working on raising awareness among patients about the importance of the home program and completing sessions regularly and educating them about their condition.'* Participant 17. In essence, therapists emphasise a comprehensive approach to enhancing self-management perspectives and outcomes for patients.

- Subtheme 4: Overarching limitations of care

The limitations of rehabilitation care in the KSA were described in this theme. Participants expressed the critical inadequacy of the current infrastructure. They noted that hospitals are ill-equipped to handle the large number of patients, resulting in insufficient sessions and a high workload for therapists. Participant 14 stated, *'It could be due to limitations in infrastructure and a lack of sufficient staff, equipment or rehabilitation protocols to optimise the service.'* Participant 17 added, *'The number of patients in our department is larger than the capacity of the facility.'* The absence of specialised rehabilitation centres and therapy

teams compounds the problem. The participants believed that having a specialised team could result in more time being dedicated to patients and their needs being addressed more effectively. Participant 1 stated, *'There should be a specialised rehabilitation center for the entire region, one equipped with the necessary devices and resources.'* She added, *'The issue in hospitals is that there is no specialisation. We don't have dedicated teams or groups for specific conditions.'* Additionally, participants highlighted a lack of standardised clinical practice guidelines, which leads to inconsistencies in therapy quality, depending on the training and expertise of individual therapists. Participant 14 illustrated this by stating, *'There are some shortcomings in terms of the service not being standardised across all hospitals and Ministry of Health centres. This leads to variations in the quality of the service provided in different locations. Some patients receive appropriate or excellent therapy based on the expertise and training of the physical therapist.'* They highlighted the absence of follow-ups, which creates a gap in terms of addressing long-term patient needs. Participant 8 stated, *'Once they are discharged, they typically do not have follow-up at the clinic.'* Addressing these limitations is paramount in enhancing the quality of rehabilitation services.

Major theme 2: Training needs

This theme highlights the crucial need for comprehensive training and education in stroke assessment, management and rehabilitation. This theme involved two subthemes: 1) training in stroke assessment and management and 2) improvements in training and education for patients and caregivers.

- Subtheme 1: Training on stroke assessment and management

This theme demonstrates the training needs of physiotherapists regarding stroke assessment and management. The therapists perceived a lack of a specialised training for stroke rehabilitation after qualification. It should be noted that physiotherapists in the KSA receive 1 year of training pre-qualification, which covers general aspects of various specialisations, including orthopaedics, neurology and paediatrics. They said that while some training occurs post qualification, it is often driven by therapist motivation, and courses are very limited. Participant 24 stated, *'the training for neurological cases is insufficient. There are limited courses that address the specific needs of practitioners.'* Participant 26 added, *'For stroke and neurological cases, the training is relatively limited.'* The therapists emphasised the importance of establishing regular and comprehensive training courses that focus on various aspects of stroke rehabilitation. Firstly, there is a recognised need for training in neurological assessment and outcome measures. Participant 24 stated, *'I believe they should focus on the basics, including assessment, evaluation, tailoring exercises and setting goals based on the patient's needs.'* She added, *'I believe if there's someone specialised in neuro, qualified for neuro cases, and they start offering courses, particularly in assessment—the foundation—and, then, they proceed with the treatment procedure, these things would be better because most therapists are not specialized.'* The therapists also stressed the importance of specialised training to support patients psychologically and socially. Participant 26 said, *'One of the key areas we could improve on is the psychological aspect. We are not particularly strong in this area.'*

It seemed that there was a lack of standardised tools for setting goals. Therapists individually establish goals for patients based on their conditions, as there are no formal tools used. Additionally, therapists often overlooked patient involvement in the goal-setting process, citing patients' limited knowledge of goal setting as a barrier. Participant 25 stated, *'Goals*

are mostly determined by the therapist alone, and they proceed according to their treatment plan. If there is no initiation from the patient, it's rare for a therapist to ask about the patient's goals, wishes or aspirations. They assess the patient and start working on the existing impairments.' Participant 1 stated, 'I mean, we ask them what they want, but they don't even understand physical therapy.' Patients' goals are often perceived as illogical, highlighting a potential misalignment between patient expectations and therapists' objectives. Participant 17 stated, 'Honestly, I always ask this question, and in the majority, they answer unreasonable answers, and they usually say, "Yes." Like, "I want to return to normal. I want to be like before."' He added, 'The patient's initial goal is something that is not logical or difficult.' The need for training in goal setting was identified as one of the most frequently emphasised areas for improvement. Participant 17 stated, 'Perhaps improving in setting plans and explaining to caregivers would be helpful, as well as using the outcome measures.' Addressing these gaps in training physiotherapists is essential in enhancing the quality of care for stroke patients.

- Subtheme 2: Improvements in training and education for patients and caregivers.

This theme illustrates the need for standardised patient and caregiver education and training. The participants emphasised the critical need for patients to receive comprehensive education regarding their medical conditions. Participant 17 stated, 'The medical education provided for the patient and their companions may not be sufficient.' However, the therapists highlighted a lack of standardised guidance and resources for educating both patients and their families effectively. This gap results in therapists lacking essential information about how to provide inpatient care and prepare patients and families for their transition to home. Participant 25 stated, 'Some (therapists) don't provide proper education for home programs; instead, they instruct patients to perform the exercises covered in the session at home.' Participant 4 stated,

'I personally give them guidance and instructions that they should adhere to. There's no specific plan, and if they need something else, we tell them to come back.' Moreover, the training of caregivers to support their relatives lacked organization and structure. Participant 1 stated, *'Families need to be educated. There should be an educational program for the families of stroke patients. It's not about the rehabilitation of the patient; it's about educating the patient's family on how to take care of them.'* Participant 7 added, *'But this idea isn't really implemented, to be honest. It's not implemented at all, but the concept of involving the caregiver in the treatment plan is great.'* These findings collectively emphasise the critical need for the development of standardised and organised patient education protocols, equipping both therapists and caregivers with the necessary tools to enhance patient understanding, facilitate smoother transitions and optimise overall care outcomes.

Discussion

The key objective of the present study was to examine and analyse the opinions of physiotherapists who are providing stroke care in Saudi Arabia to identify gaps in care continuity and the knowledge required by therapists to overcome these service gaps. The findings revealed limitations in delivering organised post-discharge services and the need for training to improve the level of care provided to individuals recovering from stroke.

In this study, therapists' perspectives on various community rehabilitation approaches are explored, and the key purpose of this is to ensure the continuity of high-quality care. According to Langhorne and Baylan [33], most stroke survivors in developing countries do not have sufficient access to inpatient rehabilitation services. Thus, home-based exercises generally become the primary form of rehabilitation intervention. Such services play a crucial

role in meeting the healthcare needs of individuals seeking rehabilitation. Nonetheless, our study revealed a common concern about patients' adherence to home-based exercises. These obstacles are similar to those identified by Mahmood et al. [34] including factors such as a lack of emphasis on the part of professionals; a lack of knowledge pertaining to stroke recovery and difficulty accessing resources, family support and healthcare facilities. Furthermore, a lack of standardisation for services, proper education for patients and proper therapist training in the KSA may negatively influence the implementation of home-based programs.

One of the most important strategies for improving stroke survivors' adherence to home-based exercises is effective patient education. It is crucial for patients and their families to have a thorough understanding of their condition, as this forms the basis for effective collaboration and sets the stage for successful rehabilitation efforts [35]. According to Ogwumike et al. [36] clinicians should ensure that the intensity, length and quantity of exercises suggested in an exercise plan are all simplified, individualised and regularly reviewed to match the skills and capacities of each stroke patient. Furthermore, goal setting is frequently used in physical therapy to improve adherence [37], but it seems to be overlooked by the participants in this study. Mahmood et al. [34] indicated that enhanced participation in home-based exercises post stroke was observed when utilising a personalised adherence program tailored to individual goals and physical capabilities. Establishing specific goals by working closely with patients to match interventions with personal goals and periodically reviewing and modifying these goals are both critical in maintaining patient motivation and engagement during the rehabilitation process.

Additionally, it is also important that therapists set aside time to educate patients about the importance of home-based exercise in order to overcome these issues. This will be made easier by the incorporation of technology and the ability to monitor participation electronically or remotely. Studies have shown that telerehabilitation can enhance patient education [38]. Moreover, a survey conducted in the KSA found that 50% of rehabilitation care providers believed telerehabilitation to be critical to service provisions but that they were not using telerehabilitation technology in their work practices [39].

Patient adherence to rehabilitation is low due to challenges involving transportation. In this context, telerehabilitation could be a viable and even vital tool. The best course of action may be to use a virtual clinic to educate patients and assess their compliance with at-home exercises, goal-setting and action planning. In a setting similar to the KSA, telerehabilitation was found to facilitate ongoing rehabilitation care post-hospital discharge and during follow-up, as well as to enhance engagement with remote rehabilitation services as compared to conventional methods [40]. Additionally, tele-rehabilitation protocols showed good adherence rates [41].

To ensure that the most suitable technology is being used properly, it is critical for rehabilitation clinicians and patients to undertake telerehabilitation training. Nonetheless, this has been identified as a major obstacle. The Saudi guidelines on implementing telerehabilitation assured that all specialists must receive training and education regarding the safety of equipment and the implementation of safety measures during telerehabilitation [42]. However, none of the participants in this study had received any training regarding telerehabilitation. Thus, there is a need for guidance about how to create a focused training

program that suits the needs of therapists, enabling them to provide better post-discharge care.

Limitations

The study is the first of its kind to explore therapists' perspectives on long-term care after stroke in the KSA; however, some limitations must be acknowledged. Firstly, online platforms were employed to conduct the focus groups and interviews. Generally, online focus groups can be beneficial because they enable participants to remain anonymous during discussions. Nonetheless, online interactions may not be able to capture the complexities of the topic and real-life reactions fully or accurately, which are critical in providing comprehensive insights into participant dynamics. Another limitation was encountered due to poor internet connectivity during a few of the interviews. This hindered smooth communication and may have affected the quality and depth of the data collected during those particular interviews. Furthermore, because the sample population was limited to a single city in KSA, it is challenging to ensure the transferability of the findings. Therefore, the perspectives and experiences captured in the study may not fully represent the diversity of viewpoints and practices that exist across regions. Moreover, the maximum number of work experience years for the therapists included in this project was 10 years, and thus, their experience may have been limited.

Conclusion

This qualitative study investigated the perspectives of therapists on long-term care for patients with stroke. The findings highlighted a lack of quality in the services provided post discharge. The study identified a need for a training program designed to improve therapists' proficiency in providing long-term care post stroke, especially in terms of the limited

availability of community rehabilitation services in KSA. It is suggested that healthcare organisations and policymakers should collaborate to establish structured and organised post-discharge services for stroke patients. Furthermore, efforts should be made to increase the availability and accessibility of community-based rehabilitation services for stroke survivors.

Supporting information

S1 file: Interview Questions

S2 file: Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist.

Author Contributions: B.T., S.R., and A.S. conceptualized the study, B.T. developed methodology, A.S. and S.R. supervised the study, B.T. performed data collection. B.T., A.S., S.R. performed data analysis, B.T. wrote the manuscript with input from A.S. and S.R. All authors have read and agreed to the published version of the manuscript.

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References

Appendix 4: Paper 4

Evaluating a training programme for physiotherapists to improve the delivery of long term care for patients with stroke in Saudi Arabia: a pilot mixed methods design.

Evaluating a stroke training programme (STP) for physiotherapists to improve delivering long term care for patients with stroke in Saudi Arabia: a pilot mixed methods design.

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Abstract

Background: Stroke is currently the second leading cause of death in Saudi Arabia (SA), with an annual incidence rate of 29 per 100,000 people. There is a huge demand for rehabilitation services for people who have had a stroke living in the community; however, the services in SA do not meet this need due to a lack of community rehabilitation services. Additionally, rehabilitation staff have reported a lack of knowledge and skills to deliver rehabilitation services for people post-stroke in the community. A first step towards developing these services is to train professionals working in this area to deliver community-based rehabilitation for patients with stroke. The study aimed to evaluate an online stroke training programme (STP) that will enable physiotherapists to deliver long-term care following the discharge of stroke patients.

Methods: A sequential mixed methods design was adopted with three measurements undertaken pre-training, post-training questionnaires and one-month follow-up interviews. Participants were eligible if they were physiotherapists of any gender who were currently providing therapy to stroke patients and working in SA. The STP consisted of four modules and was delivered via an online platform. Developed questionnaires were key outcome

measures used to measure the change in the participants' knowledge, confidence and attitude.

Chi-Square test and Wilcoxon test were used to compare pre- and post-training results.

Results: Twenty-six physiotherapists who were purposively selected completed the STP. The results demonstrated a statistically significant increase ($P<0.05$) in the participants' knowledge and confidence in providing long-term care for patients with stroke. Additionally, the STP had a positive impact on the participants' attitudes. Qualitative interviews post-training revealed that participants' experiences of the STP were positive. However, the training had limitations such as the lack of practical content and short duration.

Conclusion: The STP was sufficient and acceptable to improve participants' knowledge and confidence to deliver long-term care for patients with stroke. Future research should focus on developing strategies to enhance existing knowledge translation into practice.

Keywords: Stroke, Rehabilitation, Physiotherapy, Training.

1. Introduction

Stroke is the second leading cause of death in Saudi Arabia (SA), with an annual incidence rate of 29 per 100,000 people. It is projected that the mortality rate from strokes in the region will nearly double by 2030 [1]. Strokes often lead to numerous physical, mental, social, and economic limitations for the patient following a stroke. These consequences significantly affect the ability of patients and caregivers to carry out daily activities and cope with ongoing care needs [2]. Physical rehabilitation effectively promotes recovery of function and mobility after stroke [3]. In the context of SA, rehabilitation of long-term conditions such as stroke have limited resources including limitations in the knowledge and skills of physiotherapists to deliver rehabilitation in the community.

Physiotherapists as key rehabilitation professionals must undergo proper training to acquire the information and skills necessary to effectively deliver interventions [4]. They are also

required to regularly update their skills and knowledge to meet the demands of their profession and stay updated with changes in practice [5]. In SA, the undergraduate physiotherapy programme consists of four years of full-time studies, followed by one year of internship [6]. Despite the 5 years of training, physiotherapists in SA tend to rely on their personal experiences rather than evidence-based practice [7]. This creates inconsistency in care delivered to patients with patients seldom receiving high-quality of care, depending on the therapist's expertise and education.

In order to bridge the gap, continuing professional education could be a critical component of delivering high-quality services to patients with stroke and other conditions. There have been calls to the Saudi Commission for Health Specialties to establish post-professional programmes to provide patients with strokes with high-quality services [8]. The review indicated that rehabilitation professionals in SA including physical and occupational therapists often lack adequate training in stroke rehabilitation. Additionally, they recommended enhancing stroke rehabilitation education in the curricula for all healthcare professionals to cover stroke prevention, management, and rehabilitation [8]. However, the allocation of resources and funds for training is limited compared to other countries such as the UK [9]. This further limits the training and development of physiotherapists' skills in delivering effective care to patients.

The lack of training provided to physiotherapists generally in SA has been highlighted in other studies. One study in SA investigated physiotherapists' behaviour, attitudes, awareness, and knowledge of implementing evidence-based practice [7]. The study demonstrated insufficient implementation due to lack of training as most physiotherapists had poor basic knowledge of evidence-based practice with 89.9% unaware of its definition and 80.6% not

understanding its aim. Additionally, 32.9% were unfamiliar with basic terms, and 70.2% had no formal training [7]. Another study found that the limited availability of educational workshops in SA may have contributed to the difficulty in understanding and using outcome measures [10]. Additionally, [11] indicated that limitation in education (45%) was the most significant barrier to implementing evidence-based practice in SA, while 42.7% identified insufficient resources and funding and 38.2% identified a lack of skills and research knowledge. A recent study indicated that 51% of physiotherapists lacked knowledge of the essential principles of evidence-based practice, 60.4% did not participate in any training sessions on research and 74.9% expressed a lack of confidence in their ability to analyse literature [12]. Studies on stroke care training for physiotherapists in SA are limited, yet available literature suggests that training should focus on the development of knowledge and skills for physiotherapists to ensure they meet the required standards and deliver high-quality care to patients [8]. Some studies in the Asian context have evaluated the training for physiotherapists to assess the improvement in their knowledge, skills, attitudes and behaviour towards evidence-based practice. Their results indicated a significant increase in the physiotherapist's knowledge and skills pre- and post-training [13, 14].

A modern approach involves utilising the internet to deliver training, either entirely or partially, through training-specific websites or platforms [15]. E-learning is an easily expandable and accessible training method [16]. Studies have indicated that digital training is equally or more effective compared to traditional methods, especially in knowledge and skills acquisition [17, 18]. Digitalisation is rapidly increasing in the healthcare system in SA [19]. Evidence from other countries supports the use of online platforms to deliver training for physiotherapists in task-specific training in physiotherapy after stroke [20], interpersonal

psychotherapy [16], cognitive behaviour therapy [21], and self-management interventions (Hurley *et al.*, 2019).

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Online training has been evaluated for its effectiveness in SA for delivering training for teachers [23] and dental practitioners [24]. The findings of both studies indicated an improvement in the participants' skills and knowledge, leading to the conclusion that online training is effective. Further, one training programme provided comprehensive education to nurses in person about stroke care in SA [25] and found that the training was an effective way of learning for nurses. To the best of the author's knowledge, no study has been conducted to date to evaluate an online training programme for physiotherapists to enhance stroke care in SA. Hence, this study aimed to address this gap by evaluating the effectiveness of such training.

2. Aim and Objectives

This study aimed to evaluate an online training programme that was developed to build the knowledge and skills of physiotherapists to deliver long-term care following the discharge of stroke patients.

Objectives

- 1- To evaluate the effectiveness of the STP in improving physiotherapists' knowledge, attitudes, and confidence.
- 2- To assess the perceptions of usefulness and acceptability of the STP.
- 3- To understand and relate reasons for improvement or lack of it in the knowledge, skills and confidence aspects using qualitative data through the opinions and perceptions of the physiotherapists.

3. Methodology

3.1. Design

This study was a pilot sequential explanatory mixed methods design with two phases. Phase one involved quantitative data from a before-and-after (pre-test and post-test) design, which is a widely used approach to assess online training programmes [26, 27, 28]. This phase aimed to measure the change in knowledge, confidence and attitudes between pre-training and post-training. The second phase comprised qualitative interviews, which aimed to gain a deeper understanding of physiotherapists' perceptions and acceptability of the STP. The interviews were conducted one month after completion of the training. Ethical approval was sought from the Ministry of Health ethics committee, (Jazan Health Ethics Committee, Ref: 2416) on 31/01/2024 and the University of Birmingham on 29/02/2024 (Science, Technology, Engineering and Mathematics (STEM)) ethics committee, Ref: ERN_20-1836).

3.2. Participants

The participants recruited for this study were physiotherapists of any gender who were currently providing therapy to stroke patients and working in SA. Participants had to have access to the requisite online technology, such as Zoom or Teams, which enabled them to participate remotely. Participants were excluded if they were physiotherapists not providing care to patients with stroke and if they were working outside the city for which ethical approval was sought.

3.3 The STP

Previous studies [29, 30, and Temehy *et al.*, under review] suggested that patients lacked availability and suitability of information provided to them. In addition, the care they received was inadequate [29]. Further, patients with stroke in SA reported inadequate continuity of care as one of the main reported limitations in stroke care in SA [30]. Moreover, providing training for physiotherapists on aspects such as providing proper education to the patients and long-term approaches for stroke care was identified as key to improving services (Temehy *et al.*, under review). The dominant themes across all the above studies include improved knowledge for physiotherapists on delivering education, discharge care and planning, intensity, continuity of care and long-term approaches such as self-management and telerehabilitation. Hence, a training programme was designed to meet these gaps. The STP for physiotherapists consisted of four modules illustrated in detail in Table 1. The Template for Intervention Description and Replication (TIDieR) checklist can be found in supplementary file 1.

Table 1: The STP includes the following modules.

Themes covered in the STP	Topics included under each theme
Welcome	This section welcomed participants to the training and emphasised the importance of the training programme.
Module 1: Introduction to stroke care	This module provided an introduction to stroke pathology and stroke rehabilitation in hospitals and the community.
Module 2: Carer-education and care-transition	This module provided a demonstration of patient and carer education, discharge planning and home needs assessments.
Module 3: Outpatient care for patients with stroke	This module provided a demonstration of stroke assessment procedures, stroke outcome measures, and the process of goal setting in the community settings.
Module 4: Self-management and telerehabilitation	This module provided evidence-based practice regarding the provision of supported patient self-management approaches and the effective employment of telerehabilitation.

3.4. The outcome measure instrument

Researchers frequently adopt one of three primary methodologies when using a questionnaire-based approach: the utilisation of pre-existing questions, the modification and adaptation of existing questionnaires, or the development of a new questionnaire [31]. This study adopted the third approach, as to the best of the author’s knowledge, no available instrument currently covers all aspects of the STP. The instrument measured three main elements: knowledge, attitude, and confidence. The knowledge element in the questionnaire consisted of 15 multiple-choice items that reflected the content of the STP. The second element was attitude, which consisted of three multiple-choice questions and four items in the form of Likert-type scales designed to measure the change in physiotherapists’ attitudes. The final aspect was confidence, and consisted of five rating questions that covered the module

aspects. Identical questions were repeated on both occasions (pre- and post-training) to assess the level of knowledge acquired during the training session. An additional section was added to the post-training questionnaire which assessed satisfaction. Fifteen items with Likert-type and open-ended response options were developed to assess the satisfaction and experience of an online programme. The questions in this section were adapted from a similar study [28]. The full copy of the questionnaires can be found in supplementary file 2.

The questions were translated into Arabic. The translated version was sent to a linguistic colleague for feedback on the Arabic version. The second version was sent to a physiotherapist (not eligible for the study, as he was not from the city for which we had ethical approval). Minor changes were made, including (1) adding diploma choice to the demographic section, (2) rephrasing one question in the satisfaction section, and (3) rephrasing two items in the knowledge section for clarity. The minor changes can be found in Supplementary file 4.

3.5. Procedure

The heads of the departments of the participating hospitals were informed of the study requirements by the PI. The PI contacted them to obtain a list of therapists who worked with stroke patients. All therapists from the list were contacted by the PI. The PI provided an information sheet to those who were interested and eligible. Potential participants had two days to consider participating, during which they had the opportunity to ask questions to the researcher. If they decided to participate, the PI obtained informed consent electronically. Consent forms were signed and sent by email or WhatsApp by participants themselves.

3.6. Data collection

After providing consent, eligible therapists were contacted via email or phone with the information on the procedure of the whole study. Firstly, participants were required to complete a pre-training questionnaire. The questionnaire was set up in Microsoft Forms and sent to the participants before the training. Quantitative data pre-training was collected from April 5 to June 12, 2024. Demographic information, including age, gender, education level, and years of clinical expertise, were collected. Once the pre-questionnaire had been completed, the link for the STP was sent. Participants were asked to inform the PI when they had completed the STP; otherwise, researchers checked if the training was completed. After training completion (within a week), participants received another questionnaire (post-training questionnaire). The pre-and post-training questionnaires were used to assess knowledge, attitudes and confidence. The same set of measures was utilised in both questionnaires. However, a satisfaction section was added to the post-training questionnaire to assess participants' satisfaction [28].

One month after the STP was completed, participants received an invitation via email to participate in a follow-up interview over the phone or on Zoom. The interview explored therapists' experiences of the STP, what aspect of the learning sessions was considered the most valuable, and what modifications needed to be made to the STP. To facilitate the learning process, supplementary resources and additional materials were provided to the participants. These resources included tutorial access, guides, and links to online educational materials and videos. If participants did not complete the post-training questionnaire, their data were excluded from the study. Participants were given one month to complete the training. The post-training interview guide can be found in Supplementary file 3.

3.7. Sample size

Quantitative phase: a sample of 30 participants were selected purposively for this pilot study, which is supported by the recommendation of qualitative studies [32]. Thus, a sample size of 30 participants may provide valuable insights into the efficacy of the investigated intervention.

Qualitative phase: Participants were purposively selected from those who had completed the STP. In qualitative studies, no specific method is used in sample size calculation, so data saturation was used as a sample size guide [33]. The exact size was informed by information power [34].

3.8. Data analysis

For phase one, frequency tables were used to summarise demographic variables. The Chi-Square test was used to compare categorical variables to determine whether there was a relationship between variables [35]. Wilcoxon's test was used to compare both normally distributed and skewed data [36]. The significance level for all comparisons was set at $p < 0.05$. Additionally, to assess the change in the variables according to demographics, the Mann-Whitney test was used to assess the change against age and gender, while the Kruskal-Wallis test was used to measure the change according to participants' education levels and their years of expertise in physiotherapy and stroke care. The analysis was limited to individuals who filled out both the pre-and post-training questionnaires.

For the data from the qualitative phase, reflexive thematic analysis was used [37]. The PI (BT) performed the coding and categorising of the data. Line-by-line coding was conducted to generate initial codes. The PI identified patterns and clustered similar codes together to generate themes [37]. The final step of the analysis was carried out to integrate the data from the two phases.

3.9. Quality of the study

Several measures were employed to enhance the quality of the questionnaire. Firstly, the validity of the questions was improved through assessments and reviews by senior researchers. Secondly, the accuracy of the translated version was enhanced by having a linguistic expert review the questions. The questions were piloted on one physiotherapist holding a master's degree to identify and minimise any issues. Formatting bias was reduced by designing the questionnaires to follow the recommendations from previous studies [38]. Items were kept simple, short, and written in two languages to ensure clarity of the questions. The content was relevant to the STP, appropriate in length, and efforts were made to avoid leading questions. Additionally, selection and sampling bias were reduced by contacting every individual on the lists provided by the department heads at the two hospitals. Participants were blinded to the study's aims to prevent response bias.

4. Findings

4.1. Characteristics of the study participants

A total of 73 physiotherapists were contacted to participate in the study. Of them, 13 did not meet the inclusion criteria, 11 declined to participate, mainly because of time constraints, and 19 either did not reply or initially agreed to participate but subsequently failed to complete the pre-training questionnaire. Thus, the number of participants who completed the STP was 26, most of whom were female (17 were females, 9 were males). Further, three participants completed the pre-training questionnaire but did not complete the training. Of the participants, 80.8% were 30–39 years old, while the remaining 19.2% were 18–29 years old. In terms of participants' education, 61.5% of the participants had bachelors' degrees, 30.8% of the participants had masters' degrees, and 7.7% were in their internship period. Most

participants (61.5%) had 6 to 10 years' experience as physiotherapists. A summary of the flow of participants in this study can be seen in Figure 1, and the participants' characteristics in Table 2.

Figure 1: CONSORT flow diagram of participants in the study

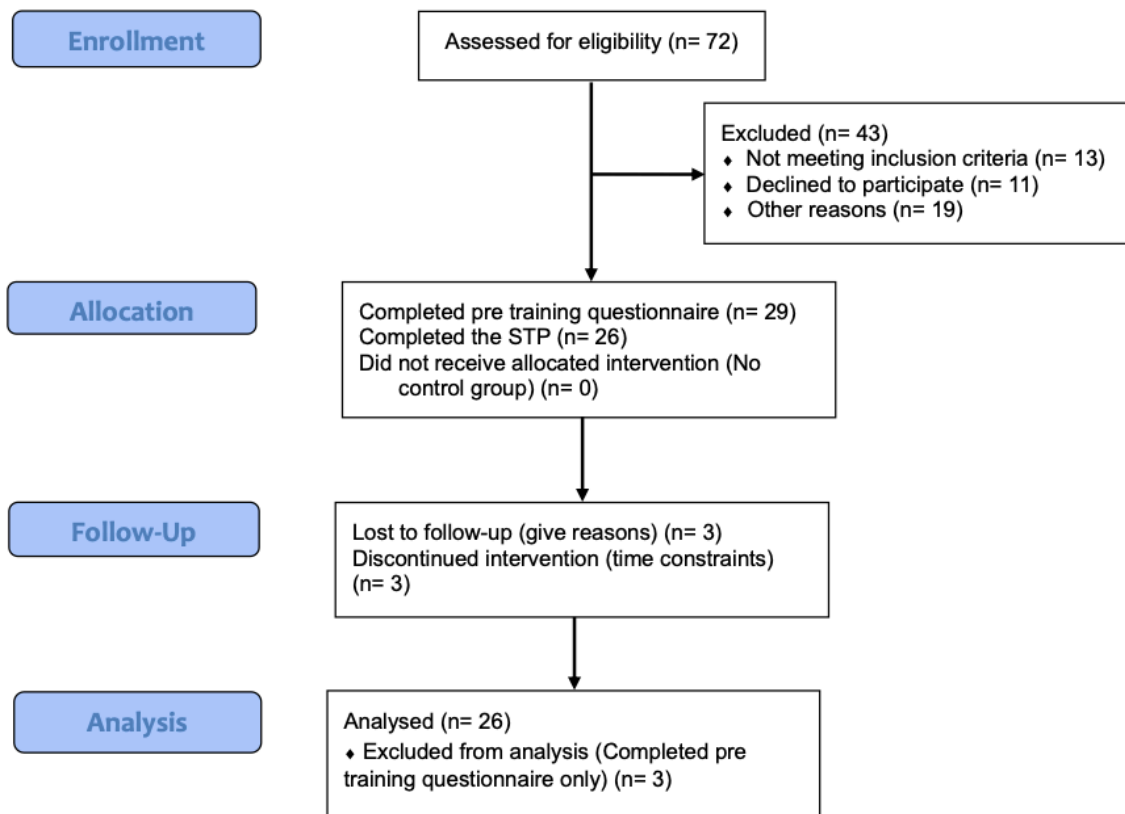


Table 1: Summary of demographic characteristics.

Variable	Characteristics	n (%)
Gender	Female	17 (65.4)
	Male	9 (34.6)
Age	18-29 Years	5 (19.2)

	30-39 Years	21 (80.8)
Education	Bachelor	16 (61.5)
	Internship	2 (7.7)
	Master	8 (30.8)
Total years of experience as a physiotherapist	Less than 1 Year	2 (7.7)
	1-5 Years	4 (15.4)
	6-10 Years	16 (61.5)
	11-20 Years	4 (15.4)
Total years of experience in stroke care	Less than 1 Year	5 (19.2)
	1-5 Years	6 (23.1)
	6-10 Years	14 (53.8)
	more than 10 Years	1 (3.8)

4.2. Quantitative results

1- Change in knowledge.

Pre-training, physiotherapists demonstrated a high level of knowledge about the education of patients and carers about the Stroke for Carers website, as 20 (76.9%) provided correct answers. However, knowledge on post-discharge planning was not sufficient, as 16 participants (61.5%) provided incorrect answers. Similarly, knowledge about setting goals with patients was demonstrated at a low level, with fewer than 45% of participants being aware of goal-setting frameworks.

Knowledge in stroke assessment revealed varying levels of knowledge among participants. Only one (3.8%) understood the regular interval at which patients with stroke should be assessed and reviewed. However, there was high familiarity with specific assessment tools, as 18 participants (69.2%) recognised the use of the Fugl-Meyer assessment scale and 20 (76.9%) identified the use of the Barthel Index.

The results for knowledge about self-management and telerehabilitation showed varying levels at the baseline among participants. Fifteen participants (57.7%) were aware of common self-management, but knowledge of the Graded Repetitive Arm Supplementary Program (GRASP) was lower, as 18 (69.2%) were unaware of it. Similarly, only 10 (38.5%) knew about the different versions of the GRASP. In contrast, most participants (n=17; 65.4%) correctly identified the use of the Patient Activation Measure (PAM). Finally, the majority (n=21; 80.8%) understood how to ensure safety during telerehabilitation.

Post-training, while the improvement of knowledge about patients' education was not statistically significant ($p=0.257$), the number of correct responses increased from 20 (76.9%) to 23 (88.5%). Similarly, in knowledge about planning services post-discharge, there was no significant change in understanding when patients should be followed up after hospital discharge if they had rehabilitation needs ($p=0.197$), but the correct response rate still improved from 10 (38.5%) to 15 participants (57.7%). However, the knowledge level on the intensity of rehabilitation increased significantly ($p=0.008$).

The comparison between pre- and post-training responses revealed significant improvements in understanding of stroke assessment. Knowledge scores about the use of the Fugl-Meyer assessment scale increased significantly, from 18 (69.2%) to 25 (96.2%) ($p=0.008$). Similarly, scores for use of the Barthel index rose from 20 (76.9%) to 26 (100%) ($p=0.014$).

Further, the programme's emphasis on goal-setting and action-planning led to significant changes in the participants' knowledge levels. Knowledge scores of the Goal-setting and Action Planning (G-AP) approach improved from 11 (42.3%) to 25 (96.7%) ($p=0.001$). Likewise, understanding of what constitutes a good action plan increased from 10 (38.5%) to

25 (96.2%) ($p=0.001$). Further, participants' familiarity with the Goal Attainment Scale (GAS) improved from 11 (42.3%) to 25 (96.2%) ($p=0.001$).

Knowledge about self-management and telerehabilitation showed a significant improvement. Awareness of common self-management strategies increased from 15 (57.7%) to 23 (88.5%) ($p=0.021$). Likewise, understanding of GRASP improved from 8 (30.8%) to 20 (76.9%) ($p=0.001$), and knowledge of its versions rose from 10 (38.5%) to 22 (84.6%) ($p=0.003$). Knowledge about the PAM increased from 17 (65.4%) to 26 (100%) ($p=0.003$). Additionally, the comprehension of safety protocols during telerehabilitation improved from 21 (80.8%) to 26 (100%) ($p=0.025$). Overall, the results show a significant increase in participants' knowledge of the majority of the items after the STP, demonstrating the effectiveness of the programme. Table 7.2 demonstrates the findings in detail, and full items can be found in Table 5 (Appendix 20).

Knowledge and participant characteristics

The trends in knowledge levels in relation to participants' characteristics were explored. Female participants' knowledge level was significantly higher than that of male participants ($p=0.045$). Participants who were in the younger age group demonstrated lower knowledge acquisition: the mean knowledge level of 30–39-year-olds was significantly higher than the mean for 18–29-year-olds ($p=0.028$). The influence of education level on the knowledge gain was not significant across groups ($p=0.140$). However, participants who held bachelors' degrees demonstrated higher knowledge levels. Further, participants' number of clinical years as a physiotherapist had an influence on the level of knowledge acquisition, with participants who had been practising for 6–10 years demonstrating a statistically significant knowledge

acquisition than other groups ($p=0.008$). Table 6 demonstrates the change in knowledge level according to demographic variables (Supplementary file 5).

Table 2: Differences in items of knowledge between pre-test and post-test

Category	Items	Pre (n/%)		Post (n/%)		Wilcoxon	
		Correct	Incorrect	Correct	Incorrect	Test Value	P-value
Education	Q1	20 (76.9)	6 (23.1)	23 (88.5)	3 (11.5)	-1.13	0.257
Planning	Q2	10 (38.5)	16 (61.5)	15 (57.7)	11 (42.3)	-1.29	0.197
	Q3	10 (38.5)	16 (61.5)	20 (76.9)	6 (23.1)	-2.67	0.008**
Assessment	Q4	9 (34.6)	17 (65.4)	24 (92.3)	2 (7.7)	-3.87	0.001***
	Q5	1 (3.8)	25 (96.2)	15 (57.7)	11 (42.3)	-3.74	0.001***
	Q6	18 (69.2)	8 (30.8)	25 (96.2)	1 (3.8)	-2.65	0.008**
Goal setting	Q7	20 (76.9)	6 (23.1)	26 (100)	0 (0)	-2.45	0.014*
	Q8	11 (42.3)	15 (57.7)	25 (96.2)	1 (3.8)	-3.74	0.001***
	Q9	10 (38.5)	16 (61.5)	25 (96.2)	1 (3.8)	-3.87	0.001***
Self-management and Telerehabilitation	Q10	11 (42.3)	15 (57.7)	25 (96.2)	1 (3.8)	-3.74	0.001***
	Q11	15 (57.7)	11 (42.3)	23 (88.5)	3 (11.5)	-2.31	0.021*
	Q12	8 (30.8)	18 (69.2)	20 (76.9)	6 (23.1)	-3.21	0.001***
	Q13	10 (38.5)	16 (61.5)	22 (84.6)	4 (15.4)	-3.00	0.003**
	Q14	17 (65.4)	9 (34.6)	26 (100)	0 (0)	-3.00	0.003**
	Q15	21 (80.8)	5 (19.2)	26 (100)	0 (0)	-2.24	0.025*

2- Change in attitude.

Pre-training, using the IDEAL discharge planning form was common across participants, with 11 (42.3%) using this form to assess and prepare patients prior to discharge. However, 5 (19.2%) of the participants did not use any particular method, and 6 (23.1%) asked the patients or developed their own methods to assess patients' need prior to their discharge. For setting goals with patients, 10 (38.5%) had no particular method for setting goals, while 6 (23.1%) had developed their own methods. None of the participants used the G-AP at all. However, use of the GAS was common, with 10 participants (38.5%) indicating that they used this scale. Finally, to monitor goal achievement, nearly half of the participants ($n=11$; 42.3%) used outcome measures, while the same number indicated that they used their clinical

judgment and experiences (n=11; 42.3%). Three participants let the patient decide and one discussed goal achievement with a multidisciplinary team.

Post-training, 10 participants (38.5%) used the IDEAL discharge planning form, while 5 (15.4%) used other methods to prepare and assess patients' needs, such as setting goals with patients. In terms of setting goals with patients, the number of participants who used no particular methods fell from 10 (38.5%) to 2 (7.7%). The majority of participants reported using the GAS (n=9; 34.6%) or the G-AP (n=11; 42.3%). For monitoring the, the number of participants who used outcome measures increased to 12 (46.2%). The number who used only their experience and clinical judgment for goal-setting decreased from 11 (42.3%) to 5 (19.2%). Further, the number who discussed goals with the multidisciplinary team was reported to have increased to 4 (15.4%). Table 4 illustrates the differences between pre-and post-training findings in assessment practice and goal-setting.

Table 4: differences between pre-test and post-test in assessment practice.

Variable	Methods	Pre	Post
		n (%)	n (%)
Assessment methods of patients' needs prior to discharge to community	No Particular Method	5 (19.2)	1 (3.8)
	Ask Patients	6 (23.1)	5 (19.2)
	IDEAL discharge planning form	11 (42.3)	10 (38.5)
	Team has developed its own method	4 (15.4)	6 (23.1)
	other	0 (0.0)	4 (15.4)
Goal setting	No Particular Method	10 (38.5)	2 (7.7)
	Goal attainment scale	10 (38.5)	11 (42.3)
	G-AP	0 (0.0)	9 (34.6)
	Team has developed its own methods	6 (23.1)	4 (15.4)
	Others	0 (0.0)	0 (0.0)
Monitoring of goals	Using outcome measures	11 (42.3)	12 (46.2)
	In discussion with the MDT	1 (3.8)	4 (15.4)
	I use my experience and clinical judgment (individually decided by staff)	11 (42.3)	5 (19.2)
	Decided by patient	3 (11.5)	5 (19.2)

Attitudes towards education, goal-setting, outcome measures and telerehabilitation:

Although the change between pre-and post-training results was not significant, the STP had a positive impact on ratings for education and the use of stroke rehabilitation practices. Pre-training, patients' and carers' education was rated 'extremely important' by the majority of participants (n=20; 76.9%) which increased to 23 (88.5%) post-training. The majority (n=16; 61.5%) rated using outcome measures as 'extremely important' before training, and this number increased to 21 (80.8%) post-training. The importance of setting goals with patients was rated 'extremely important' by 14 participants (53.8%) before training and 22 (84.6%) after training. Telerehabilitation for stroke patients was another area where attitudes changed significantly, with 15 participants (57.7%) considering it extremely important pre-training, rising to 18 (69.2%) post-training ($p=0.02$). Table 7.4 shows the differences between pre-test and post-test attitude scores.

Further, considering demographics, the greatest attitude changes were seen in those who were in their internship period, younger participants (18–29 years), and those who had fewer than 5 years of experience. Table 4 shows the changes in attitude according to demographic variables (Supplementary file 5).

Table 5: differences between pre-test and post-test in attitude.

Variable	Rating	Pre	Post	Chi-Square	
		n (%)	n (%)	Test Value	P-value
Importance of patients' and carers' education	Moderate	1 (3.8)	0 (0.0)	0.53	0.768
	Very Important	5 (19.2)	3 (11.5)		
	Extremely Important	20 (76.9)	23 (88.5)		
Importance of using outcome	Moderate	1 (3.8)	1 (3.8)	2.76	0.599
	Very Important	9 (34.6)	4 (15.4)		

measures in stroke care	Extremely Important	16 (61.5)	21 (80.8)		
Importance of goal setting session with patients and family	Moderate	1 (3.8)	0 (0.0)	2.11	0.349
	Very Important	11 (42.3)	4 (15.4)		
	Extremely Important	14 (53.8)	22 (84.6)		
Importance of tele-rehabilitation for patients with stroke	Low	3 (11.5)	0 (0.0)	15.02	0.02
	Moderate	5 (19.2)	3 (11.5)		
	Very Important	3 (11.5)	5 (19.2)		
	Extremely Important	15 (57.7)	18 (69.2)		

3- Change in confidence.

Pre-training, confidence in providing patients with the necessary support prior to discharge scored the highest, as the mean confidence score was 8.58 out of 10 (SD 1.68). Confidence in providing carers with education and support during the rehabilitation process was the second highest item pre-training, with a mean score of 8.48 (SD 1.59), and demonstrated the lowest change post-training, at 9.19 (SD 0.095).

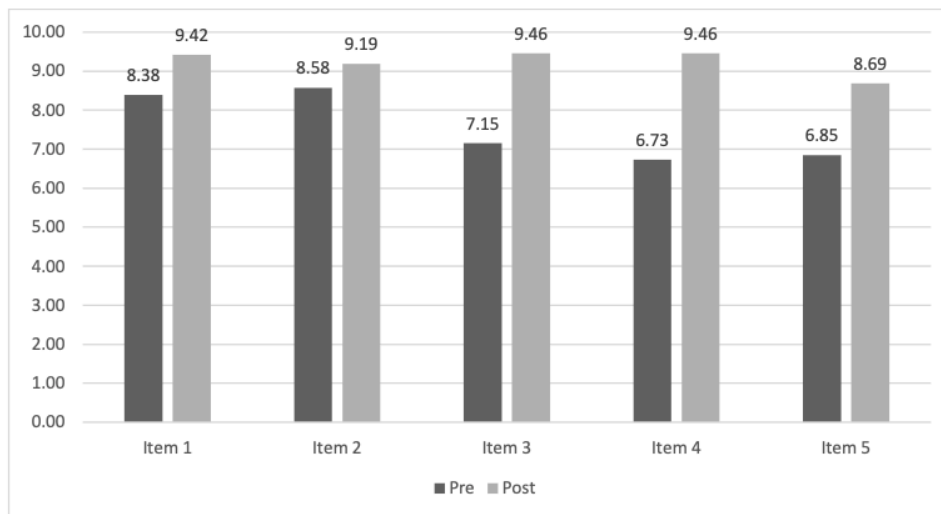
The mean confidence in using outcome measures was moderate, at 7.15 (SD 2.68). This level increased post-training to 9.46 (0.86) ($p=0.0001$). While participants' confidence in goal-setting was the lowest pre-training, goal-setting showed the greatest improvement post-training, rising from 6.73 (SD 2.24) to 9.46 (0.95) ($p=0.0001$). Further, the mean confidence level for providing effective telerehabilitation pre-training was 6.85 (SD 2.75). This level increased significantly to 8.69 (SD 2.02) ($p=0.0001$). Table 7.5 and Graph 7.2 show differences in items of confidence between the pre-test and post-test.

Additionally, participants holding masters' degrees showed higher confidence than other groups, with a mean of 83.44 (SD 32.95). Table 8 shows the change in confidence level based on the demographic variables (Supplementary file 5).

Table 6: Differences in items of confidence between the pre-test and post-test.

Category	Items	Pre	Post	Wilcoxon	
		Mean (SD)	Mean (SD)	Test Value	P-value
Carer education	I feel confident in providing carers the education and support they need to help in the rehabilitation process	8.38 (1.50)	9.42 (0.99)	-2.611	0.009
Transition	I feel confident in providing patients with stroke the necessary support prior to discharge	8.58 (1.68)	9.19 (1.27)	-1.669	0.095
Outcome measures	I feel confident in using outcome measures related to stroke care	7.15 (2.68)	9.46 (0.86)	-3.558	0.0001
Goal setting	I feel confident in using G-AP to set goals for patients with stroke	6.73 (2.24)	9.46 (0.95)	-3.88	0.0001
Telerehabilitation	I feel confident in providing effective rehabilitation virtually	6.85 (2.75)	8.69 (2.02)	-2.939	0.003

Figure 1: Differences in items of confidence between the pre-test and post-test. (Mean)



4- Usage and Satisfaction

The mean score for the appropriateness of the online format was 9.12 (SD 1.14), reflecting a high degree of appropriateness. The majority of participants (n=17; 65.4%) completed the STP in one sitting, while 9 (34.6%) needed multiple sessions. Among those who did not complete the programme in one sitting, 4 (44.5%) returned three times, 3 (33.3%) returned four times, and the rest returned either twice or five times. Furthermore, 21 (80.8%) of participants believed that the duration of the online training programme was about right, with a small proportion finding it too short (n=2; 7.7%). In terms of content quality, 24 (92.3%) of the participants found the training content to be informative and clear. Furthermore, 21 (80.8%) of respondents rated the content as adequate, 23 (88.5%) as appropriate, and 22 (84.6%) as both relevant and useful. The overall satisfaction with the training was very high for a majority of participants (n=18; 69.2%). Additionally, 25 (96.2%) of the participants felt that the training covered everything they needed, with just 1 (3.8%) indicating that something was missing. Table 7 summarises the usage and satisfaction findings.

Table 7: Satisfaction of the STP

Question	Category	n (%)
Complete the STP in ONE sitting	No	9 (34.6)
	Yes	17 (65.4)
The number of times they returned to the programme before completion	2 times	1 (11.1)
	3 times	4 (44.5)
	4 times	3 (33.3)
	5 times	1 (11.1)
Length of the STP	Too Much Short	1 (3.8)
	Short	2 (7.7)
	About right	21 (80.8)
	Long	2 (7.7)
Satisfaction of the information contained in the STP	Very Dissatisfied	1 (3.8)
	Satisfied	7 (26.9)
	Very Satisfied	18 (69.2)
	No	25 (96.2)

Aspects they wanted to add but not covered in the STP	Yes		1 (3.8)
Appropriateness of online format.	Rating		Mean (SD)
	Maximum	10	9.12 (1.143)
	Minimum	7	
Accessibility of additional information	Maximum	10	9.35 (0.892)
	Minimum	7	

4.3. Qualitative findings

Three themes were identified: (1) Feedback and experience, (2) Limitations in the STP, and (3) The applicability of the training. A summary of the themes is provided in Table 8.

Table 8: Summary of the themes.

Theme	Sub-themes	Definition
Feedback and experiences.	Overall experiences	This theme reflected participants' experiences with the training programme.
	Content feedback	
	Particular useful aspects	
Limitation of the STP.	Lack of practical content	This theme highlighted the programmes' limitations and included suggestions for improvement.
	Short duration of the training	
	Superficial explanations of specific topics	
	Online delivery	
Applicability of information.	Applicable content	This theme addresses how the information from the STP can be practically applied.
	Challenges to applicability	
	Maintain accessibility	

Theme 1: Feedback and experience.

Participants' experiences with the STP were positive. They found the training smooth, clear and simple to understand. Participant 16 stated, "*It was a programme with scientific value,*

presented in an easy and understandable way, supported by all the latest updates in the rehabilitation of stroke patients". Participant 24 added, *"I liked the explanation, ease of access to information, presentation, and the useful and new information"*. Participant 12 stated, *"I liked the explanation was in Arabic, as you know not all physiotherapists have good English language"*.

Participants indicated the usefulness of the content in providing them with relevant, detailed, and up-to-date information. Participant 1 said, *"The ease and clarity of the information, the programme had a lot of useful information, and honestly, much of it was new to me"*.

Additionally, participants highlighted that the programme was useful for new physiotherapists, since it provided fundamental knowledge required for their professional development, as illustrated in Participant 2's comment: *"Most of the provided information is recent and detailed enough to help any new physical therapist understand what a stroke is and how to treat it in detail"*.

The assessment section, outcome measures, and goal-setting were the most commonly reported useful parts of the stroke training programme. Participants highlighted that the programme offered them a recap of information such as the assessment procedures for stroke. Participant 13 stated, *"The assessment section provided a valuable recap of important information, which we need"*. Additionally, the programme provided them with new information such as the G-AP approach for setting goals, self-management strategies, and GRASP. Participant 7 stated, *"The sections on goal-setting and outcome measures were excellent and useful. There were many new parts, like the patient activation measure, which was also new to me"*. Participant 1 added, *"The self-management part was somewhat new and had excellent information"*. The outcome measures were among the most frequently

identified as useful information. Participant 13 said, *“Some of the outcome measures mentioned in the training were very useful”*.

Theme 2: Limitations

The STP had a few areas for improvement, as noted by the participants, including lack of practical content, short duration, superficial explanations of specific topics, and online delivery. One key point was the lack of practical components and clinical scenarios, which are essential for implementing theoretical information. Additionally, the programme was short, as stated by Participant 7: *“The programme was short and lacked practical aspects”*. Participant 12 stated, *“You could expand the information further so that it can be divided into two, three, or more lectures, in order to benefit us to a greater extent”*. Participant 4 added, *“The information may be more useful theoretically than practically”*.

Further, there was a need for in-depth explanations on topics such as outcome measures and telerehabilitation, which are essential for comprehensive patient care. Participant 13 said, *“If the outcome measures were deeper, not just a quick overview, it would be better, because that’s the part we need the most”*. Additionally, a few participants indicated that they preferred in-person workshops over online training in order to facilitate interactive learning and practical application. Participant 4 said, *“It could be adding practical parts, maybe a real workshop rather than online”*.

Theme 3: Applicability and Adaptation

Few participants noted that the training applicability was easy, and some participants had successfully utilised information acquired from the training such as the outcome measures. Participant 12 stated, *“It’s easy to implement the information, and with continuous practice, it*

could become easier". Participant 1 added, *"I used the Fugl-Meyer, and I used some outcome measures like the depression scale"*. However, many participants indicated that effective application of this information requires that physiotherapists need to have adequate time, good management, and collaboration across all departments. Participant 4 stated, *"Implementing these things requires time and good management, and we are under significant time pressure"*. He added, *"Having education sessions and goal-setting for every patient every two weeks is difficult because they require a lot of time"*. Several participants asked for the supplementary file that contained all checklists and references in the training. Additionally, a few participants suggested that the programme should remain available to them beyond the research period and should be widely disseminated to those who want to improve their knowledge of stroke care. Participant 16 said, *"I hope the programme remains available for those who wish to develop themselves in the future"*.

7.5.4. Integration of findings

Integration of the findings revealed the following:

Firstly, the STP's emphasis on the education of patients and carers may not be sufficient. Knowledge about the education of patients and carers improved but did not show a statistically significant increase. It seemed that physiotherapists had a high knowledge of how to educate their patients. Only one participant mentioned the patient education section as a useful part of the programme. Similarly, regarding transition and planning of post-discharge services, such as the use of the IDEAL planning form to make arrangements for care post-discharge, none of the participants mentioned planning post-discharge in the qualitative interviews.

Secondly, the training was sufficient to increase knowledge in assessment, goal-setting, and self-management and telerehabilitation. Quantitative data showed statistically significant findings in all of the above domains. The positive feedback from participants in the qualitative findings supported the quantitative findings. Additionally, most of the participants mentioned that much of the information provided in these sections was new to them. This could explain the statistically significant increase in knowledge in these domains. Table 9 provides quotes from participants to validate the quantitative findings.

Further, the increase in knowledge level was influenced by demographics, as female participants' knowledge level was significantly increased than that of male participants. It also seems that males demonstrated many more barriers to implementation of the STP than females. Additionally, males were reluctant to participate in the training, as most participants in the study were females (17). Further, the female participants who had been practising for 6 to 10 years demonstrated significant knowledge acquisition, as indicated by their positive feedback on the given information, such as the outcome measures and assessment forms, which they found highly valuable for improving their skills and patient care.

The findings regarding attitude showed a positive change. This change in attitude was supported by the fact that participants had utilised some of the knowledge gained from the programme, such as the use of outcome measures, as demonstrated in Table 9. Similarly, there was a statistically significant change in the confidence level post-training. The qualitative findings highlighted that many participants felt that the training offered them comprehensive and up-to-date information, which reflects the positive impact of the training on their confidence in providing stroke care.

Additionally, the appropriateness of the online format was scored high, with a mean score of 9.12 out of 10 (SD 1.14). However, a few participants suggested that in-person workshops would be beneficial. In terms of overall satisfaction, 26.9% of respondents were satisfied, while 69.2% were extremely satisfied with the programme. Additionally, 80% of participants believed that the length of the training was about right in the post-training questionnaire. However, participants' feedback contradicted this, as the shortness of the programme was one of the common comments by participants as a limitation of the training. Table 9 summarises the integration of

Table 9: Integration of quantitative and qualitative findings.

Description of findings	Quantitative data	Qualitative data
Increase in knowledge (Assessment)	Knowledge of stroke assessment improved significantly in all items.	Participant 13 stated, " <i>The assessment section provided a valuable recap of important information, which we need</i> ". Participant 13 said, " <i>Some of the outcome measures mentioned in the training were very useful</i> ".
Increase in knowledge (Goal-setting)	Knowledge of the goal-setting approaches improved significantly in all items.	Participant 7 stated, " <i>The sections on goal-setting and outcome measures were excellent and useful. There were many new parts, like the patient activation measure</i> ".
Increase in knowledge (Self-management and telerehabilitation).	Knowledge of self-management and telerehabilitation improved significantly in all items.	Participant 1 stated, " <i>The self-management part was somewhat new and had excellent information</i> ".
Increase in knowledge (females demonstrated higher level)	Female participants' knowledge level was significantly increased than that of male participants ($p=0.045$), and females showed a higher participation rate in the	Male participants expressed barriers to implementation: Participant 4 stated, " <i>but as I said, not all of it is applicable, especially in SA. Applying some of these things is difficult, like goal-setting ... it is not that easy; all patients have one goal, which is to return to normal</i> ".

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	training (17 female and 9 male participants).	Participant 4 stated: " <i>Implementing these things requires time and good management, and we are under significant time pressure</i> ". He added, " <i>Having education sessions and goal-setting for every patient every two weeks is difficult because they require a lot of time</i> ".
Increase in knowledge (females demonstrated a higher level)	Female participants who had been practising for 6 to 10 years demonstrated significantly greater knowledge acquisition than other groups ($p=0.008$).	Participant 8, a female who had been practising physiotherapy for 6–10 years, stated, " <i>The outcome measures form was excellent, the online video resources were also new and helpful, the assessment forms were straightforward to use</i> ". Participant 7 stated, " <i>The programme had very advanced information, especially knowing a set of outcome measures; I will use it in monitoring neuro cases in the future</i> ". Participant 8 said, " <i>The programme was excellent and provided valuable information about stroke rehabilitation. The programme can have a good impact on improving specialists' skills and knowledge, which positively affects patient care</i> ".
Change in attitude	Ratings for the importance of education, using outcome measures, setting goals and telerehabilitation all increased post-training.	Participant 1 stated, " <i>I used the Fugl-Meyer, and I used some outcome measures like the depression scale</i> ". Participant 11 stated, " <i>I used the outcome measures and the assessment tools</i> ".

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Change in confidence	There was a significant increase in all items except for providing necessary support to stroke patients prior to discharge.	Participant 2 said, " <i>Most of the provided information is recent and detailed enough to help any new physical therapist understand what a stroke is and how to treat it in detail</i> ". Participant 24, who was in his internship, said, " <i>It was helpful, and I learned new things that help me assist patients with strokes</i> ".
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5. Discussion

This study aimed to assess an online training programme designed to improve physiotherapists' provision of ongoing care after the discharge of stroke patients. The results found significant changes post-training in physiotherapists' knowledge and confidence, while the results for the attitude towards rating the importance of providing education, using stroke outcome measures and setting goals were not significant, but showed positive impact. Participants provided positive feedback regarding the training, with some limitations in implementing the information.

Physiotherapists' knowledge was assessed in previous studies in SA, but only in relation to evidence-based practice [7] and telerehabilitation [39]. The studies found insufficient knowledge among physiotherapists. Given the limited training for physiotherapists in SA [40, 41, 42], it was essential to address the gap in their knowledge to enable them to deliver long-term care for patients with stroke. The quantitative findings between the pre-and post-training questionnaires demonstrated a statistically significant increase in knowledge about stroke assessment, goal-setting, self-management and telerehabilitation, but no significant difference in patient education or discharge planning. The study results are consistent with previous studies that provided training to therapists via online platforms and demonstrated an increase in knowledge [16, 20, 22]. Although the findings of these studies are not directly comparable due to differences in the assessment methods and actual contents, they demonstrated an increase in the physiotherapists' knowledge and confidence by delivering training through online methods.

The majority of the physiotherapists who participated in this study had no previous formal training in stroke rehabilitation. Therefore, it was expected that their knowledge test scores would improve after completing the training, particularly in areas such as self-management

and goal-setting, where the information presented might have been novel to them. This was supported by the qualitative interviews, in which many participants expressed that much of the information presented in these sections was new to them. Additionally, any training programme provided to health professionals is likely to enhance their knowledge and skills by introducing new information [43]. Further, the significant increase in the knowledge scores could be due to the Hawthorne effect, where individuals perform better when they are under observation or are part of a study [44].

On the other hand, the physiotherapists' knowledge levels about providing stroke education to patients was found to be high pre-training. This finding is relevant to a recent study by [45]. The study explored physiotherapists' awareness of stroke prevention, and its findings demonstrated that physiotherapists had good levels of knowledge about stroke prevention and management. This suggests that the curriculum in SA may be effective in delivering such information. Nonetheless, gaps were identified, suggesting that therapists should be provided with continuous training and education [45]. Additionally, education of patients with stroke should not only be about prevention and risk factors. Delivering education on how patients can take care of themselves and do home exercises could be more important in the community. This was supported by [46] study, which revealed very low levels of satisfaction among patients regarding the education they had received, with most ratings ranging between 19.3% and 50%, which highlights a significant need for improvement in patient education.

Further, the standardisation of practice in delivering patient education is still lacking [30].

This inconsistency in delivering educational content can lead to different outcomes.

Variations in curricula and degree programmes across countries [47] along with differences in education levels [7] and the country of education [48] contribute to diverse practices among

physiotherapists. To minimise variation in the treatment of stroke patients across different regions in SA, it is essential to first establish comprehensive guidelines [49]. Following this, providing targeted training for physiotherapists will be crucial. This approach will bridge the gap between theoretical knowledge and practical application, ultimately enhancing patient outcomes [50].

Furthermore, physiotherapists may not have primary responsibility for planning patients' care post-discharge, given the multidisciplinary nature of stroke care. Nurses are frequently responsible for planning and coordination activities [51]. However, the programme emphasised post-discharge planning to ensure that patients are thoroughly assessed against their physiotherapy rehabilitation needs prior to discharge. This included scheduling appointments for outpatient clinics and developing a comprehensive rehabilitation plan to manage the transition period between inpatient care and outpatient follow-up. Furthermore, it is possible that the STP did not provide sufficient depth and practical applications in key areas such as the education module and post-discharge planning, which may impact the findings.

The assessment of clinical skills and the practical implementation of knowledge in this study was limited because the primary goal was to evaluate changes in knowledge, confidence, and attitudes. Previous studies have similarly focused more on user satisfaction and knowledge acquisition rather than on the clinical application of the information [20, 52]. In this study, few participants believed that implementation needs more collaboration across departments and adequate time. The issue here could be that once individuals become used to a specific system, they tend to adhere to it, as changing usual practice requires time and

various strategies [53]. Other common barriers to implementing stroke guidelines include difficulty accepting new treatment approaches and a lack of motivation to change [54]. Hurley *et al.* [22] assessed implementation of training. However, they indicated a low implementation rate and recommended a local peer mentor to facilitate the implementation. Multiple studies have emphasised the importance of organisations in the implementation of interventions [55, 56]. Organisations need to facilitate implementation by monitoring physiotherapists, auditing, and feedback [57]. Additionally, in order to ensure successful implementation, it is essential that the intervention is in line with the organisation's missions and resources [58]. Thus, future research should focus on developing strategies to enhance the translation of knowledge from training into practice

Additionally, the study lacked practical aspects, which may have an influence on translating knowledge into practice. Providing physiotherapists with knowledge is effective but not sufficient to facilitate the implementation of this knowledge. Utilising practical strategies such as role-playing to facilitate behaviour change has been shown to be effective in other settings [59]. However, this training consisted of multiple resources such as video clips, tutorials and supplementary files, which have been found to be effective in improving therapists' practical skills [60].

The overall satisfaction, low attrition (three participants), and positive feedback could indicate that the STP was feasible and acceptable. Satisfaction is crucial to assess the feasibility of the training, as the participants are unlikely to finish the training if they find it challenging, unhelpful or impractical [16]. Additionally, engagement was another factor used to assess the success of the STP in previous studies [22]. Engagement was demonstrated by the fact that 65.4% of respondents completed the training in one setting. These findings were

in line with previous studies which described a high satisfaction rate with online training [16, 22]. However, in order to enhance the completion rate, Bennett-Levy *et al.* [52] compared two modes of online training: one was independent and the other had fifteen minutes of support for therapists. They found that the supported online training mode had a higher completion rate [52]. Further, a personalised message weekly was found to be effective in improving the response rate [61]. Thus, the researcher aimed to send one message per week, but the participants' time constraint was the main reason for not completing the training.

Further, a few adaptations were recommended, although the programme received high overall satisfaction from physiotherapists. There were a few suggestions for conducting in-person workshops instead of online training. Online training was found to be no different from the in-person workshop method [62]. However, in-person training can be interactive and particularly valuable for acquiring practical skills [63]. It was evident that the online platform was effective in enhancing knowledge acquisition, but other aspects such as acquiring hands-on practical skills need in-person approaches [64]. Thus, a blended approach or a combination of both approaches could be more effective. Further, a few participants suggested that the duration of the training is short. However, other training programmes for therapists of two hours [65] and three hours [66, 16] were found to be effective in enhancing knowledge and skills post-training. In addition, the training aimed to deliver fundamental and basic brief online information on delivering effective care for patients with stroke. Finally, the participants were under 40 years old, and the majority (22 participants) had fewer than 10 years of experience. This could be due to the fact that physiotherapy educational programs are relatively new in SA. Further, younger individuals may be more familiar with online training methods than older individuals.

7.6 Study limitations

The findings from this study have to be interpreted with caution due to several limitations. Firstly, the absence of a control group and randomisation reduce the accuracy of measuring the effectiveness of the current training programme. These two elements are critical for ensuring that the changes in participants' knowledge, attitudes and confidence are truly due to the STP rather than any other external factors. The utilisation of control and comparison groups is primarily intended to prevent unwarranted interpretations (internal validity) [67]. Individuals who participated in the study might be more motivated to enhance their knowledge and skills in comparison to those who did not volunteer. This bias could influence the findings, making the programme appear more effective. Further, the study findings might have been affected by the Hawthorne effect. However, participants were not aware of the study hypothesis. In addition, triangulation of positive feedback and a very high satisfaction rate provide evidence to support the effectiveness of the programme. Additionally, the period between the pre- and post-training questionnaires was short. This limited time-frame might have affected the participants' ability to fully process and integrate the information given in the STP, which might have led to less accurate or incomplete responses in the post-training questionnaire. The short duration of the STP may have reduced the depth of information that was presented. Further, the training lacked practical elements, which was another limitation of this study. Despite the fact that the online format provided ease and accessibility for physiotherapists, it did not give the value of in-person conversations that are generally present in traditional physical workshops. Finally, the sample in the study was restricted to a single city, limiting the generalisability and applicability of the findings to wider contexts. Thus, the above elements, such as the use of a control group and extended training duration and follow-ups, may be incorporated to improve future training programmes.

7. Implications for practice

The training provided physiotherapists who participated in this study with sufficient knowledge of stroke care. Thus, the training has the potential to directly enhance their performance in clinical settings. Further, the training can act as foundational steps towards more extensive training in the future, allowing continued education of physiotherapists in SA. The training can be used to inform the curriculum of stroke education. Finally, the training can promote the standardisation of practices in various physiotherapy settings by establishing a consistent knowledge base.

8. Conclusion

The training was sufficient and acceptable to improve participants' knowledge and confidence to deliver long-term care for patients with stroke. However, strategies for performance monitoring must be implemented to facilitate effective implementation and behavioural change. Additionally, continuous training is essential to ensure that physiotherapists remain informed about the latest developments in their field. Further, providing practical training could be valuable for bridging the gap between theory and practice.

Appendix 5: PROSPERO registration

Citation

Basema Temehy, Sheeba Rosewilliam, Andrew Soundy. Exploring stroke patients' needs after discharge from rehabilitation centres: meta-ethnography. PROSPERO 2021 CRD42021256405 Available from: https://www.crd.york.ac.uk/prospERO/display_record.php?ID=CRD42021256405

Review question

What are the needs of stroke survivors after their discharge from hospital settings?

Searches

A comprehensive literature search will be conducted in three stages: firstly, a scoping search will be conducted in Google Scholar for the first 10 pages and www.ScienceDirect.com. This will be used to refine the area of focus.

Once the main focus is established the main searches will be conducted in the following online databases: MEDLINE, CINAHL, AMED, PsycINFO, the Cochrane Library, and PubMed. All bibliographies and reference lists for all retrieved articles will be manually searched for potential additional studies.

Grey literature including conference proceedings and PhD dissertations will be sought for this review. Electronic search engines Google Scholar and www.sciencedirect.com will be considered for the first 20 pages against main search terms. The social profile of the authors of articles of included studies will be searched on ResearchGate and Academia.edu.

The PICOS strategy will be used to identify the keywords of this review,

Synonyms and alternative spellings of the keywords will be also taken into consideration.

The search will be restricted to English articles, related to humans and must include abstracts but the publishing dates will not be limited.

Subject headings (e.g. MeSH) and Boolean terms 'OR' and 'AND' will be used to maintain the sensitivity of the search strategy process.

The searches will be screened by second reviewer and the results will be discussed.

Additional search strategy information can be found in the attached PDF document (link provided below).

Types of study to be included

Types of study to be included:

Qualitative studies that reported needs of stroke patients after discharge from rehabilitation services. Mixed methods studies if it is possible to extract the qualitative data separately.

Studies that evaluated needs as reported directly by stroke survivors.

Studies that evaluated stroke survivors needs after discharge in the subacute or chronic phase.

Studies that investigated needs of stroke patients and involved mixed participants of stroke survivors, carers and professionals will be included.

Studies that involve mixed participants of neurological condition needs (traumatic brain injury and stroke) will be included if it is possible to extract the data separately.

Studies that were conducted within multiple settings (received rehabilitation within a hospital setting, nursing homes, or community setting).

Qualitative multiple case studies.

Published in English.

Type of study to be excluded:

Evaluated stroke survivors needs before their discharge from hospital.

Evaluated patient satisfaction not patients perceived needs.

Studies which evaluated needs of stroke survivors' carers only.

Quantitative and mixed methods studies where qualitative data cannot be separated.

Condition or domain being studied

Stroke.

Participants/population

Adults who have experienced a stroke, ischaemic stroke or haemorrhagic stroke, were discharged from hospitals and completed their rehabilitation sessions either in a rehabilitation setting or in a community setting.

Intervention(s), exposure(s)

The review will explore the needs of stroke survivors reported directly by them after they are discharged from the hospital.

Comparator(s)/control

Not applicable.

Main outcome(s)

This study will explore the needs of stroke survivors after discharge from specialist stroke services. Outcomes will be related to their views, experience and preferences on physical, psychological, social, rehabilitation needs and any other identified needs.

Measures of effect

Words, phrases and sentences used by participants or authors.

Additional outcome(s)

None.

Data extraction (selection and coding)

Study selection:

Two independent reviewers will undertake the search processes.

- The eligible studies will be transferred to EndNote to be saved.
- Title and abstracts identified by searching databases will be screened to be assessed for eligibility.
- Duplicates will be removed.
- If there is any doubt regarding a study title or abstract, full text will be read.
- Once abstracts are shortlisted full text articles will be collected and the papers will be screened based on the inclusion and exclusion criteria.

- The screening process for titles, abstracts and articles will be done by two independent reviewers and the results will be compared. If there is any disagreement, it will be resolved by a third reviewer.

PRISMA flow-diagram will be used to guide the search and screening processes

Data extraction:

The data will be extracted from main articles will include information about study author name, year of publication, aim, country, sample characteristics (sample size, age, gender and time since discharge), setting, study design, outcomes, and measurements.

Studies will be read in order to extract key themes and metaphors

Information about patients' needs including physical, social, psychological, financial, rehabilitation or other types of needs will be extracted.

Tables in Microsoft word will be used in order to document extracted information.

To ensure it is able to extract the relevant data appropriately, data extraction tables will be piloted on two or three papers and will be compared to the second reviewer's tables.

To ensure accuracy of recorded data. Two reviewers will independently extract the data and any disagreement will be solved by third reviewer.

If there is missing or unclear information in the main article, the first author will be contacted.

Risk of bias (quality) assessment

A critical appraisal assessment may vary depending on the paradigmatic position taken by the author. This will mean either: (a) appraisal is undertaken with an appraisal tool (Joanna Briggs Institute critical appraisal checklists for qualitative studies <https://joannabriggs.org/critical-appraisal-tools>) combined with a GRADE-CERQual to provide a strength of evidence OR an appraisal that focuses more on a constructivist view point and the importance of conceptual development.

Two reviewers will assess the quality of each study independently and third reviewer will be involved if agreement cannot be reached.

Strategy for data synthesis

Data synthesis in the form of meta-ethnography synthesis will be used (Noblit and Hare, 1988).

Meta-ethnography synthesis will include the following steps:

- Stage 1: Getting started;
- Stage 2: Deciding what is relevant to the initial interest;
- Stage 3: Reading the studies;
- Stage 4: Determining how the studies are related;
- Stage 5: Translating studies into one another;
- Stage 6: Synthesising translations;
- Stage 7: Expressing the synthesis.

Studies will be read and reread repeatedly in chronological order.

Authors will make note of participants' views, interpretations and accounts on their needs after discharge from specialist services (first order construct), and authors interpretation of these concepts (second order constructs).

It will be determined how studies are related by comparing aspects of primary studies including study aim, design, setting, and primary studies' participants characteristics such as gender, age, socioeconomic status, ethnicity and time since stroke onset.

The relationship between studies will be determined by thematically organising the studies and within first order constructs, and then will be translated to each other to achieve second order constructs.

Determining the relationships within second order constructs will be used to develop line of argument or third order constructs.

Translation of the findings will be in two possible ways (a) reciprocal; where the findings overlaps or (b) refutational; where the findings conflicts.

Tabulations and grids will be used at all these stages.

An audit trail of the analysis will be used to show the progress of analysis.

Two senior reviewers will review the results of the data synthesis.

Analysis of subgroups or subsets

None planned.

Contact details for further information

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Organisational affiliation of the review

University of Birmingham

Review team members and their organisational affiliations

Miss Basema Temehy. University of Birmingham
Dr Sheeba Rosewilliam. University of Birmingham
Dr Andrew Soundy. University of Birmingham

Type and method of review

Epidemiologic, Systematic review, Other

Anticipated or actual start date

01 June 2021

Anticipated completion date

31 December 2021

Funding sources/sponsors

Jazan University

Conflicts of interest

Language

English

Country

England

Stage of review

Review Ongoing

Subject index terms status

Subject indexing assigned by CRD

Subject index terms

Adult; Anthropology, Cultural; Health Services Needs and Demand; Humans; Patient Discharge; Rehabilitation; Stroke; Stroke Rehabilitation

Date of registration in PROSPERO

24 May 2021

Date of first submission

21 May 2021

Stage of review at time of this submission

The review has not started

Stage	Started	Completed
Preliminary searches	No	No
Piloting of the study selection process	No	No
Formal screening of search results against eligibility criteria	No	No
Data extraction	No	No
Risk of bias (quality) assessment	No	No
Data analysis	No	No

The record owner confirms that the information they have supplied for this submission is accurate and complete and they understand that deliberate provision of inaccurate information or omission of data may be construed as scientific misconduct.

The record owner confirms that they will update the status of the review when it is completed and will add publication details in due course.

Versions

24 May 2021

Appendix 6: Ethical approval for stage 2

Approval Letter

Date	21/09/2021
Principal Investigator	Basema Fathi E Temehy
Protocol Title	Exploring the needs of stroke patients after discharge from rehabilitation centres in Saudi Arabian Communities: an IPA qualitative exploratory study design
Approval Number	No. 2167

Dear Basema Fathi E Temehy:

The Jazan Health Ethics Committee is pleased to inform you that the above-mentioned study has been reviewed and approved.

Approval Conditions

- This approval is valid for one year, starting from the date of this letter.
- Should any amendments need to be made to the study, the principal investigator is required to request prior approval from the Jazan Health Ethics Committee.
- This letter provides you with ethical clearance to implement your study; however, you still need to obtain administrative approval from the site/s where the study will be conducted.
- If the research will not be completed in time, the principal investigator can request an extension letter from the Jazan Health Ethics Committee one month before the expiry of the approval.
- Documents related to the study should be kept by the principal investigator for five years after the completion of the study.
- The principal investigator is required to submit a progress report to the Jazan Health Ethics Committee every six months.
- At the end of the study, principal investigator is required to submit a final study report, including the manuscript intended for publication, both to the Jazan Health Ethics Committee and the database at www.marifah.gov.sa.

The Jazan Health Ethics Committee thanks you for submitting your study for review and wishes you all the best.

Sincerely,
Dr. Mohammed Badedi



Chairman of Jazan Health Ethics Committee,
Ministry of Health, Saudi Arabia



IRB Registration Number with KACST, KSA: [REDACTED]
IRB Registration Number with OHRP/NIH, USA: [REDACTED]
Approval Number Federal Wide Assurance NIH, USA: [REDACTED]

August 10, 2021

Department: External - University of Birmingham
Category of Approval: EXEMPT

Dear Ms. Basema Temehy,

I am pleased to inform you that your submission dated July 12, 2021 for the study titled '**Exploring the needs of stroke patients after discharge from Rehabilitation Centres in Saudi Arabian Communities: an IPA qualitative exploratory study design**' was reviewed and was approved according to ICH GCP guidelines. Please note that this approval is from the research ethics perspective only. You will still need to get permission from the head of department or unit in KFMC or an external institution to commence data collection.

We wish you well as you proceed with the study and request you to keep the IRB informed of the progress on a regular basis, using the IRB log number shown above.

Please be advised that IRB for administrative purposes requires that you submit a progress report on your research every 6 months. You are required to submit any manuscript resulting from this research for approval by IRB before submission to journals for publication.

As a researcher you are required to have current and valid certification on protection human research subjects that can be obtained by taking a short online course at the US NIH site or the Saudi NCBE site followed by a multiple choice test. Please submit your current and valid certificate for our records. Failure to submit this certificate shall a reason for suspension of your research project.

Sincerely yours,



Dr. Hussam Sakkijha, FCCP, FACP, Diplomat, ABSIM
Chairman, Institutional Review Board--IRB
Consultant, Critical Care, Pulmonary & Sleep Medicine
Adult ICU Department, Critical Care Services Administration
King Fahad Medical City

[REDACTED] Kingdom of Saudi Arabia

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المملكة العربية السعودية - الرياض
مدينة الملك فهد الطبية
كلية الطب
لدور السابع
هاتف: 0112889999

RE: Ethics application and documents for study ref ERN_20-1836



Sheeba Rosewilliam (Physiotherapy) [redacted]

Tuesday, 19 C

To: Susan Cottam (Research Support Services); [+1 more](#)

Dear **Sue**

Thank you for your communication and guidance with this application.

Warm regards

Sheeba

From: Susan Cottam (Research Support Services) [redacted]

Sent: 19 October 2021 12:57

To: Sheeba Rosewilliam (Physiotherapy) <[redacted]>

Cc: Basema Temehy (PhD Spo Ex+Reha Sci Soc Sci FT) <[redacted]>

Subject: RE: Ethics application and documents for study ref ERN_20-1836

Dear Sheeba

Thanks for this, the Chair is now happy with the arrangements you have in place.

Best wishes

Sue

From: Sheeba Rosewilliam (Physiotherapy) [redacted]

Sent: 12 October 2021 07:34

To: Susan Cottam (Research Support Services) [redacted]

Cc: Basema Temehy (PhD Spo Ex+Reha Sci Soc Sci FT) [redacted]

Subject: Re: Ethics application and documents for study ref ERN_20-1836

Appendix 7: Ethical approval stage 3



UNIVERSITY OF
BIRMINGHAM

Dear Sheeba Rosewilliam, Andrew Soundy and Basema Temehy,

RE: Designing training program to improve long term care for patients with stroke in Saudi Arabia.

External ethics approval: ERN_Project Id-Submission MonthSubmission Year

Thank you for providing details of the external ethics approval in place for the above project. The Science, Technology, Engineering and Mathematics Committee has considered this and has agreed to accept it in lieu of further ethics review at the University of Birmingham.

Any adverse events occurring during the study should be promptly brought to the Committee's attention by the Principal Investigator and may necessitate further ethical review.

Please ensure that the relevant requirements within the University's Code of Practice for Research and the information and guidance provided on the University's ethics webpages (available at <https://intranet.birmingham.ac.uk/finance/accounting/Research-Support-Group/Research-Ethics/Links-and-Resources.aspx>) are adhered to.

Please be aware that whilst Health and Safety (H&S) issues may be considered during the ethical review process, you are still required to follow the University's guidance on H&S and to ensure that H&S risk assessments have been carried out as appropriate. For further information about this, please contact your School H&S representative or the University's H&S Unit at healthandsafety@contacts.bham.ac.uk.

Kind regards,

The Co-Chairs of the Science, Technology, Engineering and Mathematics Committee

E-mail: ethics-queries@contacts.bham.ac.uk

Approval Letter

Date	31/08/2023
Principal Investigator	Basema Temehy.
Protocol Title	Designing training program to improve long term care for patients with stroke in Saudi Arabia.
Approval Number	No. 2377
Study Settings	King Fahad Central Hospital, Prince Mohd bin Naser Hospital, Sabya General Hospital, Samtah General Hospital, Jazan General Hospital, Abu Arish General Hospital, and Hurath General Hospital .

Dear Dr. Basema Temehy:

The Jazan Health Ethics Committee is pleased to inform you that the above-mentioned study has been reviewed and approved.

Approval Conditions

- This approval is valid for one year, starting from the date of this letter.
- Should any amendments need to be made to the study, the principal investigator is required to request prior approval from the Jazan Health Ethics Committee.
- This letter provides you with ethical clearance to implement your study; however, you still need to obtain administrative approval from the site/s where the study will be conducted.
- If the research will not be completed in time, the principal investigator can request an extension letter from the Jazan Health Ethics Committee one month before the expiry of the approval.
- Documents related to the study should be kept by the principal investigator for five years after the completion of the study.
- The principal investigator is required to submit a progress report to the Jazan Health Ethics Committee every six months.
- At the end of the study, principal investigator is required to submit a final study report, including the manuscript intended for publication, both to the Jazan Health Ethics Committee and the database at www.marifah.gov.sa.

The Jazan Health Ethics Committee thanks you for submitting your study for review and wishes you all the best.

Sincerely,

Dr. Mohammed Badedi

Chairman of Jazan Health Ethics Committee,
Ministry of Health, Saudi Arabia



Appendix 8: Ethical approval stage 4



UNIVERSITY OF
BIRMINGHAM

Dear Sheeba Rosewilliam, Andrew Soundy and Basema Temehy,

RE: Implementing and evaluating a training program for physiotherapists to improve skills to deliver long term care for patients with stroke in Saudi Arabia.

External ethics approval: ERN_2179-Feb2024

Thank you for providing details of the external ethics approval in place for the above project. The Science, Technology, Engineering and Mathematics Committee has considered this and has agreed to accept it in lieu of further ethics review at the University of Birmingham.

Any adverse events occurring during the study should be promptly brought to the Committee's attention by the Principal Investigator and may necessitate further ethical review.

Please ensure that the relevant requirements within the University's Code of Practice for Research and the information and guidance provided on the University's ethics webpages (available at <https://intranet.birmingham.ac.uk/finance/accounting/Research-Support-Group/Research-Ethics/Links-and-Resources.aspx>) are adhered to.

Please be aware that whilst Health and Safety (H&S) issues may be considered during the ethical review process, you are still required to follow the University's guidance on H&S and to ensure that H&S risk assessments have been carried out as appropriate. For further information about this, please contact your School H&S representative or the University's H&S Unit at healthandsafety@contacts.bham.ac.uk.

Kind regards,

The Co-Chairs of the Science, Technology, Engineering and Mathematics Committee

E-mail: ethics-queries@contacts.bham.ac.uk

Approval Letter

Date	31/01/2024
Principal Investigator	Basema Temehy
Protocol Title	Implementing and evaluating a training program for physiotherapists to improve skills to deliver long term care for patients with stroke in Saudi Arabia.
Approval Number	No. 2416
Study Settings	King Fahad Central Hospital, Sabia General Hospital, Rehabilitation Center , Jazan university Hospital.

Dear Dr. Basema Temehy:

The Jazan Health Ethics Committee is pleased to inform you that the above-mentioned study has been reviewed and approved.

Approval Conditions

- This approval is valid for one year, starting from the date of this letter.
- Should any amendments need to be made to the study, the principal investigator is required to request prior approval from the Jazan Health Ethics Committee.
- This letter provides you with ethical clearance to implement your study; however, you still need to obtain administrative approval from the site/s where the study will be conducted.
- If the research will not be completed in time, the principal investigator can request an extension letter from the Jazan Health Ethics Committee one month before the expiry of the approval.
- Documents related to the study should be kept by the principal investigator for five years after the completion of the study.
- The principal investigator is required to submit a progress report to the Jazan Health Ethics Committee every six months.
- At the end of the study, principal investigator is required to submit a final study report, including the manuscript intended for publication, both to the Jazan Health Ethics Committee and the database at www.marifah.gov.sa.

The Jazan Health Ethics Committee thanks you for submitting your study for review and wishes you all the best.

Sincerely,
Dr. Mohammed Badedi

Chairman of Jazan Health Ethics Committee,
Ministry of Health, Saudi Arabia.



Appendix 9: JBI blank copy

<https://jbi-global-wiki.refined.site/space/MANUAL/355599504/Downloadable+PDF+-+current+version?attachment=%2Fdownload%2Fattachments%2F355599504%2FJBI%20Manual%20for%20Evidence%20Synthesis%20Nov%202024.pdf&type=application%2Fpdf&file name=JBI%20Manual%20for%20Evidence%20Synthesis%20Nov%202024.pdf>

JBI QARI Data Extraction Tool for Qualitative Research

Reviewer _____ Date _____

Author _____ Year _____

Journal _____ Record Number _____

Study Description

Methodology|

Method

Phenomena of interest

Setting

Geographical

Cultural

Participants

Data analysis

Authors conclusions

Comments

Complete

Yes

No

Findings	Illustration form Publication (page number)	Evidence		
		Unequivocal	Credible	Unsupported

Extraction of findings complete

Yes

No

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Appendix 10: example of analysis

Author	First order interpretations (what quotes are used to show what participants say) Second order interpretations (what the authors of articles say).	Codes	Clusters	Themes
Chen et al. 2015	<p>Readiness to return home</p> <p>First-time stroke survivors demonstrated low health literacy in stroke and prevention of stroke recurrence. Their needs to learn more about stroke and rehabilitation programmes were usually ignored in busy clinical settings before discharge from the hospital. Participants perceived that staff members were too busy to explain more detailed information to them and inflexible in caregiver training due to time constraint:</p> <p><i>They never tell me much about the disease. . . I had very bad experience having a stroke. . . and I said 'Please tell me what I had'. He [the doctor] said, 'Oh I will look into your file'. . . he came back and said, 'Oh you had a LACI'. I said, 'Now what's it short for?', but got no explanation. . . No rehabilitation services information. You got to look up in the phone book and ring them (Adrian, SP8).</i></p> <p><i>I also felt pressured as I was told they had to teach ADL, showering, toileting. . . I had to go in 7 o'clock in the morning. . . I couldn't because I was working then. . . it was very traumatic for me. . . (Eileen, CP6).</i></p> <p>The caregivers also said that they were not involved in discharge education for stroke survivors with cognitive</p>	<p>The need for information on stroke and recovery programs</p> <p>Providers time restriction</p> <p>Amount of information given</p> <p>The need for rehabilitation programs</p>	<p>Needs for info on stroke</p> <p>Factors that influence care experience: accounting for tailoring information need</p> <p>Adequate information delivery</p> <p>Needs for info on rehabilitation program</p>	<p>Limited availability and suitability of information</p> <p>Care experience</p> <p>Limited availability and suitability of information</p> <p>Limited availability and suitability of information</p>

<p>impairment that required a long-term and considerable effort in rehabilitation and adjustment in their daily activities:</p> <p><i>The only thing I wasn't prepared for was the strategies to manage cognitive changes from the clinical neurologist cos [because] I had not spoken to her until Bill was walking out of the ward (Jane, CP4).</i></p> <p>Moreover, challenges to manage stroke associated cognitive impairment were compounded by other comorbidities that required caregivers to carefully monitor the effect and side effects of treatment:</p> <p><i>She [the stroke survivor with cognitive impairment] had no understanding, no insight that she was meant to be on this one [antiplatelet]. . .It certainly has not been explained of medication in the discharge. . .The hospital staff said ' . .we gave you one medication list on discharge' (Jack, CP9).</i></p> <p>Participants were not aware of side effects of medications that may cause adverse events and contribute to unexpected hospital readmission:</p> <p><i>The only thing I thought I was a little bit concerned was that he hasn't had a proper drug review. . .The Baclofen was, probably I wasn't aware that it could've been blocking progress. . . (Rebecca, CP11).</i></p> <p>The participants perceived that knowledge and skills enabling them to maintain activities of daily living, manage ongoing</p>	<p>The need for cognitive support</p> <p>Delayed cognitive education</p> <p>Need for info on treatment side effects</p> <p>Needs for info on medication</p> <p>medication side effects info needs</p> <p>ADL training</p> <p>Self-management training</p>	<p>Rehabilitation needs</p> <p>Rehabilitation needs</p> <p>Needs for info on rehabilitation program</p> <p>Needs for info on rehabilitation program</p> <p>Needs for info on rehabilitation program</p> <p>Needs for info on rehabilitation program</p>	<p>Adequate care and services</p> <p>Adequate care and services</p> <p>Limited availability and suitability of information</p> <p>Limited availability and suitability of information</p> <p>Limited availability and suitability of information</p> <p>Limited availability and suitability of information</p>
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<p>treatments and nursing care for existing chronic conditions were prerequisites for participating in rehabilitation programmes. However, the participants were not fully prepared before discharge from hospital:</p> <p><i>...it was almost like [being] throwing in the deep end. I've never showered anyone in my life before. . .we just sort of muddled through. . .maybe like when you're leaving rehab inpatient, someone probably should go through with the partner of the person about showering, medications. . . (Judy, CP10).</i></p> <p>These perceptions of not being prepared and engaged to participate in rehabilitation after discharge from hospital clearly reveal the lack of coordinated discharge planning process among the multidisciplinary team that targets first-time stroke survivors and caregivers' educational and training needs. The consequences of maintaining this status quo would be lack of self-care ability and self-efficacy in managing stroke associated chronic conditions, restoring function and preventing complications during rehabilitation. The nurse's involvement as a discharge planner and coordinator for this patient population may be the better intervention to the situation.</p> <p>Coping with care transition There was a lack of communication and continuity of treatment when the stroke survivors were transferred from one institution to another. Rob expressed his dissatisfaction with unclear care plan when his brother Philip was</p>	<p>Discharge education plan</p> <p>Training of carer</p> <p>The need for clear and coordinated discharge plan</p> <p>Consequences of lack of discharge planning Lack of self-efficacy Self-management Restoring function Preventing complication</p> <p>The need for effective communication services</p>	<p>Clear and coordinated plan</p> <p>Rehabilitation needs</p> <p>Clear and coordinated plan</p> <p>Clear and coordinated plan</p> <p>effective communication services rehabilitation needs</p>	<p>Adequate care and services</p> <p>Adequate care and services</p> <p>Adequate care and services</p> <p>Adequate care and services</p> <p>Adequate care and services</p>
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<p>transferred to a rehabilitation facility. The situation threatened not only the patient's safety but also the outcomes of rehabilitation programme and continuity of care:</p> <p><i>...at that stage, there was a considerable degree of lack of communication where one didn't know what was happening. . .Philip was first transferred to XX [rehab ward]...so that was the transitional period that was difficult for him. . .(Rob, CP12).</i></p> <p>Transition from acute care to rehabilitation is a difficult time for stroke survivors and their family caregivers, who are still grieving the loss of health and independence and trying to adapt to their changed roles in their lives. During the transfer, stroke survivors were at risk of missed care and even a breakdown in the continuum of care caused by inadequate clinical handover, which posed a threat to patient safety and positive rehabilitation outcomes.</p> <p>Transition from hospital care to home care was a significant step for stroke survivors and caregivers to cope and adjust with daily care activities at home. Stroke survivors and caregivers were facing challenges to adapt to the new role in their life:</p> <p><i>I don't have that sounding board. . .it puts an enormous weight of responsibility on me in the fact that I don't have his technical expertise to call upon. . .(Jane, CP4).</i></p> <p><i>...Sometimes you feel you are left in the limbo...It is just that our bodies both are so tired. . . (Maria, CP3)</i></p>	<p>The needs for continuity of care</p> <p>The need for clear transferred plan</p> <p>The need for effective communication services</p> <p>Transitional needs</p> <p>Emotional support</p> <p>Adaptational support</p> <p>Missed care</p> <p>Safety</p> <p>Care continuity</p> <p>Rehabilitation outcomes</p> <p>Training need for carer</p>	<p>Clear and coordinated plan</p> <p>effective communication services</p> <p>Discharge experience</p> <p>Rehabilitation needs</p>	<p>Adequate care and services</p> <p>Adequate care and services</p> <p>Care experience</p> <p>Adequate care and services</p>
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	<p><i>...It's unfortunate sometimes I hear Maria, I wish I wasn't here anymore. . . (Henry, SP3)</i></p> <p>The shortened length of stay in an acute care hospital resulted in most first-time stroke survivors being discharged with ongoing treatment and a level of dependency due to physical and mental impairments. Care transition may be compromised if caregivers were not prepared and supported during the transition:</p> <p><i>I was still in the shock of what happened to Sam, back and forth from the hospital...and they said that we had to take the rented house anyway because it was for him to get transitional care. ...The day they sent him home, I was moving to that place [new rented home]. So it was moving and have him in home...he was home only a week and he ended up in XX [residential facility] because I couldn't cope. It was too much...He couldn't understand why he wasn't in his own house (Eileen, CP6).</i></p> <p>In contrast, provision of education that suits stroke survivors' individual needs, and taking into consideration the home situation and caregivers' emotional endurance, can help smooth the transition from hospital care to home care:</p> <p><i>I was there [a rehabilitation ward] every day. So I was involved in what he was doing. When we came home, they showed me every- thing. Remember that nurse came out. She</i></p>	<p>Patient's Despair</p> <p>Shorter hospital care High dependency Compromised transitional needs Unprepared carers</p> <p>DISCHARGE EXPERIENCE Shock Coping issues Cognitive deficits</p> <p>Discharge education/plan: Individualistic Focus on Emotional endurance</p>	<p>Post discharge experience</p> <p>Factors that influence care experience</p> <p>DISCHARGE EXPERIENCE</p> <p>Clear and coordinated plan</p>	<p>Care experience</p> <p>Care experiences</p> <p>Care experience</p> <p>Adequate care and services</p>
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	<p><i>told me everything I should be doing. I thought they were very good (Marina, CP8).</i></p> <p>The variation in the perceptions of care transition is an indicator of a lack of guidelines and a coordinated approach to ensure the continuity of rehabilitation during care transition for all stakeholders involved.</p> <p>Dealing with fragmented rehabilitation services</p> <p>The participants' perceptions of rehabilitation programmes were stated as fragmented and disorganized. They were compelled to undertake coordination with limited support from health professionals. They perceived these fragmented services as challenging during post-discharge rehabilitation:</p> <p><i>...No rehabilitation services information. You got to look up in the phone book and ring them...This is how we got onto the XX [rehabilitation centre]...There is no coordination in between...you got to pull them [services] all together . . .so this part coordinates with that. . .I think the basis of good rehab is there now, it just has to be tidied up at the ends (Adrian, SP8).</i></p> <p>The participants identified that if they had a person they could talk to regarding services and other concerns it would benefit their post-hospital rehabilitation journey. They suggested that nurses were in an ideal position to coordinate their rehabilitation:</p>	<p>The need for clear and coordinated discharge plan</p> <p>REHAB EXPERIENCE Fragmented services Limited professional support Limited information on services</p> <p>The need for post discharge coordinator</p>	<p>Clear and coordinated plan</p> <p>DISCHARGE EXPERIENCE</p> <p>Effective communication services</p>	<p>Adequate care and services</p> <p>Care experience</p> <p>Adequate care and services</p>
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	<p><i>I just had an idea. A sort of discharge rehab nurse that could ring you perhaps two or three times after you were at home...it would be reassuring even if you didn't have a problem, it would be a link, a transition, intermediate, that would be great (Rebecca, CP11).</i></p> <p><i>. . .someone to talk to sometimes, I think. Just like a bridge to cross (Michael, SP11).</i></p> <p>These participants' suggestion about the nurse's role in post-discharge rehabilitation was based on their experiences in working with nurses in rehabilitation wards in hospitals.</p> <p>The lack of engagement of stroke survivors and caregivers in discussing rehabilitation programmes and in making informed decision of the programmes was evident when the rehabilitative interventions were not delivered consistently to a participant with cognitive impairment that caused unnecessary stress to both the participant and his wife:</p> <p><i>. . .physiotherapist, occupational therapist and speech therapist. . .they make an appointment. . .but they just come when- ever. . .they overlapped on a couple of occasions. . .in James's case, it got to be structured to a certain degree because he gets confused. . .(Sue, CP2).</i></p> <p>In contrast, participants also talked about how a motivational interview that health professional used increased their confidence and rehabilitation intensity:</p>	<p>Discharge nurse</p> <p>Intermediary</p> <p>communicator</p> <p>Consequences of lack of discharge planning</p> <p>Lack of engagement</p> <p>Stress to carers</p> <p>Rehab experiences: Uncoordinated professional visits</p> <p>Motivational interviews</p> <p>Improved confidence</p>	<p>Effective communication services</p> <p>Clear and coordinated plan</p> <p>POST DISCHARGE EXPERIENCE</p> <p>Encouragement and motivation</p>	<p>Adequate care and services</p> <p>Adequate care and services</p> <p>Care experience</p> <p>Supportive network</p>
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<p><i>They asked what my goals were...our driveway at home has got a step down the bottom. I just asked how I should best handle that. . .they talked me through and I tried it at home. . .they've been successful. . .to subconsciously keep you motivated. I look forward to Mondays and Fridays, just to see what's going to happen to me (Andrew, SP10).</i></p> <p>When rehabilitation interventions engaged stroke survivors in planning and goal setting, they encouraged stroke survivors to take charge of their rehabilitation, a crucial process to develop their self-care and self-management ability in a long-term recovery.</p> <p>Uncertainty about ongoing rehabilitation</p> <p>Participants perceived ongoing changing of rehabilitation goals while they experienced different stages of recovery after stroke. However, they had to wait for a period to commence a new rehabilitation programme once they had been discharged from another:</p> <p><i>Well, each time we were waiting for different packages, it would be about two or three weeks, you know...yeah it affects our life, cos [because] he wasn't getting nothing. We didn't know what is gonna to happen (Eileen, CP6).</i></p> <p>The lack of continuity of rehabilitation was an indicator of disengaging stroke survivors and caregivers in goal setting and planning rehabilitation programs in a consistent and</p>	<p>Successful Goal-setting</p> <p>Engagement in goal setting</p> <p>Better self-management</p> <p>Waiting for rehabilitation</p> <p>Needs for continuity of care</p>	<p>Clear and coordinated plan</p> <p>Clear and coordinated plan Rehabilitation needs</p> <p>Post discharge experience</p> <p>Rehabilitation needs</p>	<p>Adequate care and services</p> <p>Adequate care and services Adequate care and services</p> <p>Care experience</p> <p>Adequate care and services</p>
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	<p>coordinated way based on stroke survivor's needs in different stages of recovery. In addition, participants were concerned that the interruption of rehabilitation may jeopardize their recovery and hinder them from achieving their rehabilitation goals:</p> <p><i>Philip's primary goal was to get his right arm working as the best he can...so that was a bit of worry early on because we had the two weeks' gap in between being discharged and starting this program and ...it took a week and a half or something before we actually saw the OT [Occupational Therapist] in here other than on the initial session with XX [therapist's name] identifying goals (Rob, CP12).</i></p> <p>Stroke rehabilitation aims to enable stroke survivors to adapt to their new life with improved physical, emotional and psychological well-being. Stroke survivors' needs change over time. This study revealed the lack of regular assessment and evaluation of stroke survivors' rehabilitation potential, once the planned rehabilitation programme was completed:</p> <p><i>No automatic follow up on what I am doing. That's the biggest problem. You've got to have some input...There is no follow up unless you do it yourself (Adrian, SP8).</i></p> <p>Family caregivers expected that ongoing rehabilitation would prevent stroke survivors from physical and cognitive deterioration and stroke associated complications such as falls. Caregivers also believed that engaging in long-term rehabilitation may alleviate caregiver burden. Jack was caring</p>	<p>Rehabilitation delay consequences: jeopardize their recovery hinder them from achieving their rehabilitation goals</p> <p>Waiting for rehabilitation</p> <p>Lack of follow-up services</p> <p>Lack of follow-up services</p> <p>NEED FOR ONGOING REHABILITATION Prevent physical deterioration Cognitive decline</p>	<p>Rehabilitation needs</p> <p>Post discharge experience</p> <p>Follow up services</p> <p>Rehabilitation needs</p>	<p>Adequate care and services</p> <p>Care experience</p> <p>Adequate care and services</p> <p>Adequate care and services</p>
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<p>for Mary who had memory loss post stroke. He shared his story about the difficulty he experienced due to a lack of strategies to manage cognitive impairment and rehabilitation for this condition:</p> <p><i>Mary and I both got iPad. I have asked around the world for Apps on iPad to help her with her memory...so you know, cognitive things, I did ask [therapists], I had no information from them (Jack, CP9).</i></p> <p>The participants revealed that inadequate education about how to prevent and manage falls contributed to readmission to hospital for stroke survivors and added stress for caregivers:</p> <p><i>It [wheelchair] moved with brakes on it and he slipped down there. I didn't even think about the breakage. The next morning I noticed his leg was sticking out to the side like that...he was there [hospital] for three weeks (Eileen, CP6).</i></p> <p>The above examples indicate that the family caregivers were not well prepared to care for stroke survivors due to lack of ongoing caregiver education and support about management of stroke-related complications.</p> <p>The long-term commitment to caregiver role without adequate caregiver support also resulted in social isolation:</p> <p><i>I am always here to help him. Assist in the shower, personal care. If I happen to go out, I always set up all his lunch before</i></p>	<p>Reduce caregiver burden Support for cognitively impaired survivors.</p> <p>Fall prevention info needs</p> <p>Training need for carer before discharge</p>	<p>Rehabilitation needs</p> <p>Information needs on stroke</p> <p>Rehabilitation needs</p>	<p>Adequate care support</p> <p>Limited availability and suitability of information</p>
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	<p><i>I go...I am just around most of the time. I don't go out very often (Marina, CP8).</i></p> <p>The consequences of social isolation without interventions include depressive symptoms, high levels of caregiver burden and low levels of quality of life. Social isolation is also an indicator that the social reintegration based on stroke survivors and caregivers' psychosocial and spiritual needs is largely overlooked in rehabilitation.</p>			
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Appendix 11: Reason for rejection

Studies did not explore needs:

1. Carlsson, E., et al. "Stroke and eating difficulties: long-term experiences." Journal of Clinical Nursing **13**(7): 825-834.
2. Clarke, P. (2003). "Towards a greater understanding of the experience of stroke: Integrating quantitative and qualitative methods." Journal of Aging Studies **17**(2): 171-187.
3. Connolly, T. and E. Mahoney "Stroke survivors' experiences transitioning from hospital to home." Journal of Clinical Nursing **27**(21-22): 3979-3987.
4. Croot, E. J., et al. "Transient ischaemic attack: a qualitative study of the long term consequences for patients." BMC Family Practice **15**: 174.
5. da Silva, J. K., et al. (2016). "Survivors' perspective of life after stroke." Revista Eletronica de Enfermagem **18**: 1-10.
6. Danzl, M. M., et al. "'Living with a ball and chain': the experience of stroke for individuals and their caregivers in rural Appalachian Kentucky." Journal of Rural Health **29**(4): 368-382.
7. DiGregorio, T. and J. Matthew (2020). "Interviewing stroke survivors about experiences of their stroke journey." British Journal of Neuroscience Nursing **16**(Sup2): S16-S17.
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Appendix 12: Interview guide.

Interview Questions Version.2 - 23/4/2021.

We are grateful for your agreement to take part in this study and ask that you spend ten minutes thinking about the listed questions before the process begins.

The researchers wish to reiterate that there are no correct or incorrect answers. Your role here is to discuss your views about your needs after your stroke or the issues you encounter in your lives. We would also be grateful if you could suggest any ideas to enhance the level of support provided within the community.

You will retain your anonymity in this research and all identifiable information, such as your name, will not be published. Thank you for taking part in this research. We will proceed when you are ready.

Interview Questions

1. Can you tell me about your life after the stroke? What aspects have been affected?
2. Can you describe what treatment you have received while you were in the hospital?
3. What were you told about what will happen after discharge from the hospital at that time?
4. What type of support did you receive after discharge? Please explain.

5. Can you describe the support you received from your family? Community?
6. What problems do you think are most important to you after discharge from hospital/rehabilitation centre?
7. What concerns/worries do you have currently? Can you describe them in detail?
8. Please tell me about your needs after stroke that you wish to fulfil?
9. Have you faced any challenges since discharge? If so, what is it and whom do you ask if you need guidance?
10. How do you handle the challenges you face within your daily life?
11. Did you continue rehabilitation in a private clinic? why?
12. What things can help you improve your adaptation to your new life?
13. What are your requirements from rehabilitation/ health services?
14. What kind of support do you think you need in order to manage your current concerns?
15. What do you suggest we can do improve the support we provide for patients who are discharged from health services?

Contact

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نحن ممتنون لموافقتك على المشاركة في هذه الدراسة ونطلب منك قضاء عشر دقائق في التفكير في الأسئلة المدرجة قبل بدء المقابلة.

يود الباحثون التأكيد على عدم وجود إجابات صحيحة أو غير صحيحة. ويتمثل دورك هنا في تقديم آرائك حول احتياجات مرضى السكتة الدماغية أو المشكلات التي قد تواجههم في حياتهم. سنكون ممتنين أيضًا لو تفضلتم باقتراح أي طرق لتحسين مستوى الخدمات المقدمة داخل المجتمع.

سنحتفظ بإخفاء هويتك في هذا البحث ولن يتم تسجيل أي من المعلومات التي قد تكشف هويتك، مثل اسمك. شكرًا لك على المشاركة في هذا البحث، سنبدأ عندما تكون مستعدًا لذلك.

1 - هل يمكن أن تخبرني عن حياتك بعد السكتة الدماغية؟ ما هي الجوانب التي تأثرت؟

2 - هل يمكنك وصف العلاج الذي تلقيتَه أثناء تواجدك في المستشفى؟

3 - ماذا قيل لك عما سيحدث بعد الخروج من المستشفى في ذلك الوقت؟

- 4 - ما نوع الدعم الذي تلقينته بعد الخروج من مركز التأهيل؟ يرجى التوضيح
- 5 - هل يمكنك وصف الدعم الذي تلقينته من عائلتك؟ المجتمع؟
- 6 - ما هي المشاكل التي تعتقد أنها الأكثر أهمية بالنسبة لك بعد الخروج من المستشفى / مركز إعادة التأهيل؟
- 7 - هل واجهت أي تحديات منذ الخروج؟ إذا كان الأمر كذلك، فما هي ومن تسأل إذا كنت بحاجة إلى توجيه؟
- 8 - ما هي الشواغل / المخاوف التي لديك حاليًا؟ هل يمكنك وصفها بالتفصيل؟
- 9 - كيف تتعامل مع التحديات التي تواجهها في حياتك اليومية؟
- 10 - هل استمررت في إعادة التأهيل في عيادة خاصة؟ لماذا؟
- 11 - من فضلك أخبرني عن احتياجاتك بعد السكتة الدماغية التي ترغب في تلبيتها؟
- 12 - ما الأشياء التي يمكن أن تساعدك على تحسين التكيف مع حياتك الجديدة؟
- 13 - ما هي متطلباتك من مراكز التأهيل/الخدمات الصحية؟
- 14 - ما نوع الدعم الذي تعتقد أنك بحاجة إليه لإدارة مخاوفك الحالية؟
- 15 - ماذا تقترح علينا بخصوص ما يمكننا القيام به لتحسين الدعم الذي نقدمه للمرضى الذين خرجوا من المراكز الصحية؟

للتواصل

باسمه طميجي، طالبه باحثه. كلية علوم الرياضة، التمارين والتأهيل في جامعة برمنغهام

إيميل:

Appendix 13: Example of analysis

Participant 1	Interpretation Coding content, looking for association	Sense of personal and social world; language used and sense of person
<p>Well, please tell me about your stroke, and what aspects of your life have been affected by the stroke?</p> <p>First, I had a stroke all of a sudden and I didn't know what happened.</p> <p>But what I want in the end is to get treatment, right? I must receive the necessary treatment through a standardized treatment plan in which all patients are treated equally. For example, when I entered the hospital, there was no neurologist to prescribe treatment for me, but an internist. Do you understand what I mean?</p> <p>Yes, you mean, there was no specialist doctor!</p> <p>The operation I underwent was what unsatisfactory.</p> <p>There was a ... surgeon, who was able to enter the place of the clot, I waited for him, and he did not come. There was also a doctor in the hospital, a vascular doctor who is the same as a neurologist.</p> <p>Aha!</p> <p>They pointed out to him that if I underwent the operation, I could die, so it was better not to do this operation for me, and I must leave and that I would get better when using the treatment, so I left the hospital with a hemiplegia on the side left, unable to do anything.</p>	<p>Event identification. No previous knowledge on stroke sign and symptoms.</p> <p>Seeking treatment</p> <p>Rehabilitation needs: No standardized treatment plan for stroke pts in SA.</p> <p>Rehabilitation needs: Lack of stroke specialists in SA</p> <p>Unsatisfaction with the operation</p> <p>Hope to be treated by specialist.</p> <p>Hope to be treated by specialist.</p> <p>Problem identification.</p>	<p>Stroke awareness</p> <p>Treatment plan</p> <p>Specialist staff shortage</p> <p><u>Patient is a doctor and knows staff in the hospital</u></p> <p><u>Patient regret the doctor choice of not doing the operation</u></p>

<p>Of course, in the beginning, there was no physical therapy for me, it was just a simple movement in the bed, and I underwent a full treatment after that.</p> <p>How many days did you stay in the hospital inpatient department? 15 days later, I was discharged from the hospital.</p> <p>What did they tell you at the time of discharge from the hospital? The decision to leave was made when they noticed that I could eat and drink, be able to answer questions, and could sit in bed unaided.</p> <p>Well, then I got out of the hospital and started physical therapy right away.</p> <p>Did you start physiotherapy immediately from the first week of your discharge or did you have to wait? No, I started treatment from the first week of my discharge from the hospital.</p> <p>Well, what kind of medical rehabilitation did you have in the hospital's physical therapy department? In the beginning, I could not sit on the bed and could not walk to the bathroom, but after a month of physical therapy, I was able to walk to the bathroom by myself and walk home from room to room, and sit with my family and children well or acceptable and with the continuation of physical therapy my condition improved. Then I</p>	<p>Body positioning treatment at inpatient.</p> <p>Patients experience: Stroke effect on patient life</p> <p>Patient experience: No long waiting to be admitted</p> <p>Patient experience: Stroke effect on patient life (unable to do ADL). Improvement in patient abilities as a consequence of PT</p> <p>Therapy experiences: Improvement happened due to PT. Beliefs on more exercise led to more improvement.</p>	<p><u>due to patient condition (unable to move)</u></p> <p><u>Patient liked his improvement due to PT</u> <u>Patient received little PT, therefore he sought gym</u></p>
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<p>entered training clubs (gym), and I improved more than the improvement from physical therapy, my muscles became strong.</p> <p>How long did you continue to undergo physical therapy? and what did they tell you at the time of discharging the physical therapy department?</p> <p>A month and a half until I was able to walk. After that I entered or participated in the gym, and going to the weightlifting, I improved a lot and started doing movements that help me how to get up if I fell, so I was trying to learn how to stand myself on my leg. (pause)</p> <p>I learned from physical therapy how to move, (alright!) I continued to the gym, and I learned how to get up quickly.</p> <p>Was there enough education in the natural department?</p> <p>There was a good education, yes yes,</p> <p>despite the lack of hospitals and the lack of doctors, and the physiotherapy centre was far for me, as if I lived in ...,</p>	<p>Patient ability improved with time. Beliefs on more exercise led to more improvement Self-learning on stroke recovery</p> <p>Coping factors: Patient copy what he learnt from PT during his rehabilitation.</p> <p>Patient experience: Education in outpatient was satisfactory.</p> <p>Rehabilitation needs: Services shortage (hospitals and staff).</p>	<p><u>Apart from his satisfaction, patient was a doctor and able to locate the information himself.</u></p> <p><u>Distance problems (the centre close to the patient home is closed due to maintenance.</u></p>
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<p>I attended physiotherapy sessions twice a week (Amm). Each session takes half an hour for the movements of the body and hands. I was given five or ten minutes, which was not enough.</p> <p>My legs improved, but my hands did not.</p> <p>Although I can move my hands right and left, up and down and move my fingers forward, but it has not improved much. When I try to hold anything light in my hand I do better with difficulty but for heavy things I can do it for five minutes or less, after that the thing falls out of my hand. For example, when I grab a carton from the car home and I can't do it until I reach the door of the house, that thing falls out of my hand.</p> <p>In the job you work in, were they cooperating with you?</p> <p>Permeated. I had a four-month long vacation. After that I went back to work, and I was no better tired.</p> <p>Have you been rehabilitated for returning to work?</p> <p>(long pause) Yes, I was rehabilitated a little.</p> <p>Well, how has your social life in general and your family been affected?</p> <p>My social and family life has been affected to some extent. I was in the hospital helping my colleagues and I could not move my left hand, so I was unable to perform any surgery, so he gave me the clinic to treat</p>	<p>Therapy experience: Frequency of treatment (twice a week) Duration of treatment (half hour PT, 10 min OT). Therapy duration was not enough</p> <p>Beliefs on intensive treatment. Little therapy means little improvement</p> <p>Desire to return to normal</p> <p>Stroke effect: Difficulty in ADL.</p> <p>Patient did not face problem at work as consequence to stroke.</p> <p>Rehabilitation needs: RTW rehabilitation.</p> <p>Patients experiences: Stroke effect on patient life</p>	<p><u>Thats why patient sought gym training.</u></p> <p><u>Patient is a doctor and he used to do operation which require fine movement.</u> <u>Desire to return to normal work life.</u></p>
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<p>patients, examine patients and prepare them for operations, and the staff performs operations for the patients I prepare.</p> <p>Was there a focus by the physiotherapy clinic on the rehabilitation of delicate functions?</p> <p>No, there is not. Of course I wanted to be able to walk and move. I didn't want to have an operation or even lift a book or notebook until I was able to walk, so I started thinking about (pause) occupational therapy. But in ... Hospital, there are two doctors who perform occupational therapy, but the number of patients is large. The patient waited until 11:00 pm to receive occupational therapy for 10 minutes. The exercises were not enough, although I do more exercises at home, but it is not enough.</p> <p>Well, what about the virtual clinic?</p> <p>not enough</p> <p>Do you think it is not enough?</p> <p>Yes. Sometimes you undergo an exercise on the screen, but the tools are not available, and sometimes the patient's application varies and is not useful unless there is a therapist present with the patient so that he helps him walk and teaches him how to do the exercise correctly.</p> <p>Well, what was your family's role at home?</p>	<p>Work changes due to stroke</p> <p>No RTW rehabilitation</p> <p>First goals for patient after stroke</p> <p>Hope of return to normal life</p> <p>Staff shortage</p> <p>Large number of patients</p> <p>Rehabilitation need:</p> <p>OT duration was not enough (intensity)</p> <p>OT duration was not enough (intensity)</p> <p>Therapy experience:</p> <p>Not satisfied with VC</p> <p>Factor of not wanting VC:</p> <p>Tools were not available</p> <p>Incorrect application of exercises</p> <p>Need supervision</p>	<p><u>Although patient said he received RTW rehabilitation.</u></p> <p><u>Patient repeated that he was receiving only 10 min OT</u></p> <p><u>Home exercise was not enough?</u></p> <p><u>Probably patient wanted to receive OT under supervision.</u></p> <p><u>Why patient did not want Virtual rehab?</u></p>
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<p>My family was helpful, especially my wife, who always encourages me to do the exercises and buy all the required tools.</p> <p>Were the family trained and instructed on how to help you do the exercises?</p> <p>My wife, she comes with me in all the sessions, she watches the exercises they give me, and then she applies them at home.</p> <p>Do you have exercises in place to do at home?</p> <p>Of course, I got many illustrated exercises, but the patient with a stroke gets tired quickly, especially when moving his hands, he improves drowsiness when he tries to do the exercises, my hands get tired quickly.</p> <p>What are the things that helped you adapt to the disease?</p> <p>Going back to work and trying to get back to a normal life may have clearly helped me cope with the disease. Also, the family had a major role in overcoming the crisis. And my wife encourages me that the problem is psychological rather than physical and accept the new situation.</p> <p>Well, what problems did you face after you left the physiotherapy department after completing all the physiotherapy sessions?</p> <p>As I told you, occupational therapy has not changed, and I hope to be a surgeon again. I was good doing operations. For example, my colleagues perform about 10-15 operations per month, while I used to</p>	<p>Social needs: Family support Motivation from family</p> <p>Care continuity: No official family training in SA.</p> <p>Social needs: Need for motivation</p> <p>Coping factors: Return to work Family Family motivation Accept the situation</p> <p>OT needs Hope to return to normal life. Patient was successful in his job</p>	<p><u>Patient's wife were insisted for her husband to return to his normal life and work.</u></p> <p><u>Patients' carer watch the exercises performed by PT and copy it.</u> <u>Sometimes even without explanation why we are doing this exercise</u></p>
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<p>perform 80 operations per month. (pause) I no longer have this ability, so I'm trying to improve my hand movement but so far I haven't found a way to do it and I'm still undergoing physiotherapy and occupational therapy at home.</p> <p>Well, have you completed treatment in private hospitals? and why?</p> <p>Yes, I visited the ... Specialist Hospital, and I paid them about 100,000 Saudi riyals, but I never benefited. ... Hospital was better than ... Specialist Hospital.</p> <p>I never got better.</p> <p>But as I told you in ... Hospital, the number of doctors is few, while the number of patients is large, so there is no proportion between what is available and what is offered.</p> <p>In your opinion, what is the solution to this problem?</p> <p>There are many problems in the area. The number of physical therapists is large in each region and is sufficient to cover the needs in hospitals. In order for the doctor to train and benefit gradually and gain experience, I sometimes go to private hospitals and there are Saudi doctors who are OK. I mean, they were good, and I benefited from them.</p>	<p>Stroke effect: Did not return to normal job</p> <p>Still searching for ways to recover Care continuity at home</p> <p>Care continuity: Care continuity approach (private clinic) Private clinic was not beneficial. Public hospital care better than private clinics Private clinic was not beneficial. Staff shortage in public hospitals comparing to number of patients.</p> <p>Rehabilitation needs: SA has a lot of issues related to rehabilitation. Staff shortage Therapists need experience and training. Saudi staff have less experience.</p>	<p>Patient is living in SA due to his job, if he lost the job he will lose the benefits of being a doctor. Patient feel sorry about himself and keep trying to return to his life.</p> <p>Looking for intensive care to return to his life Why patient is saying ... Specialist Hospital is not beneficial although it is specialist stroke care? Regret paying 100,000? Want to return to normal life in short period.</p>
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<p>While the Indian doctors have extensive experience and gained experience, these are minor problems, and the hospital is ill-equipped.</p> <p>Regarding tools such as crutches</p> <p>Tools are available and I got crutches and splints. But the splints were primitive, meaning not advanced, like those in private hospitals. They had ... splints that were comfortable for the hands. For example, they gave me leg splints at ... Hospital, it affected my leg, and I could not walk because of it. Even if I try to walk, I cannot for more than ten minutes and I feel as if I have nails in my leg because these splints are made of plastic, so they are uncomfortable and do not give good results. They are rough and uncomfortable.</p> <p>Well, at the moment if you have a problem who do you want to ask for help, is there an official way of communication with the specialists?</p> <p>Do you mean in terms of physical therapy?</p> <p>Of course.</p> <p>Yes, they gave me phone numbers that I can call, but after 9 months, I and my children have enough experience to get a response to any answer by searching the Internet and getting solutions and answers to questions, and this is an easy way to get information.</p> <p>Well, what requirements do you currently need?</p>	<p>Therapy experience: Indian staff are expert in PT Ill equipped hospital.</p> <p>Rehabilitation needs: Availability of tools Tools are not advanced in public hospitals. Private hospitals provide advanced tools. Tools are not advanced in public hospital.</p> <p>Tools were not comfortable.</p> <p>Phone was given to participant as communication way. Participant becomes expert with time Internet is an easy way to get any information</p>	<p><u>Therapist gave their phone number to patient if they asked but there are no official communication service unless he/she go to the hospital.</u></p>
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<p>(Long pause) of course, psychological problems are the most important component. The patient wishes to return to work, interact with colleagues in the workplace, feel psychological comfort and help recover more. For example, when I go to work in the hospital, I come home happy. I had very simple operations and I felt good about myself, and I was happy and at ease, my family also felt that I was happy much better than any other time. This helps the patient in my opinion to rehabilitate him through society and work.</p> <p>Well, what would you suggest to improve these aspects? What do you require from medical rehabilitation centers?</p> <p>First, (pause) the Ministry of Health is supposed to recommend the return of all patients to their work. For example, if we assume that a person has suffered a stroke in the left side of the brain or in the place that controls speech or controls thinking, then it can be facilitated to return to work. If the stroke is on the right side of the brain, this means loss of movement.</p> <p>So, I recommend the rehabilitation of patients, I mean, I saw people who had a similar stroke, but they improved more because they go for walks on the ground, plow and plant and thus benefit while I am at</p>	<p>The most important issue for stroke is psychological problem. Hope to return to normal life (work). Factors help to recover: Return to work Psychological comfort Doing what participant used to (operation) make him and his family happy. Rehabilitation needs: Social participation RTW</p> <p>Rehabilitation needs: RTW Rehabilitation to RTW</p> <p>Recovery rates differ Ways to have high recovery rate: Working, walking. No sedentary life styles Training again on work Hope to return to normal life (work).</p>	
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<p>home, and if I meet a surgeon and help him, then no, I will not restore my skills. I hope patients can be helped back to work.</p> <p>I had a stroke at ten o'clock suddenly when I was visiting patients who underwent surgery, and my colleague and I were suddenly feeling that I could not stand on my leg and I felt weak. Whoever is injured during work is treated like a Saudi and receives a salary and compensation, but you did not receive compensation and I think that you personally have nothing to do with this.</p> <p>do you have other suggestions or requirements?</p> <p>No thank you and may God bless you and grant you success. Thank you so much</p> <p>Conversation with the patient's carer:</p> <p>A .. doctor, I do not know him. I looked at him and noticed that he did not give the patient the thing I wanted, he only gave him a simple thing and gave him more than one session. As for ... Hospital, it only needs expansion and a sufficient number of doctors because the patient needs a session of at least one hour. This is my observation. In terms of performance, they are excellent. I was hoping, Doctor, in his name, that they would open a hospital in ... for physiotherapy. The employees receive a salary while they are not working.</p> <p>I mean, the student works hard and makes the most precious and tries to obtain mediation at any cost in order to get a job, and in the end you</p>	<p>Stroke happened at workplace.</p> <p>Did not received sufficient rehabilitation</p> <p>Public hospital needs: Expansion Staff Enough staff helps to have sufficient rehabilitation Need for closer centre for rehabilitation</p> <p>upset from closing the nearer centre</p>	<p><u>Participant feel sorry about himself as he was so successful in his job and suddenly lose that.</u></p> <p><u>Carer is talking about Czech Specialist Hospital as she regret going there and paying 100,000 for nothing</u></p>
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<p>have no role and you stay next to your wife at home and take a salary and the sick suffer! And we hear the saying that you are the son of the country first in the job.</p> <p>So you must do your homework, a year has passed and you are still sitting at home, and you are getting a salary, why!</p> <p>What about virtual clinics!</p> <p>Yes, virtual clinics. My husband did not benefit from anything from ... Hospital. When the hospital was closed, they came home for ten minutes several times, and then went to home medicine twice.</p> <p>After that, the Corona virus spread, and the centers were closed, and there was a children's section, and there were no equipment, why?</p> <p>There should be a physical therapy department, where is the head of the department? Why didn't you take any part? You have more than ten employees and this helps reduce pressure on ... Hospital.</p> <p>Because in fact, ... Central Hospital, my husband is a surgeon, they should not have demolished the hospital because it is in a ... and a confrontation plan, and it receives the wounded and my husband receives cases and therefore they need physiotherapy. But after the center was closed, I brought an Indian doctor home and shoot a video, because my son is studying medicine, so we give him five minutes</p>	<p>upset from staff</p> <p>No benefits from VC Rehabilitation duration was not sufficient</p> <p>Upset due to closing the near centre</p> <p>No equipment</p> <p>Referral from other hospitals increase the pressure on other hospitals.</p> <p>Upset due to closing the near centre</p> <p>Care continuity: Brought external therapist to home</p>	<p><u>The centre is closed for maintenance and clinics turned to virtual clinics or home visits. However, the carer is upset due to this</u></p>
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<p>sessions a day, even if we go to ... hospital, the sessions are not enough because they say we can complete them at home, and my husband needs three sessions Physiotherapy a day.</p> <p>We ask you, Doctor, to deliver the message. We want them to open a ... hospital, because it will feed the area, fall into a confrontation plan, and be the place of reception of ... , and this helps relieve pressure on ... Hospital.</p>	<p>Family learning to give intensive therapy</p> <p>Therapy session were not sufficient. Instruction on home rehabilitation.</p> <p>Beliefs on more rehabilitation equal more recovery</p> <p>Need for close centre for care continuity</p>	
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Appendix 14: Completed COREQ checklist.

Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

No. Item	Guide questions/description	Reported on Page #
Domain 1: Research team and		

reflexivity		
<i>Personal Characteristics</i>		
1. Inter viewer/facilitator	Which author/s conducted the interview or focus group?	Page 9
2. Credentials	What were the researcher's credentials? E.g. PhD, MD	Page 9
3. Occupation	What was their occupation at the time of the study?	Page 9
4. Gender	Was the researcher male or female?	Page 9
5. Experience and training	What experience or training did the researcher have?	Page 1
<i>Relationship with participants</i>		
6. Relationship established	Was a relationship established prior to study commencement?	Page 9
7. Participant knowledge of the interviewer	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	Page 9
8. Interviewer characteristics	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	Page 9

Domain 2: study design		
<i>Theoretical framework</i>		
9. Methodological orientation and Theory	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	Page 5

<i>Participant selection</i>		
10. Sampling	How were participants selected? e.g. purposive, convenience, consecutive, snowball	Page 6
11. Method of approach	How were participants approached? e.g. face-to-face, telephone, mail, email	Page 10
12. Sample size	How many participants were in the study?	Page 10
13. Non-participation	How many people refused to participate or dropped out? Reasons?	Page 10
<i>Setting</i>		
14. Setting of data collection	Where was the data collected? e.g. home, clinic, workplace	Page 5 & 6
15. Presence of non-participants	Was anyone else present besides the participants and researchers?	Page 10
16. Description of sample	What are the important characteristics of the sample? e.g. demographic data, date	Table 1, Page 11 & 12
<i>Data collection</i>		
17. Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	Page 7 & 8
18. Repeat interviews	Were repeat interviews carried out? If yes, how many?	Page 10
19. Audio/visual recording	Did the research use audio or visual recording to collect the data?	Page 7 & 8
20. Field notes	Were field notes made during and/or after the interview or focus group?	Page 9

21. Duration	What was the duration of the inter views or focus group?	Page 10
22. Data saturation	Was data saturation discussed?	Page 8
23. Transcripts returned	Were transcripts returned to participants for comment and/or correction?	Page 8
Domain 3: analysis and findings		
<i>Data analysis</i>		
24. Number of data coders	How many data coders coded the data?	Page 8 & 9
25. Description of the coding tree	Did authors provide a description of the coding tree?	Page 13
26. Derivation of themes	Were themes identified in advance or derived from the data?	Page 13 to 21
27. Software	What software, if applicable, was used to manage the data?	N/A
28. Participant checking	Did participants provide feedback on the findings?	Page 9
<i>Reporting</i>		
29. Quotations presented	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	Page 13 to 21
30. Data and findings consistent	Was there consistency between the data presented and the findings?	Page 13 to 21
31. Clarity of major themes	Were major themes clearly presented in the findings?	Page 13 to 21
32. Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	Page 13 to 21

Developed from:

Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

Appendix 15: Interview questions

Interview Questions Version.2- 4/9/2023.

We are grateful for your agreement to take part in this study and ask that you spend ten minutes thinking about the listed questions before the process begins.

The researchers wish to reiterate that there are no correct or incorrect answers. We would also be grateful if you could suggest any ideas to enhance the level of support provided within the community.

You will retain your anonymity in this research and all identifiable information, such as your name, will not be published. Thank you for taking part in this research. We will proceed when you are ready.

Interview questions:

Views on current rehabilitation intervention.

1. Can you describe a typical rehabilitation plan you would develop for someone who has had a stroke?
2. Can you describe aspects of stroke rehabilitation that are key in your opinion?
3. Do you think current system meet patient' functional needs? why?
4. How would you address the need for short-long plan? Have you consider setting goals with patients and their families?
5. How would you address the need for long term rehabilitation? (Especially if patients are not able to pay for future rehabilitation).
6. How would you address the needs of patients around communication?
7. What are the challenges affecting access to services/How would you address transport issue or inability of patients to attend sessions?
8. Currently how do you assess patients' needs and goals? is there any tools have been used in your hospital?
9. What do you know about post discharge services for patients with a stroke? What type of support did they receive after discharge?

10. What are the gaps in the services?

11. How would you change or improve current stroke rehabilitation intervention? What services you would add?
12. What are the main barriers that therapists have encountered in trying to meet the rehabilitation needs of patients?
13. What strategies can be applied to provide long term rehabilitation post discharge?
14. What are the strategies can be applied to improve the transition of patients from hospital to community?

15. Have you received any training from the institutions?
16. What skills and knowledge are required to deliver effective long-term care in the community?
17. What areas do you require training in?
18. What type/method of training do you think will enable your learning of knowledge and skills to provide better support for a stroke patient?

Views of self-management

1. What is your general experience on self-management for stroke?
2. Have you trained patients on doing self-management?
3. Are there any system or tool have been used in your hospital to train patients to take care of themselves?
4. What are challenges and difficulties you faced in providing self-management?
5. What are the facilitators to do self-management?
6. What training do you think patient and their caregivers need in order to take care of themselves?
7. Is there anything you would like to add that we have not covered?

النسخة العربية:

نحن ممتنون لموافقتك على المشاركة في هذه الدراسة ونطلب منك قضاء عشر دقائق في التفكير في الأسئلة المدرجة قبل بدأ المقابلة.

الهدف من هذه الدراسة هو تطوير فهم لوجهات نظر واحتياجات المتخصصين في رعاية السكتة الدماغية في المملكة العربية السعودية لبناء برنامج تدريبي سيمكنهم من تقديم الاستمرارية في الرعاية لمرضى السكتة الدماغية بعد التسريح من المستشفى بالإضافة الى اقتراحاتكم عن كيفية تعزيز مستوى الدعم المقدم لهم داخل المجتمع. يود الباحث التنبيه انه لا توجد إجابات صحيحة أو خاطئة، ستظل مجهول الهوية في هذا البحث ولن يتم نشر أي معلومات تعريفية عنك، مثل اسمك، مكان عملك أو أي معلومات عن هويتك. شكرًا لمشاركتك في هذا البحث.

أسئلة المقابلة.

وجهات النظر حول نظام التأهيل الحالي:

1. فضلًا اوصف خطة إعادة التأهيل النموذجية التي تقوم بتقديمها لشخص تعرض لسكتة دماغية؟
2. ماهي الجوانب التي تُعتبر مهمة (أساسية) عند وضع خطة إعادة التأهيل بعد السكتة الدماغية من وجهة نظرك؟
3. هل تعتقد أن النظام الحالي يلبي احتياجات المريض الوظيفية؟ ولماذا؟
4. كيف تتعاملون مع حاجة المرضى لخطة قصيرة وبعيدة المدى؟ هل قمت بوضع الأهداف بالتعاون مع المرضى وعائلاتهم؟
5. كيف تتعامل مع حاجة ورغبة المرضى للتأهيل على المدى البعيد؟
6. كيف تتعامل مع احتياج المرضى الى التواصل الدائم؟
7. ما هي العوائق التي تؤثر على الوصول إلى الخدمات؟ كيف تتعامل مع مشكلة النقل أو عدم قدرة المرضى على حضور الجلسات؟
8. حاليًا، كيف تقوم بتقييم احتياجات واهداف مرضى السكتة الدماغية؟ هل هناك أداة مستخدمة للتقييم؟
9. ماذا تعلم عن خدمات ما بعد الخروج لمرضى السكتة الدماغية؟ ما نوع الخدمات والدعم الذي يتلقونه قبل الخروج لتجهيزهم لمرحلة التسريح؟
10. ما هي الثغرات في الخدمات المقدمة حاليًا؟
11. كيف نعمل على تحسين البرنامج الحالي في إعادة تأهيل السكتة الدماغية؟ ماهي الخدمات التي ترغب في اضافتها؟
12. ما هي العوائق الرئيسية التي واجهها الأخصائيين في محاولتهم تلبية احتياجات إعادة التأهيل للمرضى؟
13. ما هي الاستراتيجيات التي يمكن تطبيقها لتقديم التأهيل على المدى البعيد بعد الخروج من المستشفى؟
14. ما هي الاستراتيجيات التي يمكن تطبيقها لتحسين عملية انتقال المرضى من المستشفى الى المجتمع؟
15. هل تلقيت أي تدريب من المؤسسات؟
16. ما هي المهارات التي يحتاجها للأخصائيين لتقديم رعاية فعالة على المدى البعيد في المجتمع؟
17. ماهي الجوانب التي يحتاج الأخصائي للتدريب فيها؟
18. ما نوع/طريقة التدريب التي تعتقد أنها ستمكنك من تعلم المهارات اللازمة لتقديم دعم أفضل لمرضى السكتة الدماغية؟

وجهات النظر حول العلاج الذاتي.

1. ما هي تجربتك العامة في مجال التأهيل الذاتي بعد السكتة الدماغية؟
2. هل قمت بتدريب المرضى على التأهيل الذاتي؟
3. هل تم استخدام أي نظام أو أداة في مستشفياتكم لتدريب المرضى على التأهيل الذاتي؟
4. ما هي التحديات والصعوبات التي واجهتها؟
5. ما هي العوامل التي تساعد على تقديم التأهيل الذاتي؟
6. ما هو التدريب الذي تعتقد أن المرضى ومقدمي الرعاية بحاجة إليه من أجل العناية بأنفسهم؟
7. هل هناك أي شيء تود إضافته ولم نتطرق إليه؟

Appendix 16: Example of the analysis

Part of an interview	Codes	Cluster	Theme
<p>First question, could you describe the treatment plan for a new patient in detail, covering all stages, whether inpatient or outpatient?</p> <p>Are all stages during hospitalization at our facility?</p> <p>Yes, What's the plan for each stage?</p> <p>When the patient is initially with us, they start as inpatients and then transition to outpatients. Usually, we receive referrals from other hospitals or specialized clinics due to our hospital is small. But in some patients, based on the assessment, I mean, we see what impairment the patient has after the assessment, we determine the treatment plan, of course. As you know, each person is different from the other. I mean, everyone is based on the affected area and what impairments they have. Based on the assessment, we start giving them the treatment plan</p> <p>Okay, is there a specific assessment form or tools you use?</p>			

<p>We do have a form, but it's quite general. Some questions are specialised for neuro cases.</p> <p>Typically, how soon do patients come to you after something like a stroke?</p> <p>Usually, after about a week, around a week.</p> <p>Yes. So, about a week after the stroke?</p> <p>Yes.</p> <p>Alright, how do you determine goals for the patient?</p> <p>Well, the goals are based on the patient's own goals. For example, some patients come with a goal to walk or to be self-reliant in their daily lives. These goals are shared. After the assessment, we identify what the patient needs and what the patient themselves desires. Some patients express specific goals, like wanting to change clothes without assistance or, for instance, one patient said he wanted to learn how to cover himself from the cold at home.</p> <p>Interviewer: Yes.</p> <p>So, the goals are shared between us and the patients.</p>	<p>No specific forms for assessment</p> <p>Patients come within one week period to outpatient.</p> <p>Shared decision</p>	<p>Lack of standardisation</p> <p>Admission to outpatient</p> <p>Goal setting</p>	<p>Standardised approaches</p> <p>Therapy experience</p> <p>Perspectives on goal setting</p>
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<p>Alright, from your experience, do therapists ask the patient about what they want to do? What are your goals? Or are the goals mostly determined by the physical therapist alone?</p> <p>Mostly determined by the therapist, and they proceed according to their treatment plan. If there isn't initiative from the patient, it's rare for a therapist to ask about the patient's goals, wishes, or aspirations. They assess the patient and start working on the existing impairments.</p> <p>Yes. How about home assessments? Assessing the home environment?</p> <p>No, not usually. Honestly, based on the ICF model, you mean? Personal and environmental factors are unfortunately not often taken into consideration because of workload.</p> <p>Okay, do you think the current system meets the patient's needs, in terms of the number of sessions, for example?</p> <p>No, honestly, the patients sometimes, there are factors that prevent the patient from continuing sessions. In some hospitals, I'll be honest with you, they apologize if there isn't enough staff or other reasons, and they reduce the</p>	<p>(contradiction) Patients are not involved in goal settings.</p> <p>There is no environmental and home assessment.</p> <p>Current system does not meet patient intensity needs.</p>	<p>Lack of patient involvement</p> <p>Lack of patient perpetration for post discharge</p>	<p>Perspectives on goal setting</p> <p>Post discharge experience</p> <p>Care continuity: Rehabilitation needs</p>
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<p>number of sessions for the patient even though the patient needs more. Many things that the patient actually needs may not be provided.</p> <p>Yes. Alright, how can we solve the problem of the patient's rehabilitation intensity? Some patients have told me that they only get, for example, maximum two sessions a week, or one PT and one OT. How can we address this issue?</p> <p>Well, this problem requires the physical therapist to be aware of it. We need to focus on patient education. A session once a week, for the most part, may not provide significant benefits. Many patients need more. Some therapists give the patient just one session a week, and on top of that, they don't even provide a proper home program. This is a problem, another problem. If possible, sometimes patients say they don't have transportation, so they can only attend one session. In this case, maybe you can give them that session and then continue with them virtually or remotely. Also, provide them with the proper home program. Alternatively, involve a caregiver, someone accompanying them, teach them the appropriate exercises, and remind them regularly. These things could help solve the problem.</p>	<p>Staff shortage</p> <p>Solution for low intensity: Education Proper home program. One session a week is not sufficient for patients.</p> <p>No proper home program provided from some therapists.</p> <p>Solution for transportation and intensity: Virtual clinics Prober home program Caregiver involvement</p>	<p>Limitation in current system</p> <p>Long term approaches limitation</p> <p>Home care:</p> <p>Benefits of telerehabilitation</p>	<p>Care continuity</p> <p>Home program perspective</p> <p>Telerehabilitation perspectives</p>
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<p>Yes. Alright, from your perspective, do therapists usually provide a proper home program, or do they just say, "Do the exercises we did in the session at home"?</p> <p>Yes, that's mostly accurate. They don't provide proper education for home programs; instead, they instruct patients to perform the exercises covered in the session at home, even if the patient may not be familiar with the exercises initially. so they start asking the therapist to take a video of them doing it with their phone. The therapist usually says, "Now, remember the exercises I'm doing for you in the session so you can do them at home." The patient might say, "Record me with your phone," so when they get home, they can remember and replicate the exercises.</p> <p>Yes. How about virtual clinics? Are they activated at your place? Are they useful? Do patients accept it?</p> <p>Well, from a useful perspective, they are beneficial because, as I mentioned, some circumstances limit the patient and yourself. Virtual clinics can address these issues like transportation. But, from what I observe, they don't always work correctly. If we take a positive approach, for some patients who can't come, I can still follow up with you at home. I can give you some weights, a</p>	<p>Most therapist do not provide prober home program.</p> <p>No organized home program for patients.</p> <p>Virtual clinic are beneficial if it used in the right way</p> <p>Virtual clinics are solution for transportation.</p>	<p>Home care needs</p> <p>Benefits of telerehabilitation</p>	<p>Home program perspective</p> <p>Perspectives on telerehabilitation</p>
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<p>TheraBand, provide exercises, and guide you remotely. However, to be honest, it's not widely implemented and doesn't solve problems consistently.</p> <p>What do we need to do to implement it correctly?</p> <p>Well, I believe we need awareness, both from the patient and the therapist. Sometimes, therapists may not have proper organization for virtual clinics, as they might have patients and other commitments simultaneously. There needs to be awareness from the therapist that virtual clinics must provide the patient with their due attention. Some patients face difficult circumstances that prevent them from coming regularly for various reasons. Sometimes, even the patient might have a long journey. In the end, if you give them a couple of exercises that they can do at home, why should they go through the trouble of traveling? This requires awareness from the therapist, emphasizing the importance of virtual clinics, and also from the patient. Some patients might get upset when you suggest virtual rehab, insisting they want to come to the clinic.</p> <p>Even virtual sessions can be beneficial. If you focus with me and follow the exercises I provide, you'll surely benefit.</p> <p>Okay, have you ever done live exercises through virtual clinics?</p>	<p>Virtual clinics has not been correctly implemented.</p> <p>Requirement for virtual clinics to be implemented correctly: Education for both therapists and patients</p> <p>Barriers to virtual clinics: Lack of awareness of its importance.</p> <p>Virtual clinics could replace physical sessions</p> <p>Patients do not accept virtual clinics</p> <p>Need for correct implementation.</p>	<p>Barriers for TR</p> <p>Needs for proper use of TR</p> <p>Barriers to implement TR</p> <p>Patients' barriers to TR</p> <p>Barriers to TB</p>	<p>Perspectives on telerehabilitation</p> <p>Perspectives on TR</p> <p>Perspectives on TR</p> <p>Perspectives on TR</p> <p>Perspectives on TR</p> <p>Perspectives on TR</p>
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<p>Yes I've done it, but not for a stroke patient. It was for a musculoskeletal patient.</p> <p>Yes. Alright, what was your impression? How did the patient react?</p> <p>Very positive. The patient, being a military person, spent two weeks in ... and two weeks in ... I explained that it wouldn't work for me to start the treatment, have it interrupted, and then resume later. So, with virtual sessions, I started working with him. Each time I entered, I asked him what happened, if there was any improvement or not. I guided him through exercises, gave him TheraBand. <i>It's really good if done correctly. It's not just a statistical measure; it's about actual patient benefit. Unfortunately, for most, it becomes more about statistics and indicators than the patient benefiting.</i></p> <p>Interviewer: Okay, what are the gaps in the current system? What things would you like to improve if you had the chance?</p> <p>Participant: Well, if I could improve something, initially, <i>I would want a specific assessment form for strokes that most therapists could use. Also, the patient should have sessions and treatment programs tailored to their needs and what they hope to achieve, in collaboration with the therapist. Additionally, increasing the number of sessions would improve results. If we can't increase</i></p>	<p><i>Virtual clinics is beneficial if it applied correctly.</i></p> <p><i>Therapists need record of virtual session for their annual evaluation.</i></p> <p><i>Need for training on neuro assessment.</i></p> <p><i>Needs for session to be tailored to patient's needs.</i></p> <p><i>Need to increase the intensity of the sessions.</i></p>	<p>Facilitators</p> <p>PT needs to do TR</p> <p>Stroke assessment</p>	<p>Perspectives on TR</p> <p>Training needs</p> <p>Training needs</p>
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<p>the physical sessions, virtual sessions could be a solution. For example, two physical sessions and one virtual session could significantly enhance outcomes. Currently, many patients receive very few sessions, maybe just two, and this is a maximum. Some may only have one session, especially if it becomes chronic. In chronic cases, therapists might tell the patient that they won't see significant improvement, and they don't need to come more than once a week.</p> <p>Um, okay, do you have services provided outside the hospital? like home care?</p> <p>Any services outside the hospital setting, like social services?</p> <p>Yes, in some cases, not all cases. In some cases, the patient should be bedridden and unable to come, so they have home care with a doctor, nurse, and physical therapist.</p> <p>In your department, do you have shared days or is it completely separate?</p> <p>No, it's completely separate thanks God</p> <p>Okay.</p> <p>Alright, do hospitals provide training for therapists? as sub-specialties?</p>	<p>Virtual clinics can be used to increase the intensity. Patients receive two sessions maximum. Chronic patients receive less sessions.</p> <p>Home care is not eligible for all patients. Should be bedridden and unable to come.</p>	<p>Goal setting</p> <p>Intensity of rehab</p> <p>TR to increase the intensity.</p> <p>Eligibility for home care</p>	<p>Rehabilitation needs</p> <p>Perspectives on TR</p> <p>Home care perspectives</p>
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<p>Yes, continuous training.</p> <p>No not at all, Some hospitals do rotations, like having therapists spend two months in neuro and two months in ortho. But if there's specialized training in a specific field, and qualified individuals are available, the outcomes could be better.</p> <p>Okay, what do you need to provide good service for stroke patients? What services?</p> <p>Yes, for example, if there are specialized courses, what training content do you need to offer good service for stroke patients?</p> <p>Well, I believe if there's someone specialized in neuro, qualified for neuro cases, and they start offering courses, particularly in assessment – the foundation. Then, they proceed with the treatment procedure. These things would be better because most therapists are not specialized. They might handle ortho for two months, and suddenly they have a neuro patient. Most of them don't take courses or strengthen themselves in this field. So, you might see the same exercises, the same protocols applied to most patients. As you</p>	<p>There is no training for therapists.</p> <p>Need for courses from specialized person.</p> <p>Need for training on stroke assessment and treatment.</p> <p>Same exercises used for all patients from different speciality.</p>	<p>Lack of available training</p> <p>Stroke assessment and treatment</p> <p>Tailored patients plan</p>	<p>Training needs</p> <p>Training needs</p> <p>Training needs</p>
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<p>know, each patient has different needs, but there are things that have become essential and repeated for most patients across specialties but on the other hand it is not essential.</p> <p>Okay, what about self-management, which includes home exercises? To what extent are patients committed to them, and what are the obstacles preventing patients from applying them?</p> <p>Well, sometimes patients may not have enough education, some things that are not available to them at home, or they might lack assistance. Especially for people who, for instance, cannot walk well or lack good balance, they can't do it without help, and they may not have support at home. This is a problem we often face. For example, if there are problems at home or no one can help them, they say, "I can't do it, and I don't have anyone to assist me." Even though you provide them with exercises to do at home, they can't perform them.</p> <p>Okay, in assessing the patients' needs, like personal, mobility, or care needs, do you conduct such assessments to understand what they lack and what you can provide?</p>	<p>Barrier for home exercises adherence.</p> <p>No assessment for patients needs.</p>	<p>Barrier to self-management</p>	<p>Perspectives on self-management</p>
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<p>No, no, it's not like that. It's more about the usual things. For instance, they might need a resistant band, or perhaps a walker. These are the things we provide for them based on their needs.</p>			
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Appendix 17: completed COREQ checklist.

Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

Developed from:

Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

No. Item	Guide questions/description	Reported on Page #
Domain 1: Research team and reflexivity		
<i>Personal Characteristics</i>		
1. Inter viewer/facilitator	Which author/s conducted the interview or focus group?	Page 9
2. Credentials	What were the researcher's credentials? E.g. PhD, MD	Page 9
3. Occupation	What was their occupation at the time of the study?	Page 9
4. Gender	Was the researcher male or female?	
5. Experience and training	What experience or training did the researcher have?	Page 9
<i>Relationship with participants</i>		
6. Relationship established	Was a relationship established prior to study commencement?	Page 9

7. Participant knowledge of the interviewer	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	Page 7 and 8
8. Interviewer characteristics	What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	Page 9

Domain 2: study design		
<i>Theoretical framework</i>		
9. Methodological orientation and Theory	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	Page 5
<i>Participant selection</i>		
10. Sampling	How were participants selected? e.g. purposive, convenience, consecutive, snowball	Page 7
11. Method of approach	How were participants approached? e.g. face-to-face, telephone, mail, email	Page 7
12. Sample size	How many participants were in the study?	Page 9
13. Non-participation	How many people refused to participate or dropped out? Reasons?	
<i>Setting</i>		

14. Setting of data collection	Where was the data collected? e.g. home, clinic, workplace	Page 7
15. Presence of non-participants	Was anyone else present besides the participants and researchers?	Page 7
16. Description of sample	What are the important characteristics of the sample? e.g. demographic data, date	Page 9
<i>Data collection</i>		
17. Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	Page 6 and 7
18. Repeat interviews	Were repeat interviews carried out? If yes, how many?	No
19. Audio/visual recording	Did the research use audio or visual recording to collect the data?	Page 8
20. Field notes	Were field notes made during and/or after the interview or focus group?	Page 9
21. Duration	What was the duration of the interviews or focus group?	Page 9
22. Data saturation	Was data saturation discussed?	Page 9
23. Transcripts returned	Were transcripts returned to participants for comment and/or correction?	Page 9
Domain 3: analysis and findings		
<i>Data analysis</i>		
24. Number of data coders	How many data coders coded the data?	Page 9
25. Description of the coding tree	Did authors provide a description of the coding tree?	Page 11

26. Derivation of themes	Were themes identified in advance or derived from the data?	derived from the data
27. Software	What software, if applicable, was used to manage the data?	N/A
28. Participant checking	Did participants provide feedback on the findings?	NO
<i>Reporting</i>		
29. Quotations presented	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	Page 13 to 20
30. Data and findings consistent	Was there consistency between the data presented and the findings?	Page 13 to 20
31. Clarity of major themes	Were major themes clearly presented in the findings?	Yes
32. Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	Page 13 to 20

Appendix 18: STP components

Training	Elements	Justification
Introduction to the training programme.	Content of the training	To ensure participants understand the context, objectives, and relevance of the training to enhance their engagement.
	Importance of the training	
	Overview of the needs in SA	
Introduction to stroke.	Introduction to stroke (definition, types, signs and symptoms).	To ensure participants have a clear foundational knowledge about stroke and its rehabilitation.
	Stroke recovery (Spontaneous and functional).	
	Stroke rehabilitation	
	Community rehabilitation	
	Stroke in SA	
Education	Education and its importance	The lack of standardised education framework in SA was evident. Thus, it was important to provide training on how to educate the patients and carers.
	Active education and its importance	Defining active education ensures physiotherapists understand the concept and its importance in promoting engagement and interactive learning during stroke recovery as active education was more effective than passive education (Forster <i>et al.</i> , 2012). Further, to empower physiotherapists to educate their patients actively rather than passively.
	The role of carer at this stage.	Highlighting the role of the carer was crucial to shift the physiotherapists' focus from solely the patient to the carer, especially considering that multiple cognitive issues often arise during this stage of recovery. Carers play an important role in stroke recovery (Qureshi <i>et al.</i> , 2021).

	What information should be given to the patients and carer?	Providing physiotherapists with guidance on addressing common post-stroke questions equips them with the knowledge to deliver effective, patient-centred care, and ensure they can confidently support both patients and carers in managing the recovery process.
	Common questions after stroke The questions were driven from (Heart and Stroke Foundation of Canada, 2024) checklists.	
	Practical advice and tips (Basic ADLs education: 12 Videos from Stroke for Carer website.	
Discharge	Discharge planning and its importance	Discharge planning was one of the most repeated limitations in SA healthcare system, thus it was necessary to provide training on its importance and the guidelines around it.
	Guidelines around transition (NICE)	
	Example of discharge planning form (IDEAL)	To align with international standards as the IDEAL discharge planning method was found effective in enhancing patient satisfaction (Moradi <i>et al.</i> , 2024).
Assessment and Outcome measures	Overview on ICF	Training physiotherapists on the ICF will help them to address not only physical impairments but also activity limitations and participation restrictions. This ensures care that aligns with the multifaceted needs of stroke patients, improving long-term outcomes.
	Stroke assessment: Subjective, Objective (Cognitive, sensation, voluntary and involuntary movement, reflexes, balance,	Recap on assessment approaches was upon request from physiotherapists and also ensures comprehensive coverage of all aspects of rehabilitation, from admission to discharge.

	posture). (12 short videos to demonstrate the assessment).	
	<p>Stroke Severity NIH stroke scale</p> <p>Motor function Fugl-Meyer Assessment. Modified Ashworth scale.</p> <p>Activities of daily living Barthel Index (BI) Functional Independence measure (FIM)</p> <p>Quality of life SS-QoL</p> <p>Depression and Anxiety Hospital Anxiety and Depression Scale (HADS).</p>	<p>Training in outcome measures was aimed to establish standardisation in clinical practice.</p> <p>The comprehensive assessment of stroke patients begins with identifying stroke severity. Then the Fugl-Meyer Assessment can act as the main assessment tool, as it comprehensively evaluates motor function, sensory impairments, balance, and joint range of motion. It is one of the most widely are reliable used tools to assess motor impairments (Gladstone, Danells and Black, 2002).</p> <p>Modified Ashworth scale to measure spasticity levels since it was not measured by Fugl-Meyer.</p> <p>Additionally, to ensure comprehensive coverage of various aspects of stroke recovery, not just physical function, it was necessary to provide training on other tools for quality of life.</p> <p>These motor impairments subsequently impact a patient's ability to perform daily activities. Thus, tools on measuring activities of daily living were necessary. The BI is easy and widely known, FIM provides more details than BI including social and cognitive aspects. These measures can help collect valid and responsive information from the patients (NICE, 2023).</p> <p>Further, the SS-QoL and HADS are particularly significant as it provides insight into patients' unmet needs and psychological needs which were repeatedly reported by patients. These measures are widely and valid measures in stroke care (Duncan, 2013).</p>
Goal setting	<p>Definition</p> <p>Importance of goal setting.</p>	<p>The inclusion of goal-setting training was essential to ensure patient-centred stroke rehabilitation.</p>

	<p>Framework to support goal setting (SMART; G-AP; GAS).</p>	<p>SMART is a widely recognised tool for goal setting, while the G-AP framework was chosen for its validation in stroke rehabilitation and accessible online resources for clinicians (Scobbie <i>et al.</i>, 2013). GAS was selected for its simplicity and efficiency, making it ideal for physiotherapists with busy schedules who need practical, time-efficient tools for goal setting and monitoring (Turner-Stokes, 2009).</p>
<p>Self-management</p>	<p>Definition Importance of self-management Example of self-management model (SIMS (Sahely <i>et al.</i>, 2023)). Graded Repetitive Arm Supplementary Program (GRASP). Patient Activation Measure (PAM).</p>	<p>The inclusion of the self-management module aimed to equip physiotherapists with guidance on evidence-based practice. The SIMS model (Sahely <i>et al.</i>, 2023) was specifically chosen as it was developed for stroke rehabilitation, used goal setting and action planning framework, and its applicability in both group and individual settings, delivered through an online platform, making it practical for use in Saudi Arabia. Given SIMS' focus on lower limb rehabilitation, GRASP was selected for its targeted approach to upper limb recovery, as it provides structured materials that physiotherapists can easily implement with their patients (Harris <i>et al.</i>, 2009). PAM was selected to assess patients' ability to manage their condition, and thus, to guide the level of support allocated to patients (Hibbard and Greene, 2013, p. 207).</p>
<p>Tele-rehabilitation</p>	<p>What is telerehabilitation? International guidelines (NICE) Operational measures Considerations for ensuring safety during telerehabilitation.</p>	<p>The operational measures component was crucial to provide guidance on technical requirements and service delivery protocols (Kim <i>et al.</i>, 2022). Safety considerations were particularly emphasised given the unique challenges of remote rehabilitation (Gutierrez-Arias <i>et al.</i>, 2023).</p>
<p>Additional resources</p>	<p>A word file contain reference,</p>	<p>The supplementary file was provided to enhance the training experience by providing additional resources and tools that support the learning process.</p>

	<p>Forms that were explained in the STP such as outcome measures, G-AP, GAS, GRASP in links.</p> <p>Videos were provided in education and assessment modules.</p>	
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Appendix 19: (TIDieR) checklist

Supplementary file 2: The TIDieR Checklist.



The TIDieR (Template for Intervention Description and Replication) Checklist*:
Information to include when describing an intervention and the location of the information

Item number	Item	Where located **	
		Primary paper (page or appendix number)	Other † (details)
1.	BRIEF NAME A training programme for physiotherapists to improve delivering long term care for patients with stroke in Saudi Arabia	_____1_____	_____
		-	

2.	WHY		
	(a) Stroke patients may encounter challenges and have additional needs including care continuity following long-term, hospital-based rehabilitation.	____ 1, 2, 3, ____	__ Temehy et al., 2023
	(b) Relying on public health services presents many future health challenges particularly when factoring in rapid population growth and increasing life expectancy.		_____
	(c) Lack of post-discharge provision for stroke patients (including community services).		
	(d) Absence of standardised care approaches for stroke patients in KSA.		
	(e) Lack of training for professionals treating long-term stroke patients.		
3.	WHAT		
	Introduction To Stroke: This section will provide introduction to stroke and stroke rehabilitation in hospital and in community.	_____ 6 —	_____ —
	Carer-education and care-transition: This section will provide overview on patients’ and carers’ education, discharge planning and home needs assessment.		
	Outpatients stroke care: This section will give overview on how stroke assessed, using stroke outcome measures and the process of goal setting.		
	Self-management and telerehabilitation: This section will provide evidence-based practice on how to provide supported self-management for the patients and technology effectively to support stroke rehabilitation.		
4.	WHO PROVIDED		
	PI (BT) to physiotherapists who work with stroke patients.	_____ 8 —	_____ —

5.	HOW	Online and recorded via Zoom.	8	-
7.	WHERE	The training programme was delivered to therapists across hospitals in one city in KSA.	6	-
WHEN and HOW MUCH				
8.	Between 5 April to 12 June 2024. Two and a half hours		11	-
9.	TAILORING	N/A	-	-
10.	MODIFICATIONS	N/A	-	-
11.	HOW WELL	N/A	-	-
			-	-
			-	-

** **Authors** - use N/A if an item is not applicable for the intervention being described. **Reviewers** – use ‘?’ if information about the element is not

Appendix 20: Copy of the questionnaires

Pre training

Dear participant, thank you for your time in taking part in this study.
This is Basema Temehy, PhD candidate at University of Birmingham,

In this study, we are interested in implementing and evaluating an online training program for physiotherapists that will enable them to deliver long-term care following discharge after a stroke in Saudi Arabia.

The pre-training questionnaire consists of four sections.
All the information will be confidential, and stored privately such as your name will not be published and not shared with anyone outside the study research team.

Thank you for taking part in this research.
Please proceed when you are ready.

عزيزي المشارك، شكرًا لك على وقتك في المشاركة في هذه الدراسة
أنا باسمة طميجي، طالبة دكتوراه في جامعة بيرمنجهام

في هذه الدراسة، نحن مهتمون بتنفيذ وتقييم برنامج تدريبي عبر الإنترنت لأخصائيي وفني العلاج الطبيعي، حيث سيمكنهم البرنامج من الرعاية لمرضى السكتة الدماغية على المدى البعيد بعد الخروج من المستشفى تقديم

يتكون استبيان ما قبل التدريب من أربعة أقسام
ستكون جميع المعلومات سرية، ولن يتم نشر أي من بياناتك الشخصية، مثل اسمك مع أي جهة خارج الفريق البحثي

شكرًا لمشاركتك في هذا البحث
فضلاً ابداً عندما تكون جاهزاً

1. What is your name (Optional) (إختياري) ماهو اسمك

2. What is your gender? ما هو جنسك

- Male ذكر
 Female أنثى

3. How old are you? كم عمرك

- 18-29
 30-39
 40-49
 50-59
 60 +

4. What is your education level? ما هو مستوى تعليمك

- Internship متدرب
- Diploma دبلوم
- Bachelor بكالوريوس
- Master ماجستير
- PhD دكتوراه

5. How many years have you been working with stroke? كم إجمالي السنوات التي قضيتها في تأهيل مرضى الجلطة الدماغية
- Less than 1-year أقل من سنة
 - 1 - 5 years ١-٥ سنوات
 - 6 - 10 years ٦-١٠ سنوات
 - More than 10 years أكثر من عشر سنوات
6. How long have you been practicing in your current field? كم مدة ممارستك لمجالك الحالي
- Less than 1-year أقل من سنة
 - 1 - 5 years ١-٥ سنوات
 - 6 - 10 years ٦-١٠ سنوات
 - 11 - 20 years ١١-٢٠ سنة
 - More than 20 years أكثر من ٢٠ سنة

Attitude

7. How do you rate the importance of patients' and carers' education during inpatient stay? كيف تقييم أهمية تعليم المرضى وعائلاتهم خلال فترة الإقامة في المستشفى
- Not important Low Moderate Very Extremely important
8. How do you assess patients' needs prior to discharge to community? كيف تقييم احتياجات المريض قبل الخروج من المستشفى للمنزل
- No particular method لا توجد طريقة معينة
 - Ask patients سؤال المريض
 - Ideal discharge planning form نموذج التخطيط المثالي للخروج
 - Team has developed its own method قام الفريق بتطوير طريقتهم الخاصة
 - Other أخرى
9. How do you rate the importance of using outcome measures in stroke care? كيف تقييم أهمية استخدام مقاييس النتائج في رعاية السكتة الدماغية؟
- Not important Low Moderate Very Extremely important
10. How do you rate the importance of goal setting session with patients and family? كيف تقييم أهمية جلسة تحديد الأهداف مع المرضى وأفراد العائلة؟
- Not important Low Moderate Very Extremely important

11. Which method of goal setting do you use? ما الطريقة التي تستخدمها في تحديد الأهداف
- No particular method لا توجد طريقة محددة
 - Goal attainment scale (GAS)
 - G-AP
 - Team has developed its own methods قام الفريق بتطوير طريقته الخاصة
 - Other أخرى
12. How do you monitor goals to know when a goal has been achieved? كيف تراقب الأهداف لمعرفة متى تم تحقيق هدف معين
- Using outcome measures باستخدام مؤشرات النتائج
 - In discussion with the MDT المناقشه مع الفريق الطبى
 - I use my experience and clinical judgment (individually decided by staff) استخدم (خبرتي وحكمى السريري) (يتم تحديده بشكل فردي من المعالج)
 - Decided by patient يتم تحديده من قبل المريض
 - Other أخرى
13. How do you rate the importance of tele-rehabilitation for patients with stroke? كيف تقيم أهمية التأهيل عن بعد لمرضى السكتة الدماغية
- Not important Low Moderate Very Extremely important

Knowledge

14. How do you assess stroke severity كيف تقيم حدة الاستروك
- NIH stroke scale
 - Barthel index
 - Mini mental examination test
 - Stroke impact scale
15. After transfer of care from hospital, people with rehabilitation needs after stroke (including those in care homes) should be followed up within: بعد نقل الرعاية من المستشفى، يجب متابعة الأشخاص الذين يحتاجون إلى التأهيل بعد السكتة الدماغية (بما في ذلك الذين يقيمون في دور الرعاية) خلال:
- 5 days ٥ ايام
 - 72 hours ٧٢ ساعة
 - Two weeks اسبوعين
 - One month شهر
16. At what regular intervals should patients with stroke be assessed and reviewed: ما هي الفترات الزمنية المنتظمة التي يجب فيها تقييم ومراجعة المرضى الذين يعانون من السكتة الدماغية
- Baseline, 6 months اول زيارة ثم بعد ستة اشهر
 - With every visit مع كل زيارة
 - Every two weeks كل اسبوعين
 - Admission, 6 months and then annually. اول زيارة، ستة اشهر ثم سنويا.

17. Stroke for carer website provides: موقع السكتة الدماغية لرعاة المرضى يقدم:

- Group exercises for carers. تمارين جماعية لمقدمي الرعاية
- Carer burden assessment. تقييم عبء الرعاية
- Education and practical tips for carer. تعليم ونصائح عملية لمقدمي الرعاية
- Social support for caregivers. دعم اجتماعي لمقدمي الرعاية

18. According to NICE 2023 guidelines, the intensity of rehabilitation for patients with stroke should be: وفقاً لإرشادات نيس ٢٠٢٣، ينبغي ان يكون شدة التأهيل للمرضى الذين يعانون من السكتة الدماغية:

- At least 3 hours a day, on at least 5 days of the week. على الاقل ثلاث ساعات في اليوم. خمس ايام في الاسبوع
- At least 45 minutes a day, on at least 7 days of the week. على الاقل ٤٥ دقيقة في اليوم. سبعة ايام في الاسبوع
- At least 2 hours a day, on at least 5 days of the week. على الاقل ساعتين في اليوم يومين في الاسبوع
- At least 1 hours a day on at least 2 days of the week. على الاقل ساعه في اليوم مره في الاسبوع

19. Fugl-Meyer Assessment scale use to measure? يُستخدم مقياس تقييم فوجل-ماير لقياس:

- Mental status assessment تقييم الحالة العقلية
- Family assessment تقييم العائلة
- Motor function assessment تقييم الوظائف الحركية
- Quality of life assessment تقييم جودة الحياة

20. Barthel index is outcome tool to measure? مؤشر بارثل هو أداة لقياس:

- Activity of daily living الانشطه اليومية
- Balance assessment تقييم التوازن
- Cognitive assessment تقييم الادراك
- Depression scale مؤشر الاكتئاب

21. What is G-AP? ما هو G-AP

- Tool assesses patients with stroke quality of life. تقييم جودة حياة مرضى السكتة الدماغية.
- Tool supports person-centred, goal setting practice. أداة تدعم الممارسة الموجهة نحو الشخص وتحديد الاهداف
- Tool assesses self-management ability. أداة تقييم قدرة الإدارة الذاتية.
- Tool supports delivering effective telerehabilitation. أداة تدعم تقديم العلاج عن بُعد بفعالية

22. A good action plan is: خطة العمل الجيدة تكون:

- MEASURABLE
- SMART
- UNIQUE

FAST

23. What Goal Attainment Scaling (GAS) used for? GAS يُستخدم لماذا

- To evaluate quality of life. لتقييم جودة الحياة
- To evaluate functional goals لتسجيل الاهداف
- To evaluate coping at home. لتقييم التكيف في المنزل
- To evaluate caregiver preparedness. لتقييم جاهزية مقدمي الرعاية

24. What are the common self-management strategies? ماهي الاستراتيجيات الشائعة في التأهيل الذاتي

- One to one coaching. التدريب الفردي
- Peer support دعم النظير
- Goal setting and action planning. تحديد الأهداف وتخطيط الإجراءات
- Websites. مواقع الويب
- All above جميع ما سبق

25. GRASP is a? GRASP ماهو

- Self-directed arm and hand exercise program. برنامج ذاتي لتمارين الذراع واليد
- Self-directed lower limb exercise program. برنامج ذاتي لتمارين الجزء السفلي
- Exercise program supports hand grasping. برنامج تمارين لدعم قبضة اليد
- Exercise program supports balance. برنامج تمارين لدعم التوازن

26. What are the versions of GRASP? ماهي الاصدارات GRASP

- Community activity version. النسخة الخاصة بالأنشطة المجتمعية
- Balance and coordination. التوازن والتنسيق
- Upper and lower limbs version. النسخة الخاصة بالاطراف العلوية والسفلية
- Home and Hospital version. نسخة منزلية ونسخه للمستشفى

27. Patient activation measures is a validated questionnaire to measure: مقياس تفعيل المريض هو مقياس معتمد يستخدم لقياس

- Knowledge, skills and confidence that a person has to manage their own wellbeing. المعرفة والمهارات والثقة التي يملكها الشخص لإدارة صحته الخاصة
- Caregivers' preparedness post discharge جاهزية مقدمي الرعاية بعد الخروج
- Caregiving burden. عبء الرعاية
- Patients' and caregivers' self-esteem. تقدير المرضى ومقدمي الرعاية

28. To ensure safety during tele-rehabilitation, patients should: لضمان السلامة أثناء التأهيل عن بُعد، يجب أن يكون المرضى

- Given the appropriate dosing of exercise. شدة التمارين المناسبة
- Performing exercises next to a wall. اداء التمارين بجوار الحائط
- Get assistance from carers. الحصول على مساعدة من مقدمي الرعاية
- All above. جميع ما سبق

Confidence

29. I feel confident in providing carers the education and support they need to help in the rehabilitation process. أشعر بالثقة في تقديم الدعم الذي يحتاجه رعاة المرضى لمساعدتهم في عملية التأهيل.

1 3 5 7 10

Not confident
غير واثق

Extremely
confident جداً
واثق

30. I feel confident in providing stroke patients the necessary support prior to discharge. أشعر بالثقة في تقديم الدعم اللازم لمرضى السكتة الدماغية قبل الخروج.

1 3 5 7 10

Not confident
غير واثق

Extremely
confident جداً
واثق

31. I feel confident in using outcome measures related to stroke care. أشعر بالثقة في استخدام مؤشرات النتائج المتعلقة برعاية السكتة الدماغية.

1 3 5 7 10

Not confident
غير واثق

Extremely
confident جداً
واثق

32. I feel confident in using G-AP to set goals for patients with stroke. أشعر بالثقة في استخدام قاب لتحديد الأهداف لمرضى السكتة الدماغية.

1 3 5 7 10

Not confident
غير واثق

Extremely
confident جداً
واثق

33. I feel confident in providing effective rehabilitation virtually. أشعر بالثقة في تقديم التأهيل الفعال عن بعد.

1 3 5 7 10

Not confident
غير واثق

Extremely
confident جداً
واثق

Post training

Dear participant, thank you for completing the pre training questionnaire and the training program. The post training questionnaire consists of five sections (Demographics, satisfaction, altitude, knowledge, and confidence).

Please proceed when you are ready.

عزيزي المشارك، شكرًا لإستكمالك استبيان ما قبل التدريب والبرنامج التدريبي.

يتكون استبيان ما بعد التدريب من خمسة أقسام

فضلاً ابدأ عندما تكون جاهزاً

1. What is your name (Optional) (إختياري) ماهو اسمك (إختياري)

Satisfaction

2. Did you complete the training program in ONE sitting? هل أكملت البرنامج التدريبي في جلسة واحدة?

q Yes q No

3. If NO, how many times you returned to the program before completing it? اذا كان الإجابة لا: كم عدد المرات التي عدت فيها للبرنامج قبل اكماله؟ _____

4. What do you think of the length of the online training program? ما هو رأيك في مدة البرنامج التدريبي

Much too short Too short About right Too long Much too long

5. Overall, how satisfied were you with the information contained in the training program? ما هو مدى رضاك عن المعلومات التي يحتويها البرنامج?

Very satisfied Satisfied Neither satisfied or dissatisfied Dissatisfied Very dissatisfied

6. Please comment: الرجاء التعليق

7. Please indicate if you thought the content of the training program was: يرجى تحديد ما تعتقده عن محتوى البرنامج؟

	Very	Somewhat	Neither	Not very	Not at all
a. Clearly presented	1	2	3	4	5
b. Informative	1	2	3	4	5
c. Adequate	1	2	3	4	5
d. Appropriate	1	2	3	4	5
e. Relevant to your work	1	2	3	4	5
f. Useful to your work	1	2	3	4	5

8. What were the parts of the training program that you found particularly helpful or liked? ما هي الأجزاء في البرنامج التدريبي التي وجدتها مفيدة لك بشكل خاص أو اعجبتك؟

9. What were the parts of the training program that you found particularly unhelpful or disliked? ما هي الأجزاء التي وجدتها في البرنامج التدريبي غير مفيدة لك بشكل خاص أو لم تعجبك؟

10. Was there anything you wanted to know but not covered in the training program? هل كان هناك أي شيء ترغب في معرفته ولكن لم يتم تغطيته في البرنامج التدريبي

q Yes q No

11. If YES, please specify: إذا كانت الإجابة نعم: فضلاً حدد

12. Online Format of the program was: هل كان التدريب عن بعد مناسب

1 3 5 7 10

Not appropriate

Appropriate

13. If NO, please list other formats: إذا كانت الإجابة لا: فضلاً حدد خيارات أخرى

14. How accessible were the additional resources contained in the training program كيف كانت إمكانية الوصول إلى الموارد الإضافية الموجودة في البرنامج التدريبي

1 3 5 7 10

Easy

Difficult

15. If difficult, please comment: اذا كانت صعبة، الرجاء التعليق.

16. Do you have any other suggestions about how the training program could be improved? هل لديك أي اقتراحات أخرى حول كيفية تحسين البرنامج التدريبي

Attitude

17. How do you rate the importance of patients' and carers' education during inpatient stay? كيف تقيم أهمية تعليم المرضى وعائلاتهم خلال فترة الإقامة في المستشفى

Not important Low Moderate Very Extremely important

18. How do you assess patients' needs prior to discharge to community? كيف تقيم احتياجات المريض قبل الخروج من المستشفى للمنزل

- No particular method لا توجد طريقة معينة
- Ask patients سؤال المريض
- Ideal discharge planning form نموذج التخطيط المثالي للخروج
- Team has developed its own method قام الفريق بتطوير طريقتهم الخاصة
- Other أخرى

19. How do you rate the importance of using outcome measures in stroke care? كيف تقيم أهمية استخدام مقاييس النتائج في رعاية السكتة الدماغية؟

Not important Low Moderate Very Extremely important

20. How do you rate the importance of goal setting session with patients and family? كيف تقيّم أهمية جلسة تحديد الأهداف مع المرضى وأفراد العائلة؟

- Not important Low Moderate Very Extremely important

21. Which method of goal setting do you use? ما الطريقة التي تستخدمها في تحديد الأهداف

- No particular method لا توجد طريقة محددة
 Goal attainment scale (GAS)
 G-AP
 Team has developed its own methods قام الفريق بتطوير طريقته الخاصة
 Other أخرى

22. How do you monitor goals to know when a goal has been achieved? كيف تراقب الأهداف لمعرفة متى تم تحقيق هدف معين

- Using outcome measures باستخدام مؤشرات النتائج
 In discussion with the MDT المناقشه مع الفريق الطبي
 I use my experience and clinical judgment (individually decided by staff) استخدم (خبرتي وحكمي السريري (يتم تحديده بشكل فردي من المعالج
 Decided by patient يتم تحديده من قبل المريض
 Other أخرى

23. How do you rate the importance of tele-rehabilitation for patients with stroke? كيف تقيم أهمية التأهيل عن بعد لمرضى السكتة الدماغية

- Not important Low Moderate Very Extremely important

Knowledge

24. How do you assess stroke severity كيف تقيم حدة الاستروك

- NIH stroke scale
 Barthel index
 Mini mental examination test
 Stroke impact scale

25. After transfer of care from hospital, people with rehabilitation needs after stroke (including those in care homes) should be followed up within: بعد نقل الرعاية من المستشفى، يجب متابعة الأشخاص الذين يحتاجون إلى التأهيل بعد السكتة الدماغية (بما في ذلك الذين يقيمون في دور الرعاية) خلال:

- 5 days ٥ ايام
 72 hours ٧٢ ساعة
 Two weeks اسبوعين
 One month شهر

26. At what regular intervals should patients with stroke be assessed and reviewed: ما هي الفترات الزمنية المنتظمة التي يجب فيها تقييم ومراجعة المرضى الذين يعانون من السكتة الدماغية

- Baseline, 6 months اول زيارة ثم بعد ستة اشهر
- With every visit مع كل زيارة
- Every two weeks كل اسبوعين
- Admission, 6 months and then annually. اول زيارة، ستة اشهر ثم سنويا

27. Stroke for carer website provides: موقع السكتة الدماغية لرعاة المرضى يقدم

- Group exercises for carers. تمارين جماعية لمقدمي الرعاية
- Carer burden assessment. تقييم عبء الرعاية
- Education and practical tips for carer. تعليم ونصائح عملية لمقدمي الرعاية
- Social support for caregivers. دعم اجتماعي لمقدمي الرعاية

28. According to NICE 2023 guidelines, the intensity of rehabilitation for patients with stroke should be: وفقا لإرشادات نيس ٢٠٢٣، ينبغي ان يكون شدة التأهيل للمرضى الذين يعانون من السكتة الدماغية:

- At least 3 hours a day, on at least 5 days of the week. على الاقل ثلاث ساعات في اليوم خمس ايام في الاسبوع
- At least 45 minutes a day, on at least 7 days of the week. على الاقل ٤٥ دقيقة في اليوم سبعة ايام في الاسبوع
- At least 2 hours a day, on at least 5 days of the week. على الاقل ساعتين في اليوم يومين في الاسبوع
- At least 1 hours a day on at least 2 days of the week. على الاقل ساعة في اليوم مره في الاسبوع

29. Fugl-Meyer Assessment scale use to measure? يُستخدم مقياس تقييم فوجل-ماير لقياس

- Mental status assessment تقييم الحالة العقلية
- Family assessment تقييم العائلة
- Motor function assessment تقييم الوظائف الحركية
- Quality of life assessment تقييم جودة الحياة

30. Barthel index is outcome tool to measure? مؤشر بارثل هو أداة لقياس

- Activity of daily living الانشطه اليومية
- Balance assessment تقييم التوازن
- Cognitive assessment تقييم الادراك
- Depression scale مؤشر الاكتئاب

31. What is G-AP? ما هو G-AP

- Tool assesses patients with stroke quality of life. تقييم جودة حياة مرضى السكتة الدماغية.
- Tool supports person-centred, goal setting practice. اداة تدعم الممارسة الموجهة نحو الشخص وتحديد الاهداف
- Tool assesses self-management ability. أداة تقييم قدرة الإدارة الذاتية.

- Tool supports delivering effective telerehabilitation. اداة تدعم تقديم العلاج عن بُعد بفعالية

32. A good action plan is: خطة العمل الجيدة تكون:

- MEASURABLE
 SMART
 UNIQUE
 FAST

33. What Goal Attainment Scaling (GAS) used for? لماذا يُستخدم GAS

- To evaluate quality of life. لتقييم جودة الحياة.
 To evaluate functional goals لتسجيل الاهداف
 To evaluate coping at home. لتقييم التكيف في المنزل.
 To evaluate caregiver preparedness. لتقييم جاهزية مقدمي الرعاية.

34. What are the common self-management strategies? ماهي الاستراتيجيات الشائعة في التأهيل الذاتي

- One to one coaching. التدريب الفردي
 Peer support دعم النظير
 Goal setting and action planning. تحديد الأهداف وتخطيط الإجراءات.
 Websites. مواقع الويب
 All above جميع ما سبق

35. GRASP is a? ماهو GRASP

- Self-directed arm and hand exercise program. برنامج ذاتي لتمارين الذراع واليد.
 Self-directed lower limb exercise program. برنامج ذاتي لتمارين الجزء السفلي.
 Exercise program supports hand grasping. برنامج تمارين لدعم قبضة اليد.
 Exercise program supports balance. برنامج تمارين لدعم التوازن.

36. What are the versions of GRASP? ماهي الاصدارات GRASP

- Community activity version. النسخة الخاصة بالأنشطة المجتمعية.
 Balance and coordination. التوازن والتنسيق.
 Upper and lower limbs version. النسخة الخاصة بالاطراف العلوية والسفلية.
 Home and Hospital version. نسخة منزلية ونسخه للمستشفى

37. Patient activation measures is a validated questionnaire to measure: مقياس تفعيل المريض هو مقياس معتمد يستخدم لقياس

- Knowledge, skills and confidence that a person has to manage their own wellbeing. المعرفة والمهارات والثقة التي يملكها الشخص لإدارة صحته الخاصة.
 Caregivers' preparedness post discharge جاهزية مقدمي الرعاية بعد الخروج
 Caregiving burden. عبء الرعاية.
 Patients' and caregivers' self-esteem. تقدير المرضى ومقدمي الرعاية.

38. To ensure safety during tele-rehabilitation, patients should: لضمان السلامة أثناء التأهيل عن بُعد، يجب أن يكون المرضى

- Given the appropriate dosing of exercise. شدة التمارين المناسبة.
- Performing exercises next to a wall. اداء التمارين بجوار الحائط.
- Get assistance from carers. الحصول على مساعدة من مقدمي الرعاية.
- All above. جميع ما سبق.

Confidence

39. I feel confident in providing carers the education and support they need to help in the rehabilitation process. أشعر بالثقة في تقديم الدعم الذي يحتاجه رعاة المرضى لمساعدتهم في عملية التأهيل.

1 3 5 7 10

Not confident
غير واثق

Extremely
confident جداً
واثق

40. I feel confident in providing stroke patients the necessary support prior to discharge. أشعر بالثقة في تقديم الدعم اللازم لمرضى السكتة الدماغية قبل الخروج

1 3 5 7 10

Not confident
غير واثق

Extremely
confident جداً
واثق

41. I feel confident in using outcome measures related to stroke care. أشعر بالثقة في استخدام مؤشرات النتائج المتعلقة برعاية السكتة الدماغية

1 3 5 7 10

Not confident
غير واثق

Extremely
confident جداً
واثق

42. I feel confident in using G-AP to set goals for patients with stroke. اشعر بالثقة في استخدام قاب لتحديد الأهداف لمرضى السكتة الدماغية

1 3 5 7 10

Not confident
غير واثق

Extremely
confident جداً
واثق

43. I feel confident in providing effective rehabilitation virtually. أشعر بالثقة في تقديم التأهيل الفعال عن بعد.

1	3	5	7	10
Not confident غير واثق				Extremely confident جداً واثق

Thank you for completing the training programme! Your hard work are truly appreciated.

خالص الشكر والتقدير لإكمالك هذا البرنامج التدريبي

44. Please write your email if you would like to receive acknowledgment letter for completing this training يرجى كتابة بريدك الإلكتروني إذا كنت ترغب في تلقي إشعار باكمال هذا التدريب

Appendix 21: Post training interview guide

Perceptions of the programme.

- What has been your experience of the training program? كيف تجربتك مع البرنامج التدريبي?
- Can you see any benefits from participating in the training in your practice? هل ترى أي تحسن في مستواك بعد التدريب
- Have you used any of the information provided in the training? هل استخدمت أي من المعلومات المقدمة
- How easy did you find it to use the intervention in practice? ما مدى سهولة استخدام المعلومات المقدمة عملياً

Factors and suggestion to improve the training.

- Does the intervention provide enough support for you in terms of knowledge and skills? هل وفر لك البرنامج دعم كافي فيما يخص المعرفة والمهارات?
- What did you like most about the program? ما هو أكثر شيء اعجبك في البرنامج?
- What did you like the least about the program? ما هو أكثر شيء لم يعجبك في البرنامج?
- What were the challenges? How did you overcome these? هل واجهت أي صعوبات، كيف تغلبت عليها؟
- What changes need to be made to the intervention to make it work most effectively in your practice? ماهي التغييرات التي تود اجراءها لجعل البرنامج أكثر فعالية عمليا?

Appendix 22: Analysis of questionnaires

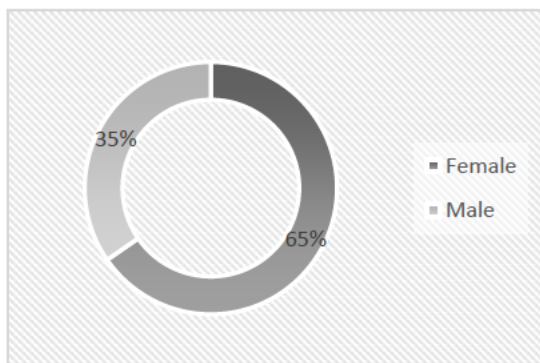
Demographics

Table 1: Demographic variables.

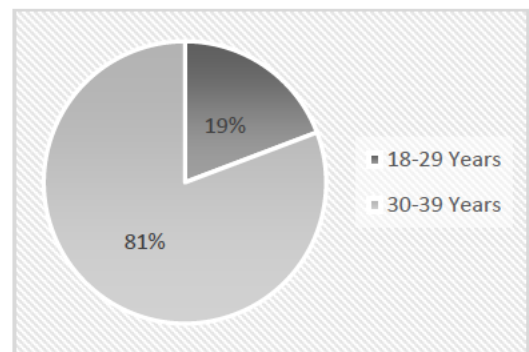
Variable	Characteristics	n	%
Gender	Female	17	65.4
	Male	9	34.6
	Total	26	100.0
Age	18-29 Years	5	19.2
	30-39 Years	21	80.8
	Total	26	100.0
Education	Bachelor	16	61.5
	Internship	2	7.7
	Master	8	30.8
	Total	26	100.0
Total years of experience in stroke care	Less than 1 Year	5	19.2
	1-5 Years	6	23.1
	6-10 Years	14	53.8

	more than 10 Years	1	3.8
	Total	26	100.0
Total years of experience as a physiotherapist	Less than 1 Year	2	7.7
	1-5 Years	4	15.4
	6-10 Years	16	61.5
	11-20 Years	4	15.4
	Total	26	100.0

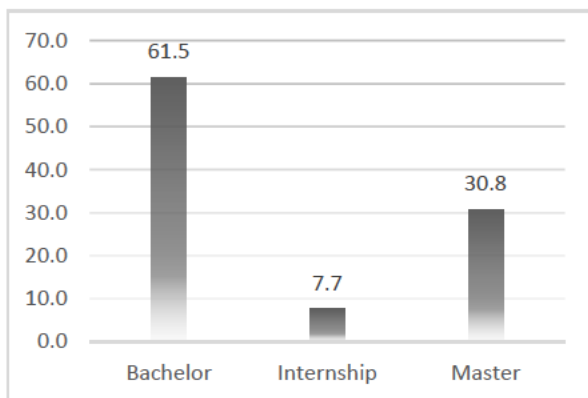
Graph (1): Participants gender.



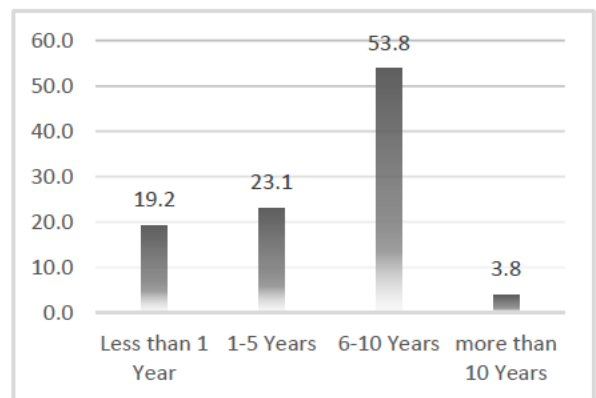
Graph (2): Participants age.



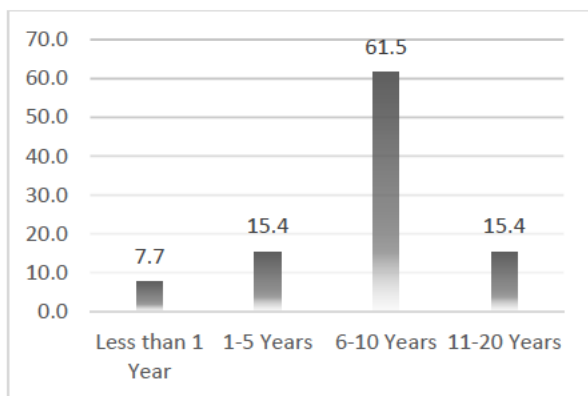
Graph (3): Education level.



Graph (4): Experience in stroke care.



Graph (5): Years of experience as a physiotherapist.



Summary of participants characteristics

- 65.4% of participants were females, while 34.6% of the participants were males.
- 80.8% of the participants were 30-39 years old, while 19.2% of the participants were 18-29 years old.
- 61.5% of the participants have bachelor's degree, while 30.8% of the participants have master's degree, while 7.7% have internship.
- 53.8% of the participants worked with stroke patients for 6-10 years, 23.1% for 1-5 years, 19.2% for less than 1 year.
- 61.5% of the participants were physiotherapists for 6-10 years, 15.4% were physiotherapists for 11-20 years, 15.4% for 1-5 years, 7.7% for less than 1 year.

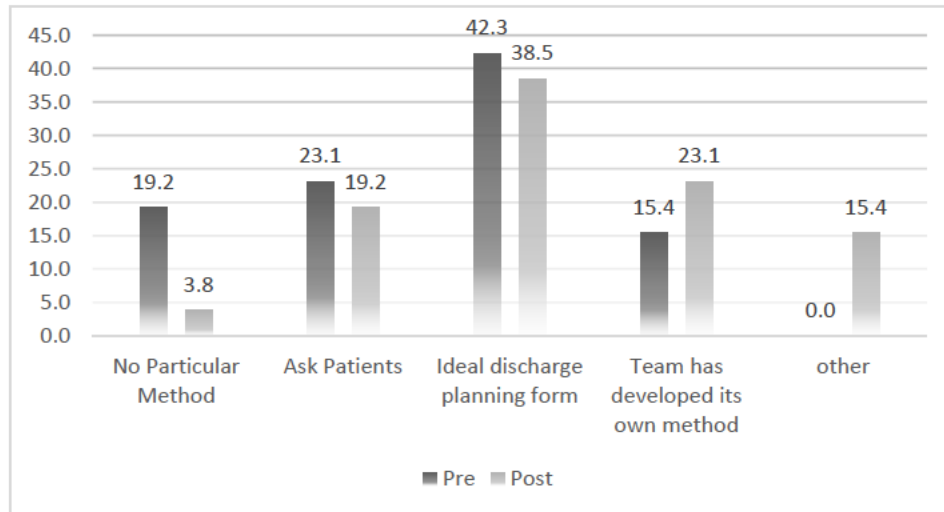
Attitude

Table 2: Change in attitude.

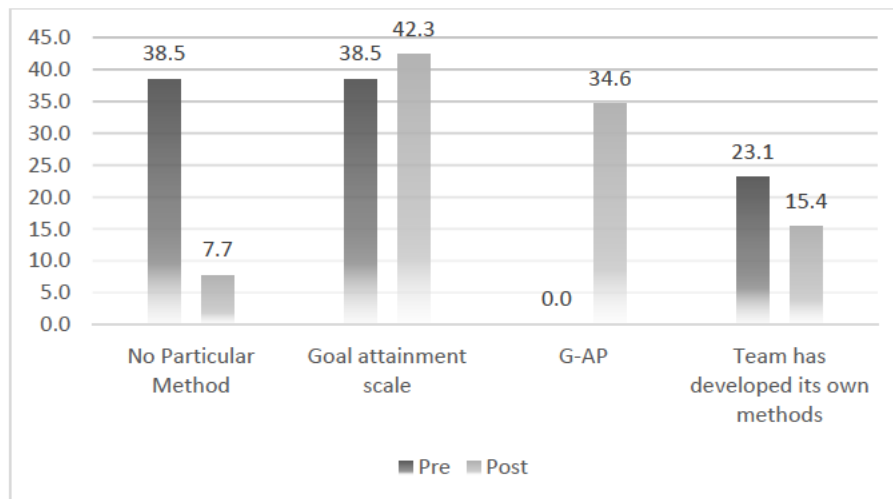
Variable	Methods	Pre	Post
		n (%)	n (%)
Assessment methods of patients' needs prior to discharge to community	No Particular Method	5 (19.2)	1 (3.8)
	Ask Patients	6 (23.1)	5 (19.2)
	IDEAL discharge planning form	11 (42.3)	10 (38.5)
	Team has developed its own method	4 (15.4)	6 (23.1)
	other	0 (0.0)	4 (15.4)
Goal setting	No Particular Method	10 (38.5)	2 (7.7)
	Goal attainment scale	10 (38.5)	11 (42.3)
	G-AP	0 (0.0)	9 (34.6)
	Team has developed its own methods	6 (23.1)	4 (15.4)
	Others	0 (0.0)	0 (0.0)
Monitoring of goals	Using outcome measures	11 (42.3)	12 (46.2)
	In discussion with the MDT	1 (3.8)	4 (15.4)

	I use my experience and clinical judgment (individually decided by staff)	11 (42.3)	5 (19.2)
	Decided by patient	3 (11.5)	5 (19.2)

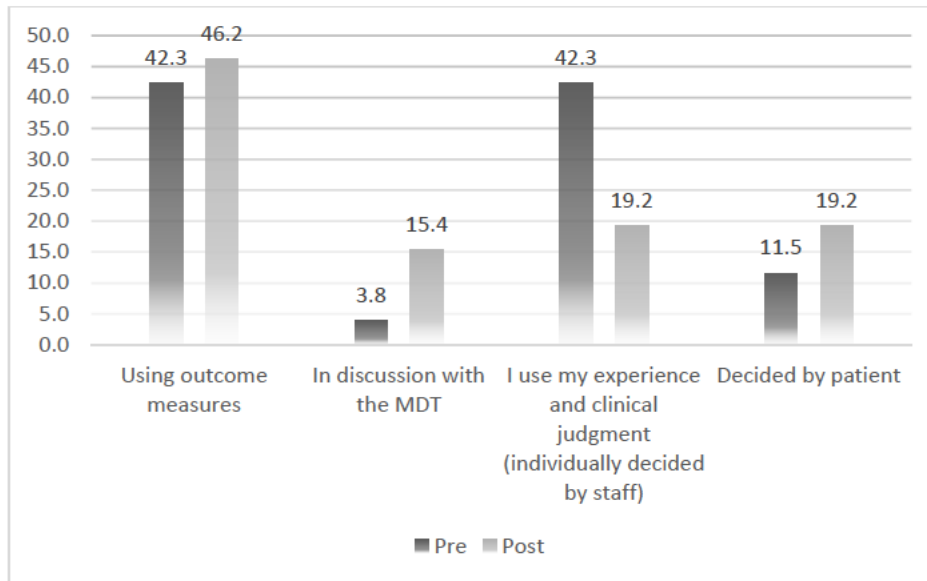
Graph 6: Differences in assessing patients' needs prior to discharge to community between pre-test and post-test.



Graph 7: Differences in methods to set goals between pre-test and post-test.



Graph 8: Differences in monitoring goals to know when a goal has been achieved between pre-test and post-test.



Summary of the change between pre and post training.

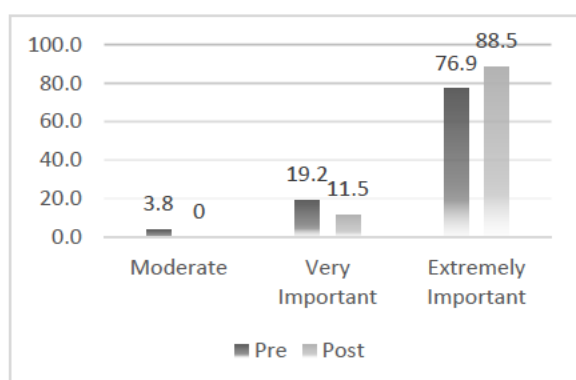
- 42.3% of the participants mentioned that they use IDEAL discharge planning form to assess the needs prior to discharge to community in pre-test, while 38.5% of the participants mentioned that they use it post-test.
- 0% of the participants mentioned that they use G-AP as a method of goal setting in pre-test, while 34.6% of the participants mentioned that they use G-AP as a method of goal setting in post-test.
- 38.5 % of the participants mentioned that they do not use particular method to set goals in pre-test, while 7.7% of the participants mentioned that they do not use particular method for goal setting in post-test.
- 42.3 of the participants mentioned that they use their clinical expertise in pre-test, while 46.2% of the participants mentioned that they use outcome measures in post-test.

Table 3: Change in attitude.

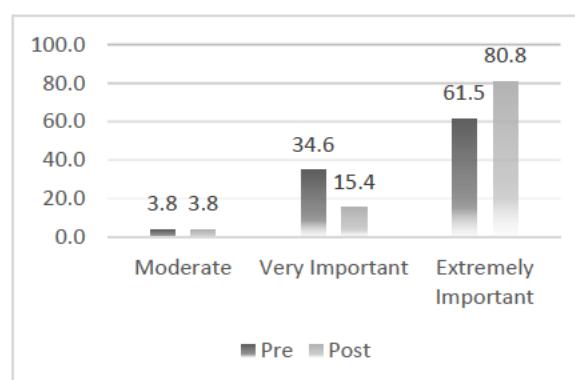
Variable	Rating	Pre	Post	Chi-Square	
		n (%)	n (%)	Test Value	P-value
Importance of patients' and	Moderate	1 (3.8)	0 (0.0)	0.53	0.768
	Very Important	5 (19.2)	3 (11.5)		
	Extremely Important	20 (76.9)	23 (88.5)		

carers' education					
Importance of using outcome measures in stroke care	Moderate	1 (3.8)	1 (3.8)	2.76	0.599
	Very Important	9 (34.6)	4 (15.4)		
	Extremely Important	16 (61.5)	21 (80.8)		
Importance of goal setting session with patients and family	Moderate	1 (3.8)	0 (0.0)	2.11	0.349
	Very Important	11 (42.3)	4 (15.4)		
	Extremely Important	14 (53.8)	22 (84.6)		
Importance of tele-rehabilitation for patients with stroke	Low	3 (11.5)	0 (0.0)	15.02	0.02
	Moderate	5 (19.2)	3 (11.5)		
	Very Important	3 (11.5)	5 (19.2)		
	Extremely Important	15 (57.7)	18 (69.2)		

Graph (9): Differences in rating the importance of patients' and carers' education between pre-test and post-test.

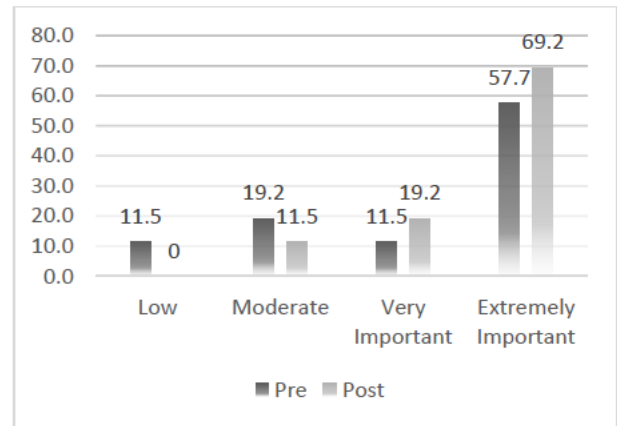
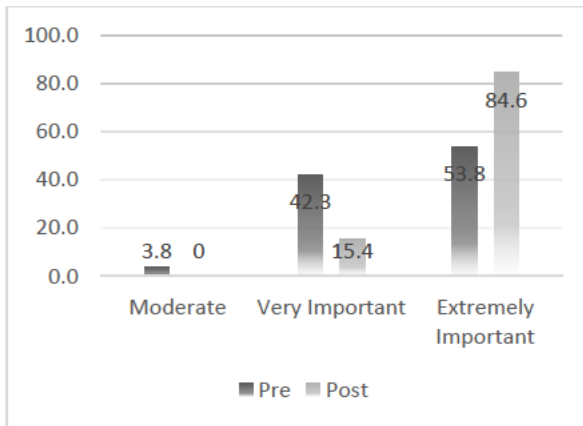


Graph (10): Differences in rating the importance of using outcome measures in stroke care between pre-test and post-test.



Graph (11): Differences in rating the importance of goal setting session with patients and family between pre-test and post-test.

Graph (12): Differences in rating the importance of tele-rehabilitation for patients with stroke between pre-test and post-test.



Summary of findings change between pre and post training.

- 76.9% of the participants mentioned that patients' and carers' education is extremely important in pre-test, while 88.5% of the participants mentioned that patients' and carers' education is extremely important in post-test. However, this difference in perception was not significant following training (Chi-Square = 0.768 ($p > 0.05$)).
- 61.5% of the participants mentioned that the importance of using outcome measures in stroke care is extremely important in pre-test, while 80.8% of the participants mentioned that the importance of using outcome measures in stroke care is extremely important in post-test. However, this difference in rating the importance of using outcome measures in stroke care was not significant after training (Chi-Square = 0.599 (> 0.05)).
- 53.8% of participants rated goal-setting with patients and families as extremely important in the pre-test, while 84.6% rated it as extremely important in the post-test. However, the change in perception following training was not statistically significant (Chi-Square = 0.349 ($p > 0.05$)).
- 57.7% of the participants mentioned that the importance of tele-rehabilitation for patients with stroke is extremely important in pre-test, while 69.2% of the participants mentioned that the importance of tele-rehabilitation for patients with stroke is extremely important in post-test. The difference in rating the importance of tele-rehabilitation for patients with stroke was significant post training (Chi-Square = 0.02 (> 0.05)).

Table 4: Differences in attitude according to demographic variables.

Variables		n	Mean	Std. Deviation	Test Value	P-value
Gender	Female	17	80.107	32.114	-0.750	0.525
	Male	9	92.630	11.217		
	Total	26	84.442	27.152		
Age	18-29 Years	5	92.654	11.688	-0.362	0.753
	30-39 Years	21	82.487	29.552		
	Total	26	84.442	27.152		
Education	Bachelor	16	87.441	23.660	0.659	0.719
	Internship	2	95.061	6.959		
	Master	8	75.790	35.891		
	Total	26	84.442	27.152		
Years of experience in stroke care	Less than 1 Year	5	92.654	11.688	1.130	0.770
	1-5 Years	6	83.188	36.527		
	6-10 Years	14	82.343	28.806		
	more than 10 Years	1	80.299			
	Total	26	84.442	27.152		
Years of experience as a physiotherapist	Less than 1 Year	2	81.662	11.989	5.965	0.113
	1-5 Years	4	99.982	0.000		
	6-10 Years	16	85.723	25.675		
	11-20 Years	4	65.168	44.365		
	Total	26	84.442	27.152		

Summary of findings

- There is no significant difference in attitude according to age (18-29, 30-39) where p-value = $0.753 > 0.05$.
- There is no significant difference in attitude according to education (Bachelor, Internship, Master) where p-value = $0.719 > 0.05$.
- There is no significant difference in attitude according to the experience in stroke care (Less than 1 year, 1-5 years, 6-10 years, more than 10 years) where p-value = $0.77 > 0.05$.
- There is no significant difference in attitude according year of expertise in physiotherapy (Less than 1 year, 1-5 years, 6-10 years, 11-20 years) where p-value = $0.113 > 0.05$.

Knowledge

Table 5: Differences in items of knowledge between pre-test and post-test.

Category	Items	Pre (n/%)		Post (n/%)		Wilcoxon	
		Correct	Incorrect	Correct	Incorrect	Test Value	P-value
Education	Stroke for carer website provides:	20 (76.9)	6 (23.1)	23 (88.5)	3 (11.5)	-1.13	0.257
Planning	After transfer of care from hospital, people with rehabilitation needs after stroke should be followed within:	10 (38.5)	16 (61.5)	15 (57.7)	11 (42.3)	-1.29	0.197
	According to NICE 2023 guidelines, the intensity of rehabilitation for patients with stroke should be:	10 (38.5)	16 (61.5)	20 (76.9)	6 (23.1)	-2.67	0.008**
Assessment	How do you assess stroke severity:	9 (34.6)	17 (65.4)	24 (92.3)	2 (7.7)	-3.87	0.001***
	At what regular intervals should patients with stroke be assessed and reviewed	1 (3.8)	25 (96.2)	15 (57.7)	11 (42.3)	-3.74	0.001***
	Fugl -Meyer Assessment scale use to measure:	18 (69.2)	8 (30.8)	25 (96.2)	1 (3.8)	-2.65	0.008**
	Barthel index is outcome tool to measure:	20 (76.9)	6 (23.1)	26 (100)	0 (0)	-2.45	0.014*
Goal setting	What is G-AP:	11 (42.3)	15 (57.7)	25 (96.2)	1 (3.8)	-3.74	0.001***
	A good action plan is:	10 (38.5)	16 (61.5)	25 (96.2)	1 (3.8)	-3.87	0.001***
	What Goal Attainment Scaling (GAS) used for:	11 (42.3)	15 (57.7)	25 (96.2)	1 (3.8)	-3.74	0.001***
Self-management and Telerehabilitation	What are the common self-management strategies:	15 (57.7)	11 (42.3)	23 (88.5)	3 (11.5)	-2.31	0.021*
	GRASP is a:	8 (30.8)	18 (69.2)	20 (76.9)	6 (23.1)	-3.21	0.001***
	What are the versions of GRASP:	10 (38.5)	16 (61.5)	22 (84.6)	4 (15.4)	-3.00	0.003**
	Patient activation measure is a validated questionnaire to measure:	17 (65.4)	9 (34.6)	26 (100)	0 (0)	-3.00	0.003**
	To ensure safety during tele-rehabilitation, patients should:	21 (80.8)	5 (19.2)	26 (100)	0 (0)	-2.24	0.025*

Summary of the change between pre and post training findings.

- There is no significant difference in item “Stroke for carer website provides” according to group (pre, post) where p-value for Wilcoxon test 0.257 (>0.05). The percentage of true answers for the item in post group (88.5%) is greater than the percentage of true answers for the item in pre group (76.9%).
- There is no significant difference in item “After transfer of care from hospital, people with rehabilitation needs after stroke” according to group (pre, post) where p-value for Wilcoxon test 0.197 (>0.05). The percentage of true answers for the item in post group (57.7%) is greater than the percentage of true answers for the item in pre group (38.5%).
- There is significant difference in item “According to NICE 2023 guidelines, the intensity of rehabilitation for patients with stroke should be” according to group (pre, post) where p-value for Wilcoxon test 0.008 (<0.05). The percentage of true answers for the item in post group (76.9%) is greater than the percentage of true answers for the item in pre group (38.5%).
- There is significant difference in item “How do you assess stroke severity” according to group (pre, post) where p-value for Wilcoxon test 0.001 (<0.05). The percentage of true answers for the item in post group (92.3%) is greater than the percentage of true answers for the item in pre group (34.6%).
- There is significant difference in item “When patients with stroke should be assessed and reviewed” according to group (pre, post) where p-value for Wilcoxon test 0.001 (<0.05). The percentage of true answers for the item in post group (57.7%) is greater than the percentage of true answers for the item in pre group (3.8%).
- There is significant difference in item “Fugl -Meyer Assessment scale use to measure” according to group (pre, post) where p-value for Wilcoxon test 0.008 (<0.05). The percentage of true answers for the item in post group (96.2%) is greater than the percentage of true answers for the item in pre group (69.2%).
- There is significant difference in item “Barthel index is outcome tool to measure” according to group (pre, post) where p-value for Wilcoxon test 0.014 (<0.05). The percentage of true answers for the item in post group (100%) is greater than the percentage of true answers for the item in pre group (76.9%).
- There is significant difference in item “What is G-AP” according to group (pre, post) where p-value for Wilcoxon test 0.001 (<0.05). The percentage of true answers for the

item in post group (96.7%) is greater than the percentage of true answers for the item in pre group (42.3%).

- There is significant difference in item “A good action plan is” according to group (pre, post) where p-value for Wilcoxon test 0.001 (<0.05). The percentage of true answers for the item in post group (96.2%) is greater than the percentage of true answers for the item in pre group (38.5%).
- There is significant difference in item “What Goal Attainment Scaling (GAS) used for” according to group (pre, post) where p-value for Wilcoxon test 0.001 (<0.05). The percentage of true answers for the item in post group (96.2%) is greater than the percentage of true answers for the item in pre group (42.3%).
- There is significant difference in item “What are the common self-management strategies” according to group (pre, post) where p-value for Wilcoxon test 0.021 (<0.05). The percentage of true answers for the item in post group (88.5%) is greater than the percentage of true answers for the item in pre group (57.7%).
- There is significant difference in item “GRASP is a” according to group (pre, post) where p-value for Wilcoxon test 0.001 (<0.05). The percentage of true answers for the item in post group (76.9%) is greater than the percentage of true answers for the item in pre group (30.8%).
- There is significant difference in item “What are the versions of GRASP” according to group (pre, post) where p-value for Wilcoxon test 0.003 (<0.05). The percentage of true answers for the item in post group (84.6%) is greater than the percentage of true answers for the item in pre group (38.5%).
- There is significant difference in item “Patient activation measures is a validated questionnaire to measure” according to group (pre, post) where p-value for Wilcoxon test 0.003 (<0.05). The percentage of true answers for the item in post group (100%) is greater than the percentage of true answers for the item in pre group (65.4%).
- There is significant difference in item “To ensure safety during tele-rehabilitation, patients should” according to group (pre, post) where p-value for Wilcoxon test 0.025 (<0.05). The percentage of true answers for the item in post group (100%) is greater than the percentage of true answers for the item in pre group (80.8%).

Table 6: Differences in knowledge according to demographic variables.

Variables		n	Mean	Std. Deviation	Test Value	P-value
Gender	Female	17	85.39	8.49	-2.038	0.045
	Male	9	57.18	35.44		
	Total	26	75.62	25.21		
Age	18-29 Years	5	55.92	35.90	-2.197	0.028
	30-39 Years	21	80.32	20.41		
	Total	26	75.62	25.21		
Education	Bachelor	16	83.27	13.13	3.934	0.140
	Internship	2	37.47	53.08		
	Master	8	69.88	30.18		
	Total	26	75.62	25.21		
Years of experience in stroke care	Less than 1 Year	5	55.92	35.90	8.007	0.046
	1-5 Years	6	86.62	4.27		
	6-10 Years	14	82.84	14.02		
	more than 10 Years	1	7.15			
	Total	26	75.62	25.21		
Years of experience as a physiotherapist	Less than 1 Year	2	79.26	6.02	11.963	0.008
	1-5 Years	4	52.36	40.96		
	6-10 Years	16	87.14	8.07		
	11-20 Years	4	51.00	32.16		
	Total	26	75.62	25.21		

According to the previous table, it is notable that:

- There is significant difference in knowledge according to gender (Male, Female) where p-value = 0.045 < 0.05. The mean value of knowledge level for female (85.3) is higher than the mean value of knowledge for male (57.1).
- There is significant difference in knowledge according to age (18-29, 30-39) where p-value = 0.028 > 0.05. The mean value of knowledge level for 30-39 years old (80.3) is higher than the mean value of knowledge for 18-29 (55.9).
- There is no significant difference in knowledge according to education (Bachelor, Internship, Master) where p-value = 0.14 > 0.05. The mean value of knowledge level for Bachelor (83.2) is higher than the mean value of knowledge for Master (69.8) and Internship (37.4).
- There is significant difference in knowledge according to experience in stroke care (Less than 1 year, 1-5 years, 6-10 years, more than 10 years) where p-value = 0.046 > 0.05. The mean value of Knowledge level for 1-5 years (86.6) is higher than the mean value of knowledge for 6-10 (82.8) and 1-5 years (55.9).

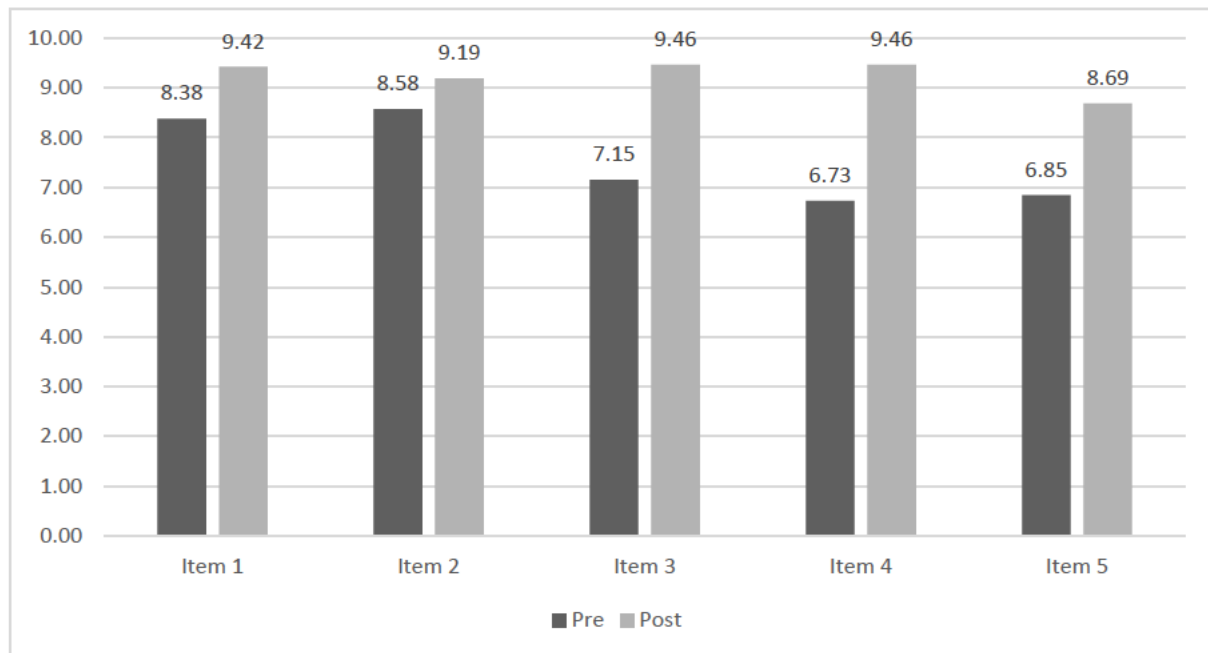
- There is significant difference in Knowledge according to year of experience as physiotherapist (Less than 1 year, 1-5 years, 6-10 years, 11-20 years) where p-value = $0.008 > 0.05$. The mean value of knowledge level for 6-10 years (87.1) is higher than the mean value of knowledge for less than 1 year (79.26) and 1-5 years (52.3).

Confidence

Table 7: Differences in items of confidence between pre-test and post test.

Category	Items	Pre	Post	Wilcoxon	
		Mean (SD)	Mean (SD)	Test Value	P-value
Carer education	I feel confident in providing carers the education and support they need to help in the rehabilitation process	8.38 (1.50)	9.42 (0.99)	-2.611	0.009
Transition	I feel confident in providing stroke patients the necessary support prior to discharge	8.58 (1.68)	9.19 (1.27)	-1.669	0.095
Outcome measures	I feel confident in using outcome measures related to stroke care	7.15 (2.68)	9.46 (0.86)	-3.558	0.0001
Goal setting	I feel confident in using G-AP to set goals for patients with stroke	6.73 (2.24)	9.46 (0.95)	-3.88	0.0001
Telerehabilitation	I feel confident in providing effective rehabilitation virtually	6.85 (2.75)	8.69 (2.02)	-2.939	0.003

Graph (13): Differences in items of confidence between pre-test and post-test.



Summary of the change between pre and post training findings

- There is significant difference in item “I feel confident in providing carers the support they need to help in the rehabilitation process” between groups (pre, post) where p-value for Wilcoxon test 0.009 (<0.05). The mean value of the item for post group (9.42) is greater than the mean value of the item for pre group (8.38).
- There is no significant difference in item “I feel confident in providing stroke patients the necessary support prior to discharge” between groups (pre, post) where p-value for Wilcoxon test 0.095 (>0.05). The mean value of the item for post group (9.19) is greater than the mean value of the item for pre group (8.58).
- There is significant difference in item “I feel confident in using outcome measures related to stroke care” between groups (pre, post) where p-value for Wilcoxon test 0.0001 (<0.05). The mean value of the item for post group (9.46) is greater than the mean value of the item for pre group (7.15).
- There is significant difference in item “I feel confident in using G-AP to set goals for patients with stroke” between groups (pre, post) where p-value for Wilcoxon test 0.0001 (<0.05). The mean value of the item for post group (9.46) is greater than the mean value of the item for pre group (6.73).
- There is significant difference in item “I feel confident in providing carers the support they need to help in the rehabilitation process” between groups (pre, post) where p-

value for Wilcoxon test 0.003 (<0.05). The mean value of the item for post group (8.69) is greater than the mean value of the item for pre group (6.85).

Table 8: Differences in confidence according to demographic variables.

Variables		n	Mean	Std. Deviation	Test Value	P-value
Gender	Female	17	72.26	33.42	-0.202	0.874
	Male	9	73.60	41.95		
	Total	26	72.72	35.75		
Age	18-29 Years	5	71.42	40.14	-0.313	0.801
	30-39 Years	21	73.03	35.71		
	Total	26	72.72	35.75		
Education	Bachelor	16	66.80	39.00	1.995	0.369
	Internship	2	77.18	4.62		
	Master	8	83.44	32.95		
	Total	26	72.72	35.75		
Years of experience in stroke care	Less than 1 Year	5	71.42	40.14	1.336	0.721
	1-5 Years	6	75.46	38.39		
	6-10 Years	14	70.06	36.42		
	more than 10 Years	1	100.01			
	Total	26	72.72	35.75		
Years of experience as a physiotherapist	Less than 1 Year	2	41.58	54.97	3.729	0.292
	1-5 Years	4	93.49	13.04		
	6-10 Years	16	76.40	30.54		
	11-20 Years	4	52.82	54.68		
	Total	26	72.72	35.75		

According to the previous table, it is notable that:

- There is no significant difference in confidence according to gender (Male, Female) where $p\text{-value} = 0.87 > 0.05$.
- There is no significant difference in confidence according to age (18-29, 30-39) where $p\text{-value} = 0.80 > 0.05$.
- There is no significant difference in confidence according to education (Bachelor, Internship, Master) where $p\text{-value} = 0.36 > 0.05$.
- There is no significant difference in confidence according to experience in stroke care (Less than 1 year, 1-5 years, 6-10 years, more than 10 years) where $p\text{-value} = 0.72 > 0.05$.

- There is no significant difference in confidence according to year of experience as a physiotherapist (Less than 1 year, 1-5 years, 6-10 years, 11-20 years) where p-value = 0.29 > 0.05.

Satisfaction

Table (9): Satisfaction of the stroke training programme.

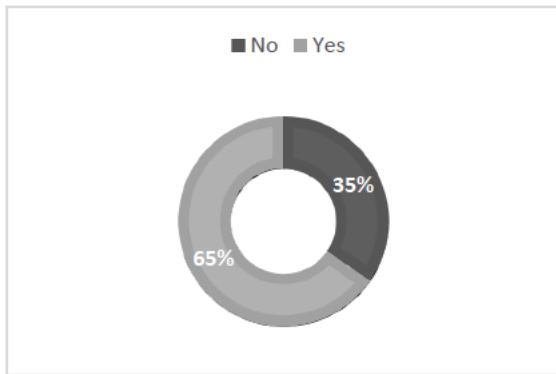
Question	Category	n (%)	
Complete the training programme in ONE sitting	No	9 (34.6)	
	Yes	17 (65.4)	
The number of times they returned to the programme before completion	2 times	1 (11.1)	
	3 times	4 (44.5)	
	4 times	3 (33.3)	
	5 times	1 (11.1)	
Length of the online training programme	Too Much Short	1 (3.8)	
	Short	2 (7.7)	
	About right	21 (80.8)	
	Long	2 (7.7)	
Satisfaction of the information contained in the training programme	Very Dissatisfied	1 (3.8)	
	Satisfied	7 (26.9)	
	Very Satisfied	18 (69.2)	
Aspects they wanted to add but not covered in the training program?	No	25 (96.2)	
	Yes	1 (3.8)	
Appropriateness of online format.	Rating		Mean (SD)
	Maximum	10	9.12 (1.143)
	Minimum	7	
Accessibility of additional information	Maximum	10	9.35 (0.892)
	Minimum	7	

Table (10): Evaluation content of the training programme.

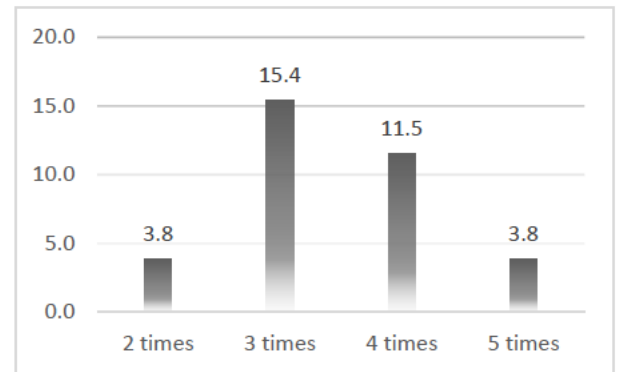
Indicate if you thought the content of the training programme was	Very	Somewhat	Neither	Not at all
Clear	24 (92.3)	1 (3.8)	1 (3.8)	0 (0)
Informative	24 (92.3)	1 (3.8)	2 (7.7)	0 (0)

Adequate	21 (80.8)	2 (7.7)	1 (3.8)	2 (7.7)
Appropriate	23 (88.5)	2 (7.7)	1 (3.8)	0 (0)
Relevant	22 (84.6)	3 (11.5)	1 (3.8)	0 (0)
Useful	22 (84.6)	3 (11.5)	1 (3.8)	0 (0)

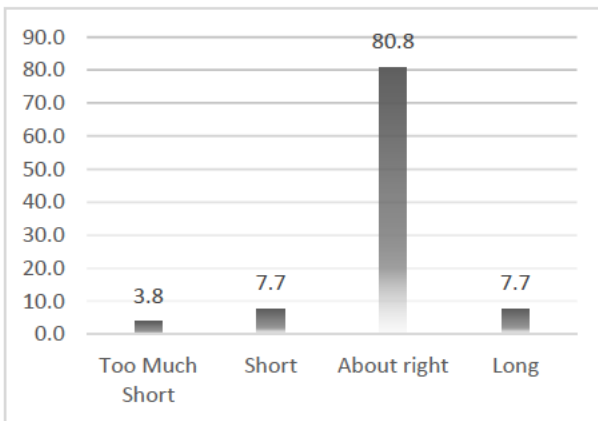
Graph (14): Completion the training programme in ONE sitting.



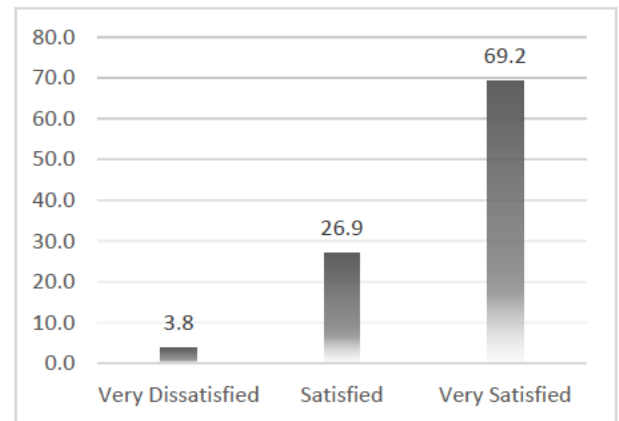
Graph (15): The number of times they returned to the programme before completion.



Graph (16): Appropriateness of the length of the online training program



Graph (17): Overall Satisfaction of the online training program



Graph (18): Evaluation content of the training program”

