HANDOVER COMMUNICATION AND CONTINUITY OF CARE FOR CHRONIC DISEASE PATIENTS IN INDIA: A MIXED-METHODS INVESTIGATION

BY

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ABSTRACT

This thesis research investigated handover communication and continuity of care for patients with chronic, non-communicable diseases (NCDs) in Himachal Pradesh and Kerala states, India. A systematic review explored the literature on quality of handover communication and interventions for handover communication in low and middle-income countries (LMICs). Mixed-methods were employed to investigate the following in Himachal Pradesh and Kerala states, India: handover and healthcare communication within and between levels of care for chronic NCD patients, the association between quality of discharge handover communication and chronic NCD patient outcomes, healthcare provider (HCP) training and protocols for handover communication and possible strategies to improve the storage and exchange of healthcare information for chronic NCD patients.

The systematic review found a relative dearth of LMIC literature and that sub-optimal recording and/or transfer of patient information was a commonly reported issue in all areas of handover communication (i.e. shift-change, discharge, referrals and transfers). A number of system, organisational cultural and individual healthcare provider issues were described as affecting the quality of each area of handover. The majority of interventional studies were non-randomised, of medium to low quality and reported improvements in handover communication.

Regarding handover and healthcare communication in Himachal Pradesh and Kerala states, India, the mixed-methods outpatient and quantitative inpatient studies evidenced that most patients who visited public healthcare outpatient clinics (OPC) and who were discharged from public hospitals received unstructured patient-held medical documents that contained deficient information for facilitating effective continuity of care. In the mixed-methods outpatient and the qualitative and prospective inpatient

studies, patient reports indicated notable inconsistencies regarding HCP healthcare management communication. In the mixed-methods outpatient, qualitative inpatient and cross-sectional HCP studies, HCP reports revealed a lack of standardised procedures for handover communication between levels of care across public and private healthcare facilities. Factors affecting the quality of handover communication were also identified; HCPs in the mixed-methods outpatient study reported that public healthcare OPCs did not maintain in-house patient records. In both the mixed-methods outpatient and qualitative inpatient studies the following factors were identified by HCPs/patients: time constraints, inconsistent referral practices, unstructured medical documents, inconsistent patient transportation of medical documents and deficient HCP handover training. In the cross-sectional HCP study, the following factors were most frequently reported as “highly applicable” to referral and discharge communication: excessive workload and poor health systems and integration.

Regarding discharge handover communication and patient outcomes, the prospective inpatient study evidenced significant associations between low-quality documented discharge communication and death (AOR=3.00; 95% CI 1.27,7.06) and low-quality verbal discharge communication and self-reported deterioration of chronic NCD/s (AOR=0.46; 95% CI 0.25,0.83) within 18 weeks of follow-up.

Regarding HCP training and protocols**,** the majority of HCPs in the cross-sectional HCP study reported that they had not received structured training for shift-change, discharge or referral. HCPs in both the mixed-methods outpatient and qualitative inpatient studies also reported an absence of handover training and structured referral protocols. One private tertiary hospital in Kerala was found to have policies and structured documents for clinical handover. Other than standards/guides for voluntary quality accreditation schemes, no further handover-specific protocols, policies, guidelines or training documents were identified across Himachal Pradesh and Kerala.

Regarding strategies for improving handover communication**,** HCPs in the qualitative inpatient study reported the following: increased public healthcare resources, formal referral systems and computerised “e-health” systems. In both the mixed-methods outpatient and qualitative inpatient studies, patients and HCPs supported the idea of structured patient-held booklets for storing and transporting medical documents.

In conclusion, the findings suggest that continuity and safety of chronic NCD patient care are likely being compromised by suboptimal recording and transfer of patient information, as well as a lack of standardised handover communication protocols and HCP training. They have also highlighted a context-relevant and acceptable intervention for improving patient information exchange and the need for further high-quality handover communication research in India and other LMICs.

DEDICATION

To my parents, whose dedication, love and support made me who I am

&

To Hannah, whose kindness, patience and love made completing this thesis possible

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AUTHORSHIP STATEMENT

The research presented in this thesis was undertaken by the author (CH) with support and guidance from the following supervisory team: Dr. Semira Manaseki-Holland (SMH), Professor Sheila Greenfield (SG), Dr. Malcolm Price (MP) and Professor Paramjit Gill (PG).

The thesis contains primary analyses of patient and healthcare provider data from India (Chapters 4-7), which was collected for a Medical Research Council development research project titled “enhanced integration of primary and secondary health systems and patient empowerment through improved continuity of care and clinical handover”. This research project and the study materials used were conceived and designed by SMH, with input from SG, PG and the following researchers: Professor Prabhakaran Dorairaj (PD), Professor Richard Lilford (RL), Dr. Jeemon Panniyammakal (JP), Dr. Sanjeev Singh (SS), Dr. Shifalika Goenka (SGo) and Dr. Suganthi Jaganathan (SJ). The following researchers were responsible for study supervision during the data collection period: SMH, PD, JP, SGo and SJ. The lead researcher in charge of data collection was SJ. Following the completion of data collection, all data were sent to the author (CH) to be cross-checked and cleaned; CH consulted with SJ via email and telephone to resolve queries and correct any inaccuracies.

CH was entirely responsible for selecting the India project data to be analysed within this thesis, as well as for selecting the analysis methods, completing the data analysis and visualising (i.e. preparing and presenting) the research manuscripts in Chapters 4-7.

Specific contributions to each thesis chapter are detailed below:

Chapter 1 – Introduction: CH drafted the chapter, SMH, SG, PG and MP reviewed and edited the chapter for content and focus.

Chapter 2 – Methods: *Systematic review:* The initial protocol, focus and selection criteria for the systematic review was developed by SMH, Carl Krynicki (SK), Korin Nandhra (KN) and Nicola Novielli (NN). CH refined the protocol and selection criteria and developed a comprehensive search strategy with support from Saimma Majothi (SM). *India project:* This research project was conceived and designed by SMH, with input from the following researchers: SG, PG, PD, RL, JP, SS, DD, SGo and SJ. CH drafted the chapter, SMH and SG reviewed and edited the chapter for content and focus.

Chapter 3 – Systematic Review: CH employed the search strategy. CH, SM, Linju Joseph (LJ) and Pratyusha Saha (SH) were involved in screening abstracts and full-text articles and quality appraising the included studies. CH drafted the manuscript, which was then reviewed and edited for content by all authors; CH, SM, CK, KN, NN, Adeela Amin, Aadil Sheikh, PS, LJ, Advaith Gummaraju, RL, Yen-Fu Cheng and SMH.

Chapter 4 – Mixed-methods outpatient paper: CH undertook the data analysis and triangulation and drafted the manuscript; the qualitative data analysis was supported by SG. The manuscript was reviewed and edited for content by all authors; CH, SJ, JP, SS, SGo, PD, PG, SG, RL and SMH.

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Chapter 6 – Prospective inpatient paper: CH undertook the statistical analysis, with support from MP. CH drafted the manuscript, which was then reviewed and edited for content by all authors; CH, SJ, JP, SS, PD, MP, PG, SG, RL and SMH.

Chapter 7 – Cross-sectional healthcare provider paper: CH undertook the data analysis and document reviews. CH drafted the manuscript, which was then reviewed and edited for content by all authors: CH, SJ, JP, SS, PD, PG, SG, RL and SMH.

Chapter 8 – Discussion: CH drafted the chapter, SMH, SG, PG and MP reviewed and edited the chapter for content and focus.

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LIST OF ABBREVIATIONS

AOR	Adjusted Odds Ratio
BMJ	British Medical Journal
CHC	Community Health Centre
CINAHL	Cumulative Index to Nursing and Allie Health Literature
COREQ	Consolidated criteria for Reporting Qualitative Research
DHS	Department of Health Services
EMBASE	Excerpta Medica Database
HIC	High-income Country
HCP	Healthcare Provider
HSPSC	Hospital Survey on Patient Safety Culture
ISBAR	Identify, Situation, Background, Assessment and Recommendation
LMIC	Low and Middle-Income Country
MEDLINE	Medical Literature Analysis and Retrieval System Online
MMAT	Mixed-Methods Appraisal Tool
NABH	National Accreditation Board for Hospitals and Healthcare Providers
NCD	Noncommunicable Disease
NQAS	National Quality Assurance Standards
OPC	Outpatient Clinic
PACU	Post-Anaesthesia Care Unit
PCC	Patient-Centred Care
PHC	Primary Health Centre
PLoS	Public Library of Science
PRISMA	Preferred Reporting Items for Systematic reviews and Meta-Analyses
PROSPERO	Prospective Register of Systematic Reviews
RCT	Randomised Controlled Trial
SBAR	Situation, Background, Assessment and Recommendation
SHC	Sub-Health Centre
STROBE	STrenghtening the Reporting of OBservational studies in Epidemiology
UK	United Kingdom
USA	United States of America
WHO	World Health Organization

THESIS FORMAT

This thesis is presented in accordance with the University of Birmingham Alternative Thesis Guidelines, which allow Chapters formatted for submission to peer-reviewed journals and published articles to be included. Some of the work in this thesis has been prepared for submission to peer-reviewed journals (Chapters 3 and 7). In addition, some of the work presented in this thesis has been published in peer-reviewed journals (Chapters 4, 5 and 6). These publications are as follows:

1. **Humphries C**, Jaganathan S, Panniyammakal J, Singh S, Goenka S, Dorairaj P, Gill P, Greenfield S, Lilford R and Manaseki-Holland S. (2018) Investigating clinical handover and healthcare communication for outpatients with chronic disease in India: A mixed-methods study. *PLOS ONE*, 3(12). pp. e0207511.
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3. **Humphries C**, Jaganathan S, Panniyammakal J, Singh S, Dorairaj P, Price M, Gill P, Greenfield S, Lilford R and Manaseki-Holland S. (2020) Discharge communication for chronic disease patients in three hospitals in India. *PLOS ONE,* 15(4). pp. e0230438.

Please note that the page numbers of the publications will not be included in the pagination sequence of the thesis and that the referencing and numbering of tables and figures will be self-contained within each chapter. Please also note that the inclusion of publication and publication-style chapters will result in some duplication, as each chapter will have self-contained components that overlap with parts of other thesis sections.

The full regulations for the University of Birmingham Alternative Thesis Guidelines can be found at:

http://www.birmingham.ac.uk/Documents/university/legal/regulations-part7.pdf

https://intranet.birmingham.ac.uk/as/studentservices/graduateschool/documents/public/rsa/alternative-format-thesis-guidelines.pdf

1. INTRODUCTION

The research within this thesis focuses on handover communication and continuity of care for patients with chronic, non-communicable disease (NCD) in Himachal Pradesh and Kerala states, India. This chapter provides general background information as well as justification, aims and objectives for the research.

1.1 Definition of clinical handover

Clinical handover (also referred to as “handover”, “clinical handoff” and “handoff”) is defined as “the transfer of professional responsibility and accountability for some or all aspects of care for a patient, or group of patients, to another person or professional group on a temporary or permanent basis”.[1] Information exchanged often includes a patient’s current and recent changes in condition, ongoing treatment requirements and foreseen changes or complications that may occur. Clinical handover takes place across the following transitions of care: patient referrals, patient transfers, hospital discharge and hospital shift-change. It is also becoming increasingly relevant in outpatient and ambulatory care settings, where handover may take place if investigations are pending and/or patients with ongoing care needs are likely to re-represent for care. See Table 1.1 for definitions of each transition of care term and the levels of care in which they take place; see Table 1.2 for definitions of levels of care.

Table 1.1 Definitions of hospital shift-change, hospital discharge, patient referral, patient transfer and outpatient/ambulatory handover

Term	Definition	Place of occurrence (i.e. level of healthcare)
Hospital shift-change	A meeting between HCPs during the change of hospital shift in which vital information about and responsibility for the patient is provided from the off-going provider to the oncoming provider*	Secondary/tertiary care (i.e. inpatient units/wards)
Hospital discharge	The point at which a patient is released from hospital care by a HCP and either returns home and/or to another healthcare service†	Secondary/tertiary care (i.e. inpatient units/wards)
Patient referral	The process of HCP directing/redirecting a patient to a specialist HCP or healthcare service for treatment§	Within secondary/tertiary care (i.e. intra-hospital referrals between departments), between secondary/tertiary care (i.e. inter-hospital referrals) or between levels of care (e.g. inter-facility referrals between social/community/primary-level care and secondary/tertiary care)
Patient transfer	The movement of a patient from one healthcare service to another**	Within secondary/tertiary care (i.e. intra-hospital transfers between departments), between secondary/tertiary care (i.e. inter-hospital transfers) or between levels of care (i.e. inter-facility transfers between social/community/primary care and secondary/tertiary care)
Outpatient / ambulatory care handover	Transfer of patient information between outpatient/ambulatory HCPs when investigations are pending and/or patients with ongoing care needs are likely to re-represent for care††	Secondary/tertiary care (i.e. hospital outpatient departments)

* From: Groves PS, Manges KA, Scott-Cawiezell J. 2016.[2]
† Adapted from: Medical dictionary, Farlex & Partners. 2009.[3]
§ Adapted from: Dictionary, Merriam-Webster. 2020.[4]
** Adapted from: Kulshrestha A, Singh J. 2016.[5]
†† Adapted from: Bismilla Z, Wong B. 2018.[6]

Table 1.2 Definitions of levels of healthcare

Level of care	Definition
Primary care	Healthcare providers, generally based in the community, who act as the first point of consultation for all patients
Secondary care	Hospitals, typically providing inpatient and outpatient services, with medical specialists that usually do not have first contact with patients
Tertiary care	Hospitals, providing specialist consultative care from specialists using facilities for specific investigation and treatment, usually following referral from primary or secondary care professionals; Many tertiary care centres will also provide secondary care (predominantly for the local population)

1.2 Definition of handover communication

Whilst clinical handover focuses on communication and a transfer of responsibility between healthcare professionals (HCPs), the term “handover communication” encapsulates the communicative process during transitions of care between HCPs and between HCPs and patients. It is defined as: “the process of passing patient-specific information from one caregiver to another, from one team of caregivers to the next, or from caregivers to the patient and family for the purpose of ensuring patient care continuity and safety; it also relates to the transfer of information from one type of healthcare organisation to another, or from the healthcare organisation to the patient’s home”.[7] The recognition of HCP to patient communication during care transitions within this definition is significant, as patients are often the sole constant throughout their care process and can provide valuable information at each stage.[8] In addition, this definition recognises that handover does not always take place between healthcare facilities, but sometimes between healthcare facilities and patients’ homes, which is critical for facilitating self-management. This thesis focusses on handover communication during

the following transitions of care: patient referrals, patient transfers and hospital discharge.

1.3 Definition of healthcare communication

Whilst this thesis predominantly focuses on handover communication, it also captures some data on general healthcare communication that takes place between HCPs and patients during outpatient consultations or inpatient care. Therefore, for the purposes of this thesis, healthcare communication is defined as the exchange of verbal and/or documented medical information between HCPs and patients that does not take place during a transition of care.

1.4 Definitions of continuity of care

Effective clinical handover and handover communication are central components of continuity of care, which has most simply been defined as "the seamless provision of healthcare between settings and over time".[9] Historically, there has been a lack of consensus on definitions of continuity with terms such as continuum of care, coordination of care and seamless care being used interchangeably. With this issue in mind, Haggerty *et al*. conducted a multidisciplinary review in 2003 to develop a common understanding of continuity of care and provided a foundation for reliable measurement.[10] Amongst different emphases across healthcare domains, they found two core elements of continuity of care that emerged within every discipline: (i) care of an individual patient and (ii) care over time. They also identified three types of

continuity of care relevant to all disciplines: (i) *relational continuity* refers to "an ongoing therapeutic relationship between a patient and one or more providers", (ii) *Informational continuity* refers to "the use of information on prior events and circumstances to make current care appropriate for the individual and their condition" and (iii) *management continuity* refers to "the provision of timely and complementary services within a shared management plan".[10]

For the purposes of this thesis, the term "continuity of care" will refer to informational continuity (i.e. regarding the storage and exchange handover and healthcare communication) and subsequent management continuity (i.e. regarding how continuity of management may be affected by the storage and exchange of handover and healthcare communication); relational continuity was not assessed.

1.5 Importance of handover and healthcare communication and the effects of poor practice

Clinical handover is pervasive throughout healthcare, demonstrated via estimates which put the number of handovers per year at over 100 million in England and over 300 million in the United States of America (USA).[11-13] Given this frequency, handover communication is arguably one of the most significant communicative processes that takes place during the delivery of patient care. This is further evidenced by a growing body of research from high-income nations, which has established communication as a well-known risk factor for patient safety and clinical handover as an area of care where communication issues often arise.[7 14] Common handover communication issues include: poor quality of medical/referral/transfer/discharge records,[15-19] HCP over-reliance on memory (rather than referring to documented information),[20-22] unstructured

(and subsequently incomplete) information exchange practices,[23 24] deficient explanations regarding patient treatment and minimal patient involvement. [22 25-27]

Regarding risks to patient safety, over the past thirty years numerous reviews and publications have shown that ineffective handover communication can lead to delays in diagnosis and treatment,[28 29] incorrect treatment,[29] increased length of hospital stay,[29 30] unplanned hospital readmissions,[31-33] adverse drug reactions and other severe/life-threatening clinical complications.[29 34] The scale of this problem has previously been highlighted in a report from the World Health Organization (WHO) collaborating centre for patient safety solutions.[7] For example, communication breakdowns were the predominant root cause of severe adverse events reported to the USA's Joint Commission between 1995 and 2006.[35] More recently, a large-scale European Commission project focussing on transitions of care found that handover communication was responsible for 25-40% of adverse events.[36] Such findings have resulted in the WHO listing the improvement of communication during patient handovers within its top five patient safety solutions.[37]

One area of clinical handover between secondary and primary care that has found to be particularly critical for patient safety is hospital discharge, which involves a transition from hospital to primary/community care and/or home.[38-40] For example, in a seminal prospective cohort study from Canada, it was shown that one in five patients experienced an adverse event within one month of discharge and that one-third of these events were preventable.[39] Regarding the impact of handover communication between HCPs on post-discharge patient safety, multiple studies have established an association between the deficient and/or untimely of transfer of documented discharge information between levels of care and adverse events, such as unplanned hospital readmissions.[32 33 38] Further, despite the fact that effective discharge documentation (e.g. summaries, letters etc.) has been shown to reduce post-discharge complications

and readmissions,[41-45] research indicates that this often receives low priority from HCPs and lacks sufficient levels of clinical information.[18 42 46-50] A 2019 systematic review highlighted the following major risks of discharge letters for patient safety: delayed sending of letters, non patient-centred letters, insufficient information in letters and lack of training for writing discharge letters during medical education.[18] Ineffective handover communication between HCPs and patients/carers during discharge - including education regarding medical condition/s and/or treatment/s - has also been identified as an issue that can result in post-discharge adverse events.[39] In particular, patients failing to understand important discharge instructions has been posited as a contributor to increased medication errors and subsequent hospital revisits.[51-53] Whilst discharge poses risks for all patients, vulnerable patients such as older people and those with multiple comorbidities, limited language comprehension and/or lack of family/social support systems have been shown to be particularly susceptible to the consequences of ineffective discharge handover communication.[54-56]

Aside from risks to patient safety, the discontinuity of care and additional treatments resulting from failures in handover communication can lead to increased healthcare expenditure, inefficient use of health system resources and patient dissatisfaction.[8 57] Each of these consequences places increased pressure on health systems and if not dealt with effectively, can result in a vicious cycle of suboptimal healthcare delivery. Between HCPs and patients/carers, deficient handover and healthcare communication can also hinder patient-centred care (PCC), which commonly refers to care that involves patients and carers in the care process, integrates patient education and knowledge sharing, takes into account individual values, desires and needs and includes both physical and emotional support.[25 58-60] It has been defined as: “care which explores the patients' reason for the visit, concerns and information needs; seeks an integrated understanding of the patients' world; finds common ground

on the problem and mutually agrees on management; enhances prevention and health promotion; and enhances the continuing relationship between patient and doctor".[59] A lack of patient-centred care is problematic, as patient-centred healthcare delivery has been shown to decrease costs and result in more efficient resource utilisation.[61-63] In addition, research has shown that by increasing self-care abilities and improving satisfaction with care and overall quality of life, PCC can lead to improved patient outcomes.[61]

Overall, the mounting evidence regarding the significance of communication in healthcare has led to the WHO raising global awareness; the improvement of handover communication has been listed in the WHO top five solutions for patient safety.[64] More recently, the WHO has established "World Patient Safety Day" to be observed annually on the 17th of September.[65] As part of this, communication between healthcare providers has been stated as one of the key issues affecting patient safety.

1.6 Handover and healthcare communication in low and middle-income countries (LMICs) and India

1.6.1 LMICs

Compared to high-income countries (HICs), patient safety and specific communication-related initiatives have historically received less priority across many LMICs. This has contributed to inefficient health systems with limited integration both within and between levels of healthcare. In particular, the integration of primary healthcare has been identified as a significant challenge that has frequently led to the omission of effective linkages with secondary and tertiary-level hospital care.[66-69] The situation has

been further intensified by the fragmented nature of healthcare governance across many LMICs; care provision can often be spread across several HCPs, including those from non-governmental organisation projects and unregulated private facilities.[66] Given these challenges, there is a growing need for cohesive methods of healthcare delivery and information transfer between HCPs and between HCPs and patients. However, LMIC studies have rarely featured in systematic reviews focussing on handover and associated interventions. Therefore, as part of this thesis, a systematic literature review has been conducted to explore the literature on quality of handover communication and evaluated interventions for handover communication in LMICs (Chapter 2).

As for healthcare communication between HCPs and patients, in 2018 a review was conducted focussing on HCP-patient communication practices across five countries in East Asia.[70] The literature from China (an upper middle-income country) demonstrated that asymmetrical doctor-patient relationships, characterised by “doctor-centred” communication were the norm; this was shown to be leading to increased patient dissatisfaction due to more patients wanting to be involved in healthcare interactions.[70] Further LMIC-based research on HCP-patient communication practices remains limited, but similar tendencies for paternalistic physician behaviour have been reported in both Indonesia and India.[71] [72]

1.6.2 India

Like many LMICs, across India there has been a historic lack of attention given to patient safety and specific communication-related initiatives for healthcare delivery. However, in recent years the government has begun to increase its focus on this area of quality improvement and during the course of this thesis research a “National Patient Safety Implementation Framework 2018-2025” has been published; a policy-level

document that provides guidance to state-level policymakers on incorporating patient safety strategies and serves as an informative resource for programme/facility managers and patient/consumer rights groups.[73] Within this, one of the key priorities listed is “establishing a culture of safety and improving communication, patient identification, handing over transfer protocols in healthcare facilities”.

Whilst this holds promise for future developments, a plethora of key challenges to patient safety and subsequent communication-related efforts remain. Such challenges include a deficiency of adequately skilled HCPs regarding patient safety, minimal funding for patient safety research and a lack of standardised guidelines for patient safety in public healthcare facilities (see Figure 1.1 for full summary).[74] In addition, issues of fragmented healthcare provision and limited integration within and between levels of healthcare in India have been intensified by chronic under-funding of public health systems and an increasing presence and popularity of largely unregulated private HCPs.[75] Presently, it is common for patients to shop around between various public and private HCPs, often resulting in the provision and transportation of disparate medical papers that contain disjointed information.[76-78]

General challenges:

- ⊗ Disjointed laws/regulations/policies/strategies regarding quality of care
- ⊗ Dearth of documented patient safety training for HCPs
- ⊗ Deficiency of adequately skilled HCPs regarding patient safety
- ⊗ Minimal funding for patient safety research
- ⊗ Fragmented research activities regarding patient safety and findings are not widely disseminated or used for decision-making
- ⊗ Hesitation from both public and private HCPs to publish patient safety research due to worries regarding impact on reputation

Public healthcare sector challenges:

- ⊗ Minority of public healthcare facilities are actively involved in quality accreditation schemes
- ⊗ Lack of standardised guidelines for patient safety in public healthcare facilities
- ⊗ Absence of period assessment of HCP awareness/understanding of patient safety in public hospitals

Private healthcare sector challenges:

- ⊗ Private healthcare sector lacks standardised guidelines regarding desired provision of patient safety practices
- ⊗ Few private hospitals have implemented patient safety procedures

Figure 1.1 Summary of key challenges to patient safety and subsequent handover and healthcare communication efforts in India

Although there is relatively widespread awareness of the aforementioned difficulties within India, research conducted on factors central to patient safety and healthcare integration, such as handover communication, has remained limited. Initial scoping searches ran prior to conducting a full systematic review on handover communication in LMICs (Chapter 2) revealed a small number of predominantly single-site studies focussing on handover communication in India. Of these, most were observational and evidenced suboptimal recording and transfer of information during shift-change,

discharge and inter-hospital transfer.[78-83] Reported factors affecting quality of handover communication within observational studies included hospital shift times and unethical HCP behaviour (i.e. demanding informal payments from patients).[80-82] Regarding intervention studies, two focussed on shift-change and found that the implementation of structured handover guidelines and documents improved documented information exchange.[84 85] Another interventional study implemented structured discharge documents and evidenced improvements in the provision of patient-held discharge information.[76] Two further interventional studies, conducted by the same research group, implemented HCP and parent (i.e. carer) discharge training;[86 87] The first of the two studies evidenced mixed results on parental confidence regarding home-care requirements, whereas the second evidenced predominantly positive results including improvements in nurse knowledge, discharge documentation, parent home-care mastery scores and reductions in patient surgical site infections.

Regarding healthcare communication between HCPs and patients, previous reports have indicated the presence of paternalistic physician behaviour during consultations in India, which may be resulting in patients feeling intimidated, unable to ask questions and leaving healthcare consultations with unmet information needs.[72] With regard to possible factors contributing to doctor-centred healthcare communication, a qualitative study investigating public and private doctor's experiences of tuberculosis patient encounters in a rural Indian district reported the following: perceptions of ill-informed patients, lack of appreciation for patients' knowledge/concerns, difficulties relating to patients of different social backgrounds, mistrust of patients and gender stereotypes (i.e. viewing women as having an inferior status, therefore depicting them as dependent and vulnerable).[71] It may also be the case that the implicit biases of HCPs (i.e. unconscious, uncontrollable or irrational prejudices or stereotypes) are having a negative impact on patient relations, even if conscious efforts are made to try and avoid this.[88] Another influential factor could be the reportedly historic lack of doctor-patient

communication skill development and training within Indian medical curriculums.[89] More widespread evidence on this topic in India is currently lacking.

1.7 Justification for research

1.7.1 Focus on handover communication in India

An extensive body of literature from high-income countries has evidenced that high-quality handover communication is needed for effective continuity and safety of patient care, as well as being a contributor to health systems functioning, cost-saving and patient-centred care.[8 25 29 32 33 39 57] However, despite pervasive challenges regarding fragmented care provision and limited health systems integration, research on this topic in India remains lacking. The small number of observational studies that have been conducted in India have evidenced suboptimal information exchange across shift-change, discharge and inter-hospital transfer.[78-83] A handful of interventional studies have also indicated that relatively simple strategies, such as structured medical documents and handover guidelines, can improve recording and transfer of key patient information.[76 84-87] Given these emerging findings, there is a pressing need for further in-depth investigation of handover communication practices, policies, protocols and HCP training to elucidate context-specific challenges and identify appropriate interventions.

1.7.2 Focus on chronic NCDs and use of tracer conditions

The improvement of handover communication within and between levels of healthcare is significant for all patients with medical conditions that require involvement from

multiple HCPs. However, it is particularly pertinent for chronic NCD patients that require long-term management involving multiple care episodes. This is because such management demands effective coordination and continuation of care across different HCPs, often working in different locations. In addition, across the globe there has been a rising burden of NCDs; in 2016 the WHO estimated that NCDs were responsible for 71% of global deaths and that more than three-quarters of those deaths occurred in LMICs.[90] In India the burden is particularly high and, with ageing populations and deteriorating lifestyle behaviours (e.g. smoking, poor diets, lack of exercise etc.) amongst other issues, the WHO has estimated that NCDs account for 63% of all deaths across the country.[91] This burden has also made a notable contribution to morbidity across the country, where between 1990 and 2016 there has been a 170% increase in disability-adjusted life years (i.e. years of "heathy" life lost) from diabetes alone.[92 93] The effects of such morbidity are being felt across the Indian socioeconomic spectrum. Whilst there is evidence to suggest that NCDs such as diabetes and hypertension have become "diseases of affluence",[94 95] other findings have indicated that they also are having a significant adverse impact on socioeconomically disadvantaged populations.[92 96] Given the pressure that this is placing on already strained health systems, there is a pressing need to investigate areas of healthcare provision, such as handover communication, that impact upon efficiency, integration and overall quality and safety of healthcare.

For the purposes of this research four high-burden chronic NCDs were chosen as tracer conditions, based on the premise that selecting these conditions would make it possible to investigate and obtain focussed insight on handover communication and subsequent continuity of care in the study areas of India.[37] The four NCDs chosen were: cardiovascular disease, chronic respiratory disease, diabetes mellitus and hypertension, as prognosis depends on continuity of care at primary and secondary

levels of healthcare, as well as the patient's involvement in self-management. These conditions were also chosen as the rates of each are rapidly escalating across LMICs and within India, so much so that the United Nations has recognised them as a major challenge within its sustainable development goals and India's Ministry of Health and Family Welfare has prioritised efforts to establish policies and strategies for their prevention and control.[97-101]

1.8 Thesis aims, objectives and structure

1.8.1 Aim

The research within this thesis aimed to: (i) evaluate the LMIC-based evidence on quality of handover communication and interventions for handover communication, (ii) investigate handover and healthcare communication practices, protocols and training within and between levels of healthcare in Himachal Pradesh and Kerala states, India, and (iii) identify possible strategies to improve the storage and exchange of chronic NCD patient information in Himachal Pradesh and Kerala states, India.

1.8.2 Objectives

1) To assess and summarise the LMIC-based evidence on observed/perceived quality of handover communication, factors affecting quality of handover communication and interventions for handover communication during the following transitions of care: shift change, discharge, referral and transfer (Chapter 3)

2) To describe chronic NCD patient and HCP attitudes, experiences and recall of handover and healthcare communication during public outpatient care (Chapter 4)
3) To describe chronic NCD patient and HCP attitudes, experiences and recall of handover and healthcare communication during public hospital inpatient care (Chapter 5)
4) To explore chronic NCD patient and HCP attitudes regarding possible strategies to improve the storage and exchange of chronic NCD patient information (Chapters 4 and 5)
5) To describe chronic NCD patient experiences and recall of handover communication during public hospital discharge (Chapter 6)
6) To investigate associations between the quality of verbal and documented discharge handover communication and chronic NCD patient outcomes (Chapter 6)
7) To identify HCP training, procedures and protocols for handover communication (Chapter 7)
8) To elucidate factors affecting quality of handover communication and subsequent continuity of care for chronic NCD patients (Chapters 4, 5, 6 and 7)

1.8.3 Structure

Chapter 1 introduces the thesis, defining and describing the importance of clinical handover, handover communication, healthcare communication and continuity of care. It also explains why the research within this thesis focusses on patients with chronic NCDs and justifies the need for handover communication research in India.

Chapter 2 presents an overview of the methodology of this PhD research, including information regarding the selection of study sites as well as the research approach, methods and design.

Chapter 3 presents a comprehensive systematic review utilising a narrative synthesis approach to summarise the literature focussing on the quality of handover communication and associated interventions in LMICs. This has been written up for submission to a peer-reviewed journal for publication.

Chapter 4 presents a mixed-methods study investigating clinical handover and healthcare communication for chronic NCD outpatients in Himachal Pradesh and Kerala states, India; it contains descriptive analysis of quantitative outpatient survey data, inductive thematic analysis of qualitative semi-structured interview data and convergent triangulation of data sources to establish barriers to continuity of care. This paper was published in PLOS One in 2018.

Chapter 5 presents a qualitative study on patient and healthcare provider knowledge, attitudes and barriers to handover and healthcare communication during chronic NCD inpatient care in Himachal Pradesh and Kerala states, India; it contains inductive thematic analysis of semi-structured patient and HCP interviews. This paper was published in BMJ Open in 2019.

Chapter 6 presents a quantitative prospective cohort study on chronic NCD patients' experiences and recall of discharge communication across three hospitals in Himachal Pradesh and Kerala states, India; it study contains descriptive and multivariate analysis of inpatient questionnaire data and investigates the associations between quality of discharge communication and chronic NCD patient outcomes at 5 and 18 weeks follow-up. This paper was published in PLOS One in 2020.

Chapter 7 presents a quantitative cross-sectional study on HCP training, procedures and protocols for handover communication in Himachal Pradesh and Kerala states, India; it contains descriptive analysis of HCP questionnaire data and training/policy/guideline documents. This has been written up for submission to a peer-reviewed journal for publication.

Chapter 8 discusses the principal findings of this thesis as well as their interpretation and implications. It also identifies the strengths and limitations of the research, highlights suggestions regarding future research and draws final conclusions.

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2. METHODS

This thesis is comprised of five studies: a systematic review, a mixed-methods study, a qualitative study, a prospective cohort study and a cross-sectional study. Each chapter contains a specific description of the study settings and/or methods used. This chapter contains additional information on healthcare in India, the India handover project, the study settings and justification regarding the research approach, methods and study designs.

2.1 Healthcare in India

2.1.1 Structure of public healthcare

At the national level, public healthcare in India is directed by the Ministry of Health and Family Welfare. At the state level, public healthcare is managed by the State Department of Health and Family Welfare, which has extensive autonomy in deciding upon, designing and delivering health programs. Figure 2.1 contains a summary of the structure of public healthcare in India, based on Indian Public Health Standard Norms.[1]

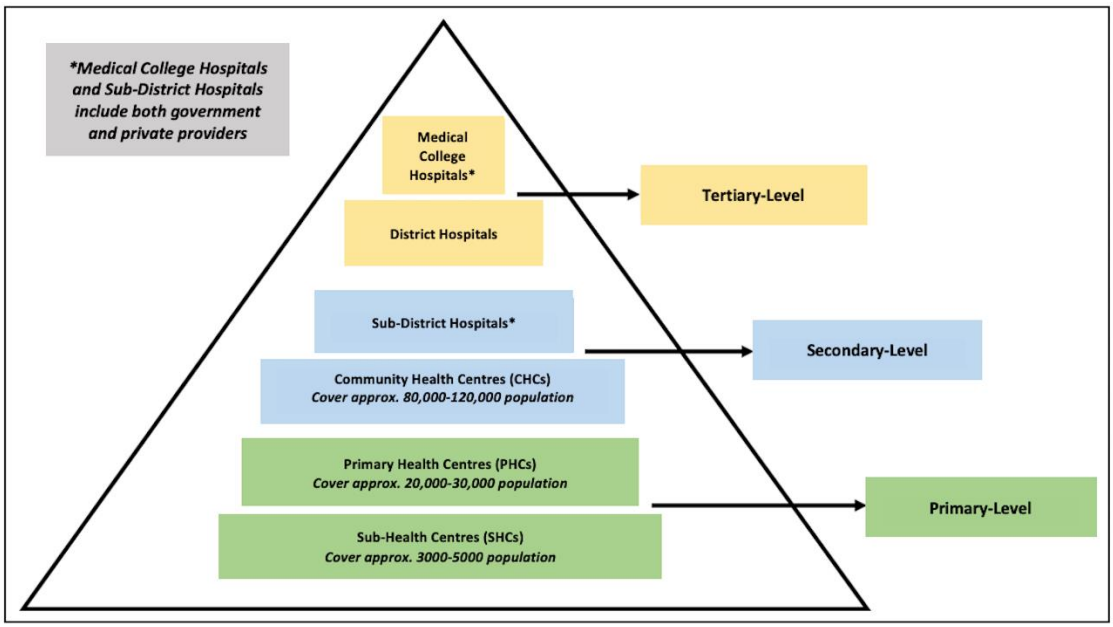

Figure 2.1 Structure of the Indian Public Healthcare System according to Indian Public Health Standard Norms

2.1.2 Public healthcare – An overview

Public healthcare in India has lacked adequate funding for many decades due to de-prioritisation from economic planners.[2] Therefore, whilst enormous progress continues to be made in improving outcomes such as life expectancy and under-five mortality rates,[3] the increasing population and prevalence of chronic NCDs alongside unresolved challenges in of communicable diseases is placing more strain on the public health system than what can be successfully managed. The quality of care provided in public facilities varies notably across India and public facilities often fall short of meeting the essential health needs of the population.[4] Reportedly common issues with public healthcare services include a shortage of trained HCPs, deficient medical supplies, limited (and often unreliable) opening times and poor accessibility (i.e. many facilities are situated too far away from those who need them).[4] Primary healthcare in rural areas of India is particularly problematic and the government has

estimated that 37% of rural Primary Health Centres (PHCs) are without a lab technician, 25% are without a pharmacist and 10% are without a doctor.[5] Public healthcare facilities are often the only source of qualified healthcare professionals in rural areas, which is where many of India's poorer citizens reside.[4]

2.1.3 Private healthcare – An overview

In recent decades the private healthcare industry in India has proliferated in order to meet the increasing health needs, expectations and earnings of the growing population.[4] Private HCPs have become so popular that they are now a dominant source of healthcare provision in India; national surveys have evidenced up to 65% of households reporting that they use private HCPs.[4 6] However, whilst the top end of the private market has world-class resources and treatments available, private HCPs lack regulation and quality remains notably inconsistent across facilities.[7] In some cases private HCPs deliver services without the appropriate expertise or equipment. In addition, whilst many patients prefer to visit private HCPs, it can often result in high out-of-pocket costs.[8] This can be particularly catastrophic for poor households, who are more likely to finance healthcare via the sale of assets and/or borrowing money.[9] Ultimately, private HCP costs mean that many poorer patients are unable to access private care, while others fall into further poverty as a result of the expense.

2.2 Background – India handover project

This thesis contains primary analyses of qualitative and quantitative patient and HCP data from India (Chapters 4-7), which was collected concurrently over the same period (December 2014 – November 2015) for a development research project titled "enhanced integration of primary and secondary health systems and patient empowerment through improved continuity of care and clinical handover". The project (also referred to as the "India handover project") was jointly conceived by the University of Birmingham and the following India partners: the Centre for Chronic Disease Control, Delhi, and the Amrita Institute of Medical Sciences, Kochi. To the author's knowledge, it is the first research of its kind, which set out to rigorously describe handover practices and factors affecting the quality of handover across primary and secondary/tertiary care services in India. Given the diversity of health systems between each state of India,[10] it was recognised that it would not be possible to capture the totality of such diversity. Instead, the aim was to make inferences and broad recommendations that would enable the transferability of key principles across states and regions.

As the India handover project data analysed within the study chapters of this thesis (Chapters 4-7) were collected concurrently, the choice of study designs and methods in each of these chapters were not informed by findings from the others. Rather, each study chapter serves as part of an overall situation analysis of handover communication and continuity of care for chronic NCD patients in Himachal Pradesh and Kerala states, India.

2.2.1 Study settings

The study settings for the India handover project were the northern state of Himachal Pradesh and the southern state of Kerala, the locations of which are demonstrated in Figure 2.2 below.

Source: mapsofindia.com[11]

Figure 2.2 A map of India demonstrating the locations of the study sites

The study sites for the project included the following public healthcare facilities: one PHC, one community health centre (CHC) and one secondary care hospital in Himachal Pradesh state and two PHCs, one secondary-care hospital and one tertiary-care hospital in Kerala state. Chosen facilities were located in a variety of rural, peri-urban and urban locations to provide insight from a range of geographical and public health service settings. The research predominantly concentrated on public healthcare as this is where handover most frequently occurs within and between levels of care and where many socio-economically vulnerable populations in India access affordable healthcare.[6] However, given the increasing presence and popularity of private HCPs across India, some data were collected from private HCPs via questionnaires and policy/training/guideline document reviews to gain a broader insight into handover communication practices, policies, protocols and HCP training across the study areas.

2.2.2 Himachal Pradesh – An overview

Himachal Pradesh is situated in the mountains of the Himalayas in the North of India and as such is a predominantly rural state; it has a total population of 6.86 million people and 10% live in urban regions.[12] It is relatively prosperous compared to other areas of India, although economic growth remains modest. In addition, stark inequalities exist between regions and some continue to experience high levels of poverty.[13] Himachal Pradesh has also made significant strides in educational attainment compared to other states and has an average literacy rate of 83% (national average = 74%). Whilst the last Indian population census reported that literacy rates were lower for women (77%) compared to men (91%),[12 13] progress is also being made on gender issues with more girls than boys now in school across the state.[13]

Progress on issues of health across the state are more mixed, with some improvements being seen in areas such as infant mortality.[13] Regarding public healthcare infrastructure, according to the state Directorate of Health Services there are 75 hospitals, 89 CHCs, 538 PHCs and 2083 sub-health centres (SHCs) across the state.[14] In addition, despite the rise in the number and popularity of private HCPs across India, public healthcare utilisation within Himachal Pradesh remains relatively high and is reportedly growing.[15] [16] The doctor-patient ratio within the state is 1:3,550.[17]

2.2.3 Kerala – An overview

Kerala state is situated on the southwest coast of India and has a population of 33.9 million people.[18] Almost half (48%) of the population lives in urban areas.[18] It is a relatively affluent state with low poverty levels, but areas of high poverty exist and inequality in the consumption of goods and services is the highest in any state of India.[19] Kerala boasts the highest literacy rate in India (94%), with similar rates between women (92%) and men (96%) and outperforms most states on progress regarding education and gender.[18] [19] It has also made outstanding progress in the area of health and rates of infant mortality and malnutrition are among the lowest in the country.[18] [19] Regarding public healthcare infrastructure, according to the state Directorate of Health Services there are 139 hospitals, 232 CHCs, 848 PHCs and 5408 SHCs across Kerala.[20] The healthcare environment in the state has become increasingly complex due to the increasing popularity and presence of HCPs; estimates have shown that the proportion of patients seeking care from private HCPs grew from 55% in 1986 to 65% in 2004.[21] Despite this, public healthcare facilities in Kerala continue to proactively deliver essential services and still act as the first point of care for many.[4] The doctor-patient ratio within the state is 1:400.[17]

2.3 Research paradigm

A paradigm broadly refers to “a set of assumptions and perceptual orientations shared by members of a research community”,[22] which often includes beliefs about aesthetics, values and morals.[23] The term “worldview” is used as a synonym for paradigm and has been described as “a way of thinking and making sense of the complexities of the real world”.[24] In social research paradigms can be viewed as conceptual and practical tools for effectively addressing research questions.[25] Historically, paradigms have also been particularly concerned with assumptions about the nature of being/reality (ontology) and its study (epistemology), with certain paradigmatic positions being commonly (though not solely) associated with specific study designs.[26]

At opposing ends of the paradigmatic spectrum are positivist and constructivist paradigms. Linked to the quantitative approach, the positivist paradigm asserts the existence of objective reality; it focusses on facts rather than abstract deductions, stating that knowledge should be based on the acquisition of empirical evidence and logical reasoning.[27 28] Conversely, linked to the qualitative approach is the constructivist paradigm, which postulates the existence of multiple subjective realities; it opposes the idea of a single method to generate knowledge and believes instead that knowledge is socially constructed and ever-changing.[22 28]

More recently, a newer paradigm of pragmatism has gained support from numerous researchers.[29-31] This is a problem-oriented philosophy, less focussed on ontology and epistemology and instead concentrating on answering research questions with the most suitable methods. The pragmatic paradigm provides a philosophical underpinning for mixed-methods research, as it acknowledges that a variety of qualitative and quantitative methods may need to be employed to effectively address research questions.[32] Given the diverse nature of research aims and objectives for this thesis

(summarised in Chapter 1), the pragmatic paradigm served as the philosophical basis for the utilisation of a mixed-methods approach.

2.4 Research approach

A mixed-methods approach was selected for this thesis research to suitably address the range of aims and objectives and ultimately provide a comprehensive situation analysis regarding handover communication and continuity of care for chronic NCD patients in Himachal Pradesh and Kerala states, India. Mixed-methods research involves the use of qualitative and quantitative methods and has been defined as "the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration".[33]

Mixed-methods studies have become increasingly common across healthcare research and have proven to be particularly beneficial when investigating health services.[34 35] This is because drawing upon the complementary strengths of quantitative and qualitative approaches can offer superior capabilities for addressing multifaceted issues, including the delivery of care across heterogeneous and dynamic health systems.[34] The utilisation of mixed-methods can also assist researchers in gaining a clearer comprehension of the connections and/or contradictions between data sources, which can elucidate further valuable areas of investigation.[35]

By employing a mixed-methods approach, incorporating triangulation of findings from HCP and patient questionnaires and interviews as well as training/policy/guideline

document reviews, this thesis research aimed to obtain a richer depiction of the topic of interest and establish robust conclusions.[36]

2.5 Research methods

2.5.1 Systematic review

A systematic review was conducted that aimed to provide a comprehensive summary of the observed and/or perceived quality of handover communication, the evaluated interventions that have been employed to improve handover communication and the reported effectiveness of such interventions in LMICs. A secondary aim of the review was to describe factors affecting the quality of handover communication in LMICs. This method was employed as systematic reviews enable findings to be summarised from numerous studies whilst minimising bias.[37] The review was also utilised to assist in identifying current gaps in evidence that could be addressed in future research. Published quantitative, qualitative and mixed-methods research literature from LMICs was explored. The absence of time and language restrictions and focus on multiple areas of handover communication maximised the scope of the review. A narrative synthesis approach was employed for data analysis due to the heterogeneity of study designs and health systems described. The Mixed Methods Appraisal Tool (MMAT) was used to appraise the methodological quality of included studies and facilitate the synthesis of findings.[38]

2.5.2 Pilot study

The study instruments used to collect inpatient and outpatient data in the India handover project were adapted from questionnaires used in previous handover research conducted in Nigeria, as part of a Masters in Public Health thesis (see Appendix 1). The HCP questionnaire was developed using components of the Agency for Healthcare Research and Quality Hospital Survey on Patient Safety Culture.[39] All questionnaires and interview topic guides were further developed using relevant handover communication literature and input from experienced health systems researchers in the UK and India.

Prior to the commencement of the pilot study and data collection for the India handover project, all researchers were trained by the principal investigator – SMH – in the principles research ethics, effectively administering questionnaires and using standardised data collection and storage methods. Following this, a small pilot study was conducted in Kerala to test all data collection instruments. This was an iterative process conducted over three rounds, which aimed to ensure that all questionnaires and topic guides effectively addressed the research topic and were comprehensible and contextually appropriate. Four researchers went out to two study hospitals (i.e. two researchers per hospital) with the questionnaires and topic guides and interviewed two patients/carers and two HCPs each. As well as asking questions from the questionnaires and topic guides, researchers also asked for feedback regarding the clarity and cultural and contextual appropriateness of the materials. Once this was complete, all researchers convened with the lead researcher (SJ) and a supervisor (SGo – medical professor familiar with the study settings and experienced in NCD research) to discuss the intended aim of each questionnaire and topic guide question and participant responses. During these discussions, the wording within the materials was developed to improve relevance and clarity before researchers returned for

subsequent rounds of testing. Appendix 1 contains the final study questionnaires and topic guides used in the India handover project.

2.5.3 Qualitative chronic NCD patient and HCP data

Semi-structured interviews were conducted with chronic NCD patients and HCPs to explore and elicit a deeper understanding of experiences regarding handover and healthcare communication during public outpatient and inpatient care, as well as attitudes regarding possible strategies for improving the exchange of chronic NCD healthcare information (Chapters 4 and 5). During patient interviews, whilst patients predominantly responded to questions, available accompanying carers (e.g. friends, family members etc.) were able to provide support with answers when required (i.e. in a purely supportive capacity). The use of individual interviews provided the opportunity for all participant groups to have their voices heard and ensured that findings were grounded in their experiences. Semi-structured interviews are an effective method for collecting in-depth information on a chosen topic and provide opportunities for open-ended participant elaboration, which can result in the emergence of unexpected issues/subjects.

Purposive, consecutive sampling was used to recruit patients with chronic NCDs (i.e. cardiovascular disease, chronic respiratory disease, diabetes mellitus or hypertension) for interviews from outpatient waiting areas and hospital inpatient wards.[22] As participant recruitment was conducted within healthcare facilities during working hours, opportunistic sampling was used to recruit available HCPs for interviews.[40] The sufficiency of the sample sizes for the qualitative studies was linked to data saturation, which has been defined as: “the point when no new information or themes are observed in the data”.[41] For both the mixed-methods outpatient study (Chapter 4) and

the qualitative inpatient study (Chapter 5), qualitative data collection and analysis continued until theoretical saturation was achieved for both patients and HCPs.[42] Saturation was assessed via the use of spreadsheets that documented the frequency of codes that occurred for each participant group.

Thematic analysis was utilised to analyse all qualitative chronic NCD patient and HCP data (Chapters 4 and 5), which has been defined as: “a method for identifying, analysing and reporting patterns within data”.[43] This is a widely used analytical method across qualitative research that many deem to be a valuable method in its own right.[43-45] An inductive (i.e. data-driven) approach to thematic analysis, such as that used in grounded theory, was employed. However, grounded theory was not required as the aims of the research did not relate to the development of hypotheses and/or theories.[46] An inductive thematic approach was used as this omitted the involvement of pre-existing theoretical and/or epistemological positions,[43] in order to facilitate a purely data-driven identification of themes relating to handover and healthcare communication. Overall, the versatility of the thematic method (resulting from its lack of ties to underlying theory and/or epistemology) meant it was attuned to the pragmatic approach and therefore an appropriate choice for the research.

2.5.4 Quantitative chronic NCD patient and HCP data

Outpatient questionnaires containing patient-held document content checklists were used to explore chronic NCD patient experiences and recall of healthcare communication and intra and inter-facility referral and transfer communication during public outpatient care (Chapter 4). Inpatient questionnaires containing discharge document checklists were used to explore chronic NCD patients' experiences and recall of discharge communication and health outcomes at 5 and 18 weeks follow-up

(Chapter 6); follow-up times were chosen based on the common need for chronic NCD patients to return to HCPs within these periods, as the questionnaire also asked about health-seeking behaviour. HCP questionnaires were used to explore their experiences of training, procedures and protocols for handover communication, as well as attitudes towards barriers to handover communication. All questionnaires contained closed questions, with some spaces for open-ended elaboration, and were administered and completed by researchers (i.e. questionnaires were delivered in person in an interview format, with patients being asked and answering questions verbally and researchers filling in the corresponding answers). During the delivery of outpatient and inpatient questionnaires, whilst patients predominantly responded to questions, their available accompanying carers (e.g. friends, family members etc.) were able to provide support with answers when required (i.e. in a purely supportive capacity). Questionnaires are a practical and effective method for collecting large datasets that contain targeted information on a topic of interest as well as providing quantifiable information that can be analysed using a variety of statistical methods.[47] In addition, the inclusion of patient-held medical document content checklists within outpatient and inpatient questionnaires facilitated the objective assessment of documented information transfer between HCPs and patients.

Purposive, consecutive sampling was used to recruit patients with chronic NCDs (i.e. cardiovascular disease, chronic respiratory disease, diabetes mellitus or hypertension) to complete questionnaires from outpatient waiting areas and hospital inpatient wards.[22] As participant recruitment was conducted within healthcare facilities during working hours, opportunistic sampling was used to recruit available HCPs with a minimum of 12 months of professional experience to complete questionnaires.[40] Due to the lack of prior work completed in the field of study, the sample sizes for questionnaire data in the outpatient, inpatient and HCP studies (Chapters 4, 6 and 7) were calculated

using a formula to determine the minimum sample needed to estimate a population mean with confidence limits of 95% for a variable (such as the proportion of patients receiving complete healthcare information) with a prevalence of 50%. The following formula was used: Necessary Sample Size = (Z-score)² * StdDev*(1-StdDev) / (margin of error)².[48] Based on the study parameters this worked out as 384.16; therefore, the aim was to collect survey data from a minimum of 385 patients in each study.

Descriptive statistics were used to summarise the results of outpatient, inpatient and HCP questionnaires (Chapters 4, 6 and 7). In addition, the use of logistic regression analyses in the prospective inpatient study (Chapter 6) made it possible to investigate the associations between quality of verbal and documented discharge communication and the following chronic NCD patient outcomes at 5 and 18 weeks follow-up: death, hospital readmission and self-reported deterioration of NCD/s. Regression modelling also enabled adjustment for potentially confounding variables, which can reduce bias and improve study validity.[49]

2.5.5 Policy, guideline and training document data

Expert consultations and online searches of relevant public and private healthcare websites were used to locate national, state-level and local handover communication policy/guideline/training documents as part of the cross-sectional HCP study (Chapter 7). Due to the descriptive nature of the study, a narrative approach was employed to review and summarise the handover-related contents of pertinent documents. The utilisation of document reviews was employed to add value to findings by enabling clearer conclusions to be drawn regarding systems-level factors affecting handover communication and subsequent continuity and safety of patient care in Himachal Pradesh and Kerala states, India.

2.6 Study designs

The study designs utilised in this thesis research were governed by the nature of the aims and objectives summarised in Chapter 1. Therefore, designs were predominantly descriptive (Chapters 3, 4, 5 and 7) to provide a comprehensive overview of the quality of handover communication and associated interventions in LMICs, as well as of handover and healthcare communication and potential strategies for improving the exchange of chronic NCD patient information in Himachal Pradesh and Kerala states, India. The inpatient study reported in Chapter 6 utilised a prospective observational design to capture chronic NCD post-discharge outcomes and facilitate the investigation of associations between quality of discharge communication and chronic NCD patient outcomes.

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3. HANDOVER COMMUNICATION IN LOW AND MIDDLE-INCOME COUNTRIES: A SYSTEMATIC REVIEW

Given the emerging challenges resulting from a lack of prioritisation on patient safety initiatives and poorly integrated health systems across numerous LMICs (including India),[1-6] there is a pressing need to find ways of improving cohesion and overall quality of healthcare delivery. However, reviews focussing on handover communication and associated interventions have rarely featured LMIC-based research. Therefore, a systematic review was conducted with the primary aims of describing the observed and/or perceived quality of handover communication, the evaluated interventions that have been employed to improve handover communication and the reported effectiveness of such interventions in LMICs. A secondary aim was to describe factors affecting the quality of handover communication in LMICs. The transitions of care focussed upon included hospital shift-change, hospital discharge and intra and inter-healthcare facility referrals and transfers. The mixed-methods appraisal tool was used to assess the quality of all included studies.[7]

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This chapter has been written in paper format for submission to a peer-reviewed journal.

Handover communication in low and middle-income countries: a systematic review

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3.1 Abstract

Background: Effective handover communication facilitates integration, continuity and safety of care both within and between levels of healthcare. Despite the simplicity of many established handover interventions, initiatives regarding transitions of care have received less priority across many low- and middle-income countries (LMICs). We sought to appraise and summarise the literature on observed and/or perceived quality of handover communication, factors affecting the quality of handover communication and evaluated interventions for handover communication in LMICs.

Methods: Seven academic databases were searched for published qualitative, quantitative and mixed-methods studies. The searches covered the period of database inception to June 2018 and were not restricted by language. Eligible studies were independently, critically appraised and synthesised using a narrative synthesis.

Results: The searches yielded 10,820 citations after de-duplication of records. Of these, 94 articles met the inclusion criteria; 65 observational (i.e. non-interventional) and 29 interventional. Studies were conducted across 25 LMICs, were predominantly hospital-based and included a wide range of designs, participants and healthcare provider (HCP), patient and medical artefact-related outcomes. The most studied area of handover communication in both observational and interventional studies was hospital discharge. Sub-optimal recording and/or transfer of patient information was a commonly reported problem during shift-change, referrals, transfers and hospital discharge. A number of system, organisational cultural and individual HCP factors were described as affecting each area of handover communication; system factors were most commonly reported. Interventional studies were predominantly non-randomised and reported as being effective. Strategies varied widely and included structured documents, handover guidelines, communication tools, HCP and/or patient

training/education, an integration initiative and a digital referral communication mechanism.

Conclusions: This review has highlighted a range of challenges that need to be addressed to ensure the successful integration and functioning of health systems. It has also demonstrated a current dearth of high-quality handover communication interventional research across LMICs. It is imperative that further robust quality improvement projects are conducted and that relevant policies and training are put in place that highlight the importance of handover communication for continuity and safety of patient care.

Registration: This review is registered with the PROSPERO International Prospective Register of Systematic Reviews (CRD42014009309).

3.2 Introduction

Clinical handover involves the transfer of responsibility and accountability for patient care between healthcare providers (HCPs) and therefore plays a key role in facilitating continuity of care,[1] which is defined as "the seamless provision of healthcare between settings and over time".[2] It is also a vital component of facilitating integration between levels of care, which is critical for patients whose needs extend beyond one care episode. However, miscommunication is one of the leading causes of serious adverse events in patients and poor handover procedures, in particular, have been shown to lead to life-threatening situations during treatment as well as hospital readmissions and preventable deaths.[3-5] Such findings highlight the importance of handover for patient safety and have become an increasingly international concern.[6] Reviews have been carried out across several high-income countries (HICs), such as the United Kingdom and Australia,[7 8] over the past decade to develop risk reduction recommendations.

Handover communication is defined as "the passing of patient-specific information from one caregiver/team of caregivers to the next and from caregivers to the patient and family in order to ensure care continuity and safety".[5] There are a number of different interventions that have been promoted to aid this communication in HICs, many of which have been summarised in reviews of the literature by Merten *et al.* and Hesselink *et al.*[9 10] For example, within hospitals, standardised shift-change protocols and training can improve both the verbal and documented handover process between HCPs.[9] The use of structured discharge planning has also been shown to improve information exchange between HCPs and between HCPs and patients, as well as helping primary care follow-up in the community.[10] Other relatively simple interventions for improving handover communication involve systematic methods for recording patient information; in HICs these have more frequently involved electronic records and health information

systems, which have permitted easier access and transfer of information across levels of care.[11-13]

Despite the simplicity of many handover interventions, across many low and middle-income countries (LMICs) handover and wider patient safety initiatives have received less priority, resulting in a lack of integration both within and between levels of care (where such levels exist). The situation in LMICs is likely to have been intensified by the fragmented and frequently unregulated nature of care provision that is spread across numerous HCPs.[14] In these circumstances, integrating hospital and primary care has posed a significant challenge and has often been omitted entirely.[14-17] However, the need for high-quality methods of transferring healthcare information has grown given the increasing number of patients with chronic non-communicable diseases (NCDs), whose care is seldom concluded in a single episode. With the rise in ageing populations and deteriorating lifestyle behaviours (e.g. smoking rates, lack of exercise etc.) amongst other factors, the World Health Organization (WHO) has estimated that NCDs currently account for 71% of the global deaths.[18] This burden of disease is disproportionately affecting LMICs, where 85% of premature NCD deaths in people aged between 30 and 69 years occur.[18 19] People in LMICs also tend to develop NCDs younger and suffer for longer than those in HICs.[20] There is an interconnection between chronic NCDs and poverty that forms a vicious cycle; the poorest populations are most likely to die due to greater exposure to risks and reduced access to healthcare services.[18] In addition, chronic NCDs have a particularly detrimental impact on the economic growth of the world's poorest countries, subsequently reducing their potential for development.[18]

Given the importance of handover communication for improving health systems functioning, the WHO Collaborating Centre for Patient Safety Solutions has published a report containing suggested actions for improving communication during patient

handovers to prevent harm.[5] However, there is a lack of widespread evidence; both the WHO and the Australian Commission on Safety and Quality in Health Care reviews concluded that handover is not well researched and there are substantial gaps in policy.[5 7] Further, a recent systematic review of educational interventions to improve handover solely featured HIC literature and also concluded that despite some increase in interest and publications on the topic, the quality of available research remains deficient.[21]

Based on such reports and the experience of researchers involved in this review, it was hypothesised that handover communication is an integral aspect of health systems functioning that has lacked comprehensive focus in LMIC settings. The primary aims of this review were to describe the observed and/or perceived quality of handover communication, the evaluated interventions that have been employed to improve handover communication and the reported effectiveness of such interventions. A secondary aim was to describe factors affecting the quality of handover communication in LMICs. The transitions of care focussed upon included hospital shift-change, hospital discharge and intra and inter-healthcare facility referrals and transfers (see Figure 3.1 for definitions).

Hospital shift-change: A meeting between HCPs during the change of hospital shift in which vital information about and responsibility for the patient is provided from the off-going provider to the on-coming provider.*

Hospital discharge: The point at which a patient is released from hospital care by a HCP and either returns home and/or to another HCP (e.g. primary care, nursing home etc.).†

Referral: The process of a HCP directing/redirecting a patient to an appropriate healthcare specialist or service for treatment (often accompanied by a written request to the specialist/service), either within the same healthcare facility (i.e. intra-facility referral) or between different facilities (i.e. inter-facility referral).§

- *Example of an intra-facility referral: Hospital outpatient HCP directs a patient from the outpatient clinic to another department of the hospital for specialist treatment*
- *Example of an inter-facility referral: Primary care HCP directs a patient to hospital for specialist treatment*

Transfer: The movement of a patient from one HCP to another, either within the same healthcare facility (i.e. intra-facility transfer) or between different facilities (i.e. inter-facility transfer).**

- *Example of an intra-facility transfer: Following surgery, HCP/s move a patient from the surgical department to the intensive care unit of the same hospital*
- *Example of an inter-facility transfer: HCPs transport a patient from one hospital to another using an ambulance, due to an increase in the patient's medical care needs*

* Definition from Groves PS, Manges KA, Scott-Cawiezell J. 2016.[22]
† Definition adapted from Farlex & Partners medical dictionary. 2009.[23]
§ Definition adapted from Merriam-Webster dictionary. 2020.[24]
** Definition adapted from Kulshrestha A, Singh J. 2016.[25]

Figure 3.1 Definitions of transitions of care

3.3 Methods

3.3.1 Study registration and protocol

This review is registered with the PROSPERO International Prospective Register of Systematic Reviews (CRD42014009309).

3.3.2 Eligibility criteria

3.3.2.1 *Participants and healthcare settings*

Eligible participants included in the review were patients, carers and HCPs (i.e. HCPs and/or healthcare facility managers) of any age or sex involved in the handover communication process or evaluation. All healthcare settings within LMICs (as defined by the World Bank 2018) were considered.[26]

3.3.2.2 *Phenomena of Interest*

Observed/perceived quality of handover communication

One phenomenon of interest for this study was the observed/perceived quality of handover communication, which is defined as verbal and/or documented patient-specific information that is passed from one HCP/team of HCPs to the next and/or from HCPs to patients/carers to ensure continuity and safety of care.[5]

Evaluated interventions for handover communication

Additional phenomena of interest for this study were evaluated interventions that aimed to improve handover communication between HCPs and/or between HCPs and patients and their reported impact/effectiveness.

Factors affecting quality of handover communication

Within studies that evaluated the observed/perceived quality of handover communication, another phenomenon of interest was factors identified as affecting the quality of handover communication between HCPs and/or between HCPs and patients.

3.3.2.3 *Outcomes*

We sought any outcomes relevant to the quality of verbal and/or documented handover communication, such as the form and standard of information recording and exchange, compliance with relevant policies and/or protocols, rates of error during transitions of care and patient, carer and/or HCP satisfaction with handover communication processes. Clinical outcomes and adverse events associated with quality of handover communication were also of interest, such as readmissions, diagnostic delays and death. Additional outcomes of interest were factors reported as affecting the quality of handover communication.

3.3.2.4 *Study Designs*

We considered published quantitative, qualitative and mixed-methods studies that evaluated the quality of handover communication and/or studies that evaluated an intervention for improving the quality of handover communication. A study was eligible for inclusion if it included an evaluation of the quality of patient-specific healthcare information provided, shared or exchanged between HCPs and/or between HCPs and patients during one or more transitions of care. An intervention study was eligible for inclusion if it evaluated an intervention that aimed to improve the provision, sharing or exchange of patient-specific healthcare information between HCPs and/or between HCPs and patients during one or more transitions of care. Eligible interventions

included strategies such as shift-change report training, structured referral letters and patient discharge education. For all studies, relevant healthcare information included verbal and/or documented details and included clinical information, patient self-care/management information and healthcare records.

The following studies were excluded: those involving telemedicine for diagnostic or consultation purposes and those involving discharge planning with community-based (i.e. transitional) care from hospital nurses/doctors without handover to another HCP.

3.3.3 Search strategy

To summarise the available literature regarding the quality of handover communication in LMICs, we designed search and selection strategies that were broad and inclusive, with no time or language restrictions. Where relevant, papers were translated into English. C.H searched for published studies from inception to 14th June 2019 in the following electronic databases: CINAHL Plus (Platform), Cochrane Library, EMBASE (Ovid), MEDLINE (Ovid), MEDLINE In-Process (Ovid) and PsycINFO (Ovid) using keywords and MESH terms such as “handover”, “handoff”, “referral”, “transfer” and “discharge”. C.H also searched for published reports and further citations via Google search engine (first 200 results). See supplementary file S1 for search strategies. All references were managed in EndNote Version 9.

3.3.4 Study selection

All records identified in the search were screened for potential inclusion in the review. Titles and abstracts were reviewed by two independent researchers (C.H and S.M) and relevant references retained for full-text review. If an abstract was not available for a record of interest, a full-text was searched for to be reviewed for inclusion. Full-text

screening was completed by C.H, S.M, L.J and P.S, with C.H screening all retained studies and the remaining researchers screening a third each, thus acting as second independent reviewers. Throughout the selection and inclusion process, any disagreements between researchers were resolved through discussion or, if the need arose, consultation with a third reviewer (S.M.H).

3.3.5 Data extraction

Data extraction was completed by C.H with P.S checking a random sample (50%) of all included studies. During data extraction, studies were categorised as either observational or interventional; observational studies were defined as those that were non-interventional (i.e. studies that evaluated quality of handover communication with no intervention component) and interventional studies were defined as those that evaluated strategies for improving handover communication. For observational studies, a data extraction sheet was used to extract the following information: First author, year of publication, LMIC/s, study design, sample size, study healthcare setting/s, outcome measure/s (regarding the quality of handover communication) and results (regarding the quality of handover communication). For interventional studies, a data extraction sheet was used to extract the following information: First author, year of publication, LMIC/s, study design, sample size, study healthcare setting/s, evaluated intervention, outcome measure/s and summary of results (regarding the impact/effectiveness of the intervention). Data extraction was managed via electronic forms on Microsoft Excel.

3.3.6 Quality appraisal

Given the mixed-methods nature of this review, the Mixed Method Appraisal Tool (MMAT) was used to assess the quality of included studies.[27] This is a reliable

instrument that has been used for several mixed-methods systematic reviews covering literature across high, middle and low-income countries.[28-30] It contains methodological quality criteria for qualitative studies, randomised controlled trials, non-randomised studies, quantitative descriptive studies and mixed-methods studies. The criteria vary for each study design and cover aspects such as the appropriateness of research questions, the relevance of sampling strategy, sample representativeness and the appropriateness of measurements and analytical methods; see supplementary file S2 for the full list of MMAT methodological quality criteria by study design. Quality appraisal was completed by C.H, S.M, L.J and P.S. C.H randomly sampled 10% of all appraised studies to ensure reliability in the process.

Given the descriptive nature of this review, quality scores for each study were calculated using the MMAT to provide a succinct yet informative overview of study quality. These were characterised using scores from zero to five stars (also expressed as 0–100% of the quality criteria being met). For quantitative and qualitative studies, all five quality criteria needed to be met to receive the highest score (100%). For mixed-methods studies, the overall score was dependent on the lowest score of each of the study components (qualitative and quantitative); therefore, scores were determined by the quality of the weakest component. For the purposes of this study, studies that scored 0-20% were considered of low quality, studies that score 40-60% were considered of medium quality and studies that scored 80-100% were considered of high quality.

3.3.7 Synthesis

Due to the heterogeneity of study designs, populations, outcome measures and interventions, a narrative synthesis approach was used to summarise study findings for each area of handover communication (e.g. shift-change, discharge etc.).

For the observed/perceived quality of handover communication, preliminary synthesis was undertaken by consulting the data extraction sheet and categorising studies by those that had either predominantly positive (i.e. high-quality handover communication) or negative (i.e. low-quality handover communication) results. The findings were then summarised in the text using this structure and details were included regarding study settings and the outcome measures used to evaluate quality of handover communication.

For evaluated interventions for handover communication, preliminary synthesis was undertaken by consulting the data extraction sheet and grouping together similar intervention strategies. The findings were then summarised in the text using this structure and details were included regarding study settings, objectives and results regarding the impact/effectiveness of each intervention.

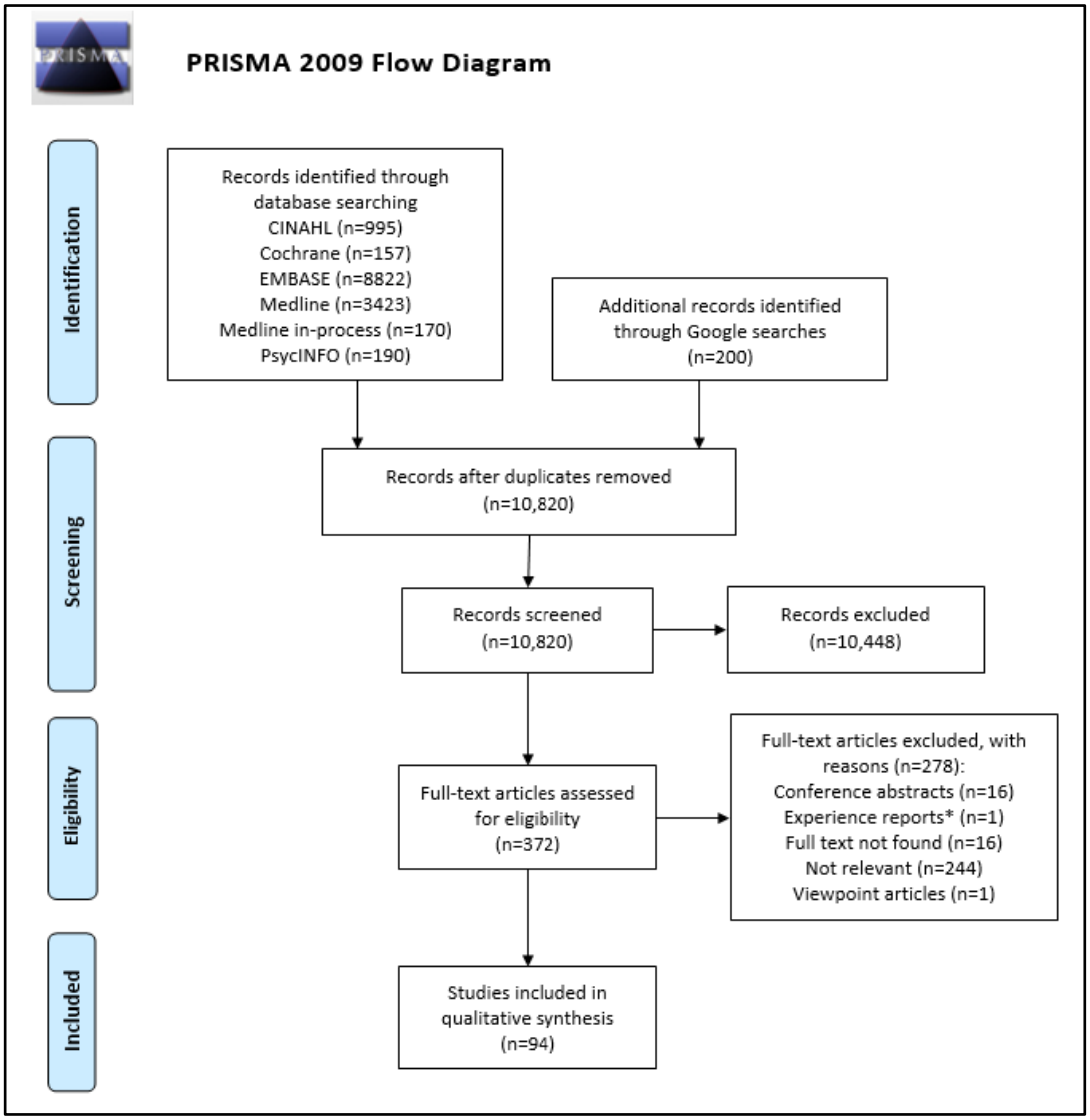
For factors affecting the quality of handover communication, preliminary synthesis was undertaken by consulting the results of all observational studies and tabulating factors identified as affecting quality of handover communication. These were then categorised into one of the three following factors relevant to clinical handover, previously defined in a review by the Australian Commission on Safety and Quality in Healthcare:[7] System factors: regarding policies, procedures, operating systems, work systems, routines, supervision and legislation; Organisational cultural factors: regarding interpersonal relationships and/or communication between/amongst HCPs that impacts on patient care; and Individual HCP factors: regarding HCP knowledge, skills and attitudes that

affect their ability to perform their role and/or transfer information to others. The findings were then summarised via a concept map and in the text using this structure and details were included (in the text) regarding study settings.

3.4 Results

3.4.1 Study selection

The searches identified 13,957 citations. After the removal of duplicates, 10,820 citations remained. Following the screening of titles and abstracts, 372 full-text research articles were reviewed in detail. Of these, 94 articles met the review inclusion criteria. Figure 3.2 contains the PRISMA Flow Diagram of the study selection process.[31]



*Experience reports = narratives or descriptions of healthcare experience that were not collected using formal research methods

Figure 3.2 PRISMA Flow Diagram of the study selection process

3.4.2 Included studies

The included studies (n=94) were published research articles from 1973 to 2019, with the majority (n=82) being published from 2005 onwards. The studies were conducted across a total of 25 LMICs. The majority of studies (n=62) were conducted in upper-middle income countries (based on World Bank country classification data at the time

the review was conducted).[26] Brazil (n=14), India (n=11), South Africa (n=10) and China (n=10) were the four most frequently studied LMICs. Additionally, three studies were conducted across multiple LMICs (Table 3.1).

Table 3.1 Number of studies from LMICs grouped according to World Bank Country Classification (2018)

Income group	Country names (number of studies)
Low-income	Ethiopia (2), Nepal (1), Uganda (1)
Lower-middle income	Ghana (2), Indonesia (1), Jordan (2), India (11), Nigeria (6), Pakistan (2), Philippines (1), Sri Lanka (3), Sudan (1)
Upper-middle income	Argentina (1), Brazil (14), Brazil/Colombia (2), China (10), Colombia (2), Croatia (1), Iran (7), Jamaica (1), Lebanon (2), Mauritius (1), South Africa (10), Thailand (1), Turkey (8)
Mixture	Argentina/Brazil/Colombia/Mexico (1)

3.4.3 Study characteristics

The majority (n=65) of studies were observational (Table 3.2) and the remaining (n=29) were interventional (Table 3.3). Included studies were predominantly hospital-based and included a wide spectrum of patients and HCPs, including chronic disease, prenatal, postpartum, trauma and surgical patients as well as medical students, health systems managers, clinical healthcare staff, community health workers and non-governmental agency staff. In addition, many studies either focussed on or included an evaluation of, medical artefacts used to exchange clinical information (e.g. referral documents, discharge summaries etc.).

Table 3.2 Characteristics of included observational studies

Observational Studies (n=65)			
Main area of handover communication studied	**Number of studies**	**LMICs where studies were conducted** **(Number of studies)**	**Medical specialties featured in studies** **(Number of studies)**
Hospital shift-change	13	Brazil (3), China (2), Colombia (1), India (2), Iran (1), South Africa (1), Sri Lanka (1), Turkey (1), Uganda (1)	Internal medicine/surgery/gynaecology (1), paediatrics (2), obstetrics and gynaecology (1), neurology (1), neonatal intensive care (1), neurology/neurosurgery (1), internal medicine/surgery/intensive care/cardiology/neurosurgery/obstetrics and gynaecology (1), intensive care (1), n/a (4)*
Hospital discharge	21	Brazil (6), Ethiopia (1), India (2), Lebanon (1), Nepal (1), Nigeria (1), Pakistan (2), South Africa (3), Sri Lanka (1), Thailand (1), Turkey (2)	Surgery (4), emergency medicine (2), oral and maxillofacial surgery (1), intensive care (1), hepatology (1), burns (1), internal medicine/emergency medicine (1), obstetrics and gynaecology (2), cardiology (2), internal medicine (3), paediatrics (1), n/a (2)*
Intra-facility referrals†	1	Nigeria (1)	Oral and maxillofacial surgery (1)
Inter-facility referrals§	16	Argentina/Brazil/Colombia/Mexico (1), Brazil/Colombia (2), Ethiopia (1), Ghana (2), Iran (1), , Nigeria (4), South Africa (4), Sudan (1), Turkey (1)	Gynaecology (1), obstetrics and gynaecology (1), emergency medicine (1), internal medicine/paediatrics/dermatology/ophthalmology/obstetrics and gynaecology/dentistry/oncology (1), paediatric emergency medicine (2), psychiatry (2), internal medicine/obstetrics and gynaecology/paediatrics/surgery (1), dentistry (1), surgery (1), cardiology/gynaecology (1), n/a (4)*
Intra-facility transfers†	1	Brazil (1)	n/a (1)*
Inter-facility transfers§	3	India (1), Jamaica (1), Turkey (1)	Intensive care (1), emergency medicine (2)
Multiple areas of hospital-based handover**	10	Argentina (1), China (1), Colombia (1), Croatia (1), India (1), Iran (3), Jordan (1), Turkey (1)	Post-anaesthesia care (1), intensive care (2), n/a (7)*

* Studies not focused on/within a medical specialty setting
† Intra-facility = within healthcare facilities
§ Inter-facility = between healthcare facilities
**Studies evaluating multiple forms of hospital-based handover (e.g. shift-change and intra-hospital transfers)

Table 3.3 Characteristics of included interventional studies

Interventional Studies (n=29)			
Main area of handover communication studied	**Number of studies**	**LMICs where studies were conducted** **(Number of studies)**	**Medical specialties** **(Number of studies)**
Hospital shift-change	7	China (2), India (2), Iran (1), Lebanon (1), Mauritius (1)	Gynaecology (1), internal medicine/surgery/cardiology (1), neurosurgery (1), neurology intensive care/ surgery intensive care/respiratory intensive care (1), internal medicine (1), internal medicine/orthopaedics/intensive care (1), paediatrics (1)
Hospital discharge	14	Brazil (4), China (2), India (3), Jordan (1), Philippines (1), Sri Lanka (1), Turkey (2)	Geriatrics (1), emergency medicine (1), internal medicine/surgery/gynaecology/gynaecologic oncology/neurology/urology (1), cardiothoracic surgery (1), obstetrics and gynaecology (1), internal medicine (2), neonatal intensive care (1), cardiac intensive care (2), paediatric cardiac surgery (2), oncology/surgical oncology (1), emergency medicine/family medicine (1)
Inter-facility referrals[†]	3	Indonesia (1), South Africa (2)	Obstetrics and gynaecology/paediatrics (1), n/a (2)*
Intra-facility transfers[§]	3	China (3)	Emergency medicine/intensive care (1), intensive care (1), post-anaesthesia care (1)
Inter-facility transfers[†]	2	Iran (1), Turkey (1)	Emergency medicine (2)

* Studies not focused on/within a medical specialty setting
[†] Inter-facility = between healthcare facilities
[§] Intra-facility = within healthcare facilities

3.4.3.1 *Observational studies*

Observational studies most commonly focussed on hospital discharge (n=21) and hospital shift-change (n=13). There were also several studies (n=10) that evaluated multiple areas of hospital-based handover (e.g. “handoffs and transitions”); these and several other observational studies evaluated areas of handover communication as part of larger assessments of patient safety culture, quality of care and/or healthcare communication/coordination. Most observational studies focussed on/within medical specialty settings (Table 3.2).

Regarding study designs, most observational studies utilised purely quantitative approaches (n=56), consisting of predominantly cross-sectional (n=48) studies. An array of direct (e.g. direct observations) and non-direct (e.g. questionnaires) assessment methods were used, as well as various outcome measures to evaluate the quality of documented/verbal handover communication (Table 3.4). HCP-related outcomes focussed on knowledge, performance (e.g. errors) and perceptions (e.g. regarding effectiveness/) of handover communication practices. Patient and/or carer-related outcomes focussed on perceptions (e.g. satisfaction) and reports regarding receipt of handover communication. Outcomes related to medical artefact analysis covered legibility, completeness and/or accuracy of documented information. Supplementary file S3 contains a summary of extracted data from all observational studies.

Table 3.4 Study designs and data collection methods used

Observational studies (n=65)		
Study design	**Number of studies**	**Methods used for data collection**
Qualitative	4	Direct observations, interviews
Quantitative	56	Direct observations, medical records, interviews, questionnaires/surveys, registers
Mixed-methods	5	Direct observations, group discussions, interviews, medical records, questionnaires/surveys
Interventional studies (n=29)		
Study design	**Number of studies**	**Methods used for data collection**
Qualitative	2	Interviews
Quantitative	25	Audio recordings, clinical status assessments, direct observations, healthcare staff reports, interviews, medical records, questionnaires/surveys
Mixed-methods	2	Direct observations, group discussions, interviews, medical records, questionnaires/surveys

3.4.3.2 *Interventional studies*

The majority (n=14) of interventional studies focussed on hospital discharge, followed by hospital shift-change (n=7). Most interventional studies also focussed on/within medical specialty setting/s (Table 3.3).

Regarding study designs, most interventional studies utilised purely quantitative approaches (n=25), which were predominantly pre-post studies (n=16). Interventional studies also featured a range of direct (e.g. audio recordings) and non-direct (e.g. interviews) assessment methods (Table 3.4). A wide variety of outcome measures were used to assess the impact of interventions; HCP-related outcomes focussed on

knowledge (e.g. regarding handover procedures), performance (e.g. information omissions) and perceptions (e.g. patient/carer readiness for discharge). Patient and/or carer-related outcomes also included those related to knowledge (e.g. self-care awareness), as well as mastery/skill levels (e.g. regarding post-discharge care) and perceptions (e.g. self-perceived functional status). Outcomes related to medical artefact analysis concentrated on legibility and completeness of documented information. Further, a small number of interventional studies incorporated clinical (e.g. readmissions) and economic (e.g. cost of handover) outcomes. Supplementary file S4 contains a summary of extracted data from all interventional studies.

3.4.4 Quality appraisal

The majority of included studies were of medium to high quality; of the 94 studies appraised, 76 had a quality score equal to or greater than 60% (i.e. meeting three out of five criteria = ***) (Table 3.5).

Table 3.5 Study designs and MMAT methodological scores

Observational studies (n=65)	**Number of studies and MMAT appraisal scores**				
Study design (Number of studies)	**20% (*)**	**40% (**)**	**60% (***)**	**80% (****)**	**100% (*****)**
Qualitative (n=4)	0	0	0	0	4
Quantitative descriptive (n=29)	0	0	6	8	15
Non-randomised (n=27)	0	5	7	14	1
Mixed-methods (n=5)	2	2	1	0	0
Interventional studies (n=29)					
Study design (Number of studies)					
Qualitative (n=2)	0	1	1	0	0
Quantitative descriptive (n=2)	0	1	0	1	0
Non-randomised (n=21)	1	5	9	6	0
Randomised controlled trial (n=2)	0	0	1	0	1
Mixed-methods (n=2)	1	0	1	0	0

3.4.4.1 *Observational studies*

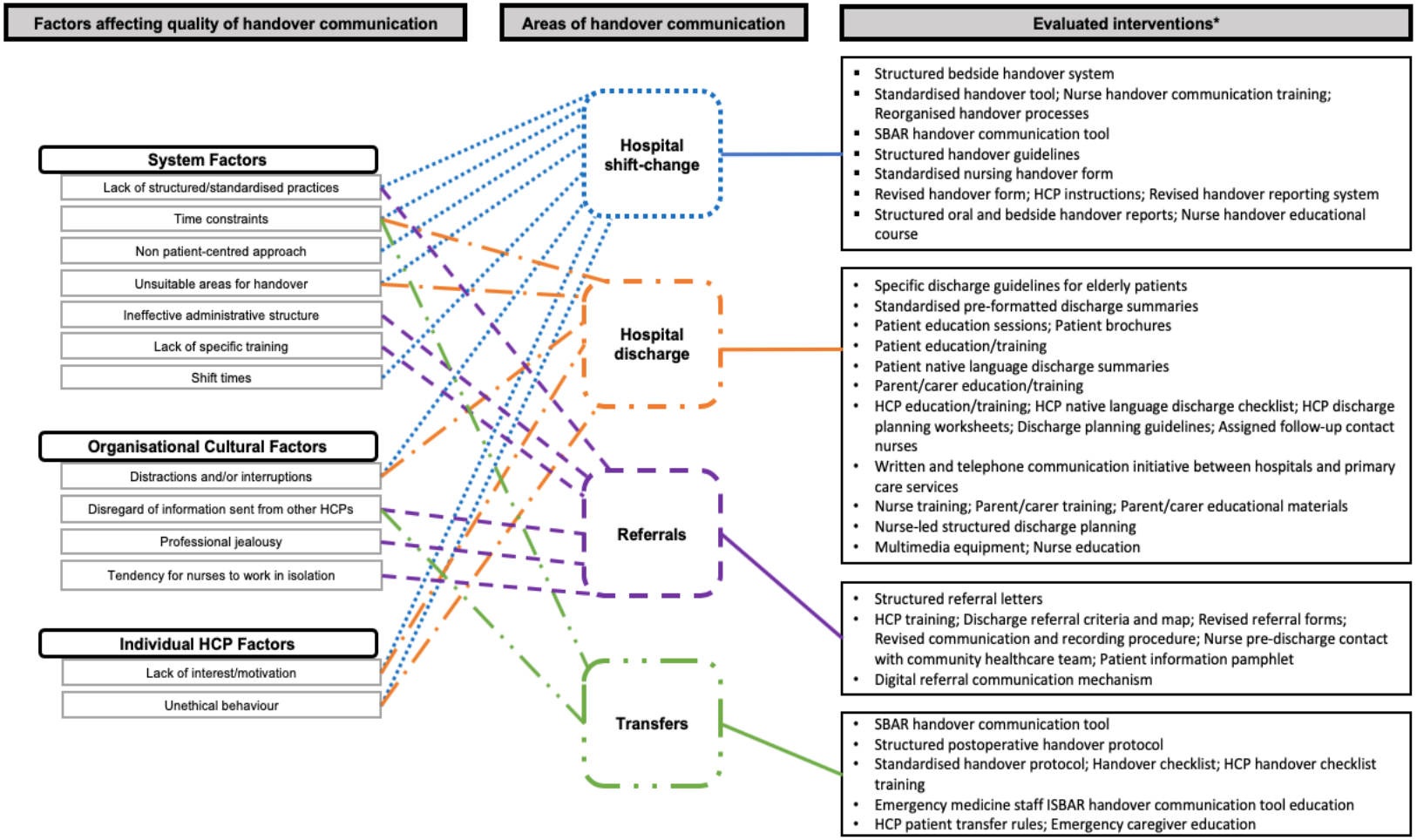
All qualitative observational studies (n=4, 100%) were of high quality, with scores of 100%. The majority of quantitative descriptive (n=23, 79%) and non-randomised (n=15, 56%) observational studies were of medium to high quality, with scores equal to or more than 60%. All mixed-methods observational studies (n=5, 100%) were of medium to low quality, with scores equal to or lower than 60%. (Table 3.5). Supplementary file S5 contains a summary of quality appraisal assessments for all included studies.

3.4.4.2 *Interventional studies*

All qualitative (n=2, 100%), mixed-methods (n=2, 100%) and the majority of non-randomised (n=15, 71%) interventional studies were of medium to low quality, with scores equal to or less than 60%. Of the two quantitative descriptive interventional studies, one was of low quality (score=40%) and one was of high quality (score=80%). All randomised controlled trials (n=2, 100%) were of medium to high quality, with scores equal to or more than 60% (Table 3.5). Supplementary file S5 contains a summary of quality appraisal assessments for all included studies.

3.5 Synthesis of results

The results regarding the observed and/or perceived quality of handover communication, factors affecting the quality of handover communication and evaluated interventions are presented for each of the following areas of handover focussed on in the included studies: hospital shift-change, hospital discharge, referrals and transfers. Figure 3.3 contains a concept map of factors affecting the quality of handover communication and evaluated interventions for each area of handover communication. See supplementary files S3 and S4 for a summary of extracted data from each observational and interventional study.



*Interventions listed as described and combined in each interventional study

Figure 3.3 Concept map of factors affecting quality of handover communication and evaluated handover communication interventions

3.5.1 Hospital shift-change

3.5.1.1 *Observed/perceived quality of shift-change handover communication*

Multiple studies involving observations and/or document content evaluations of handover communication during shift-change reported issues of deficient recording and/or transfer of information.[32-36] For example, two studies in India utilising observations evaluated compliance with handover practices in neurology wards and found that both doctors' and nurses' scores for staff interaction and patient communication did not exceed 53%.[33 34]

The majority of studies evaluating the quality of shift-change communication assessed HCP and/or patient perceptions and indicated predominantly suboptimal information transfer.[36-45] For example, multiple studies using the Hospital Survey on Patient Safety Culture (HSPSC) found that the minority of HCPs provided positive responses regarding the dimension "handoffs and transitions" (including sub-dimensions regarding shift-change communication).[40-47] In addition, a mixed-methods study in a paediatric ward in Brazil evidenced nurse reports that several issues considered to be important, such as patients' vital signs and emotional state, were not regularly addressed during shift-change.[37]

Regarding patients, a qualitative study of patient experiences of shift-change handover on a Ugandan labour ward revealed the following themes: poor organisation and conduct of handovers; gaps in continuity of care during and after handovers; traumatic experiences; negative outcomes of care related to handovers; poor handovers as a feature of health system failures.[38]

Whilst the majority of studies evaluating shift-change communication highlighted issues, some studies demonstrated predominantly positive HCP perceptions of information transfer.[47-54] For example, a study in Colombia used questionnaires to

assess nurses views on communication and coordination of care found that across all studied hospital units, shift-change communication was rated 3.5 or more out of a maximum score of 4.[49]

3.5.1.2 *Factors affecting the quality of shift-change communication*

System factors identified as affecting quality of shift-change communication included a lack of structured/standardised practices,[36-39 50 51] time constraints,[36] unsuitable areas for handover,[36] and shift times.[33 34] Shift times was a factor only reported in studies regarding shift-change; two studies across multiple hospital wards in India found that adherence levels for handover practices fell during particular shifts (i.e. early mornings, nights and weekends);[33 34] it was posited that this may have been linked to fatigue, lack of motivation and/or supervision. A further system factor reported across multiple studies was a non-patient-centred approach to shift-change;[36 38] patient-centred care is defined as: “care which explores the patients' reason for the visit, concerns and information needs; seeks an integrated understanding of the patients' world; finds common ground on the problem and mutually agrees on management; enhances prevention and health promotion; and enhances the continuing relationship between patient and doctor”.[55] For example, in a qualitative study of labor ward shift-change in Uganda, mothers reported that HCPs were not attentive to their needs – *“during the many hours of waiting, nobody explained to me what was going on”* - and that they felt left out of decision-making processes – “*They took [my baby] away without telling me what they were going to do or even getting my consent”*.[38]

An organisational cultural factor identified as affecting shift-change communication was distractions and/or interruptions.[36 51 54] For example, in a survey study of neonatal intensive care unit HCPs in Brazil, of the 39% of participants that reported that shift-

change was negatively affected by delays, the most frequently reported interferences were noise, side talk and colleague interruptions.[54] Regarding individual HCP factors, a qualitative study of nurses in Iran found that a lack of interest/motivation and unethical behaviour affected the quality of shift-change communication.[36] Nurses not in charge of handovers were reported to have low practical involvement in the process – *"In the handover process, all of the responsibilities are for the one in charge and other nurses don't have an active role in this process, and speak with each other or do other things, while they must have an active role and listen to reports carefully"*. Observations also evidenced that some nurses labelled/made prejudgments about patients and their families during discussions.[36]

3.5.1.3 *Evaluated interventions for shift-change communication*

Seven shift-change interventional studies were found during searches.[56-62] Two studies in China and India implemented structured shift-change handover guidelines in specific hospital wards/units. The study in China evidenced significantly higher patient satisfaction ($\chi^2 = 4.59$; $p<0.05$) and nurse satisfaction ($\chi^2 = 5.92$; $p<0.05$) with handover in the intervention group compared to the control group, as well as fewer handover-related problems ($\chi^2 = 20.32$; $p<0.01$).[59] The study in India evidenced significantly improved scores on handover performance (from 22.27 to 79.33; $p<0.01$) and a reduction in work-related concern ratings (from 35.80 to 21.83; $p<0.01$) following intervention implementation.[58 59]

Two other studies in China (in a medical unit) and India (across an entire hospital) implemented standardised handover forms. Following implementation, the study in China evidenced a significant reduction in overall nursing error rates (from 9.2 to 5.7 per 100 admissions; $p<0.01$) and handoff-related error rates (from 2.7 to 0.3 per 100

admissions; p<0.01).[61] The study in India evidenced an overall improvement in compliance with handover communication procedures (from 20% to 75%).[60 61]

Three studies from Mauritius, Lebanon and Iran implemented quality improvement projects where challenges regarding shift-change were highlighted and targeted interventions were designed and implemented by staff working in the hospitals/wards/units.[56 57 62] Each study demonstrated predominantly positive impacts on a range of outcomes, including protocol adherence, staff knowledge, staff and patient satisfaction and reduced errors and interruptions.[56 57 62] For example, a study across three hospital units in Lebanon implemented a standardised shift-change tool, nurse handover training and reorganised shift-change processes, which resulted in a significant reduction in information omissions (from 4.96 to 2.29 per patient handoff; p<0.01).[57] There was also a reduction in the mean number of interruptions per shift-change report (from 2.17 to 1.26), as well as significant reductions in interruptions due to physician rounds (from 25% to 4%; p<0.01) and side talk between nurses (from 16% to 4% (p<0.05).[57]

3.5.2 Hospital discharge

3.5.2.1 *Observed/perceived quality of discharge communication*

The majority of studies evaluating the quality of discharge handover communication utilised observations or document content evaluations and demonstrated suboptimal recording and/or transfer of information.[63-74] For example, a qualitative study in India observed the quality of care provided during childbirth (including information sharing between HCPs and patients) and found that discharge advice often lacked family planning, immunisation, breast-feeding, danger signs and follow-up information.[70] Additionally, in a study of nurses' knowledge, perceptions and practices regarding

hospital discharge in Pakistan, whilst 93% of surveyed nurses reported that they documented discharge planning activities, an audit of medical notes revealed that 60% did not contain such information.[75]

Two studies in Lebanon and South Africa investigated possible causes of hospital readmission and included the contents/adequacy of discharge information as an explanatory variable in the analyses.[68 72] The study in Lebanon found no association between discharge information and readmission, reportedly due to a lack of available documented discharge information.[71] The study in South Africa found that the second biggest contributor to potentially avoidable causes of 30-day readmission for heart failure patients was inadequate discharge planning (accounting for 7% of readmissions).[68 72]

Fewer studies gathered data on HCP and/or patient perceptions to assess the quality of discharge communication and the majority of these described suboptimal recording and/or transfer of information.[76-80] For example, a survey study of burn patients in Turkey found that almost half (49%) reported not being informed about post-discharge care and treatment before leaving the hospital.[77]

Other studies demonstrated predominantly positive findings on the observed/perceived quality of discharge communication.[81-84] Regarding documented information, a study in South Africa evaluated discharge instructions and found that 97% of patients were given a follow-up referral and 64% were requested to return to the hospital within two weeks of discharge.[84] As for patient perceptions, a study in Ethiopia evaluated patient satisfaction with maternity care and found that over 60% of patients were either satisfied or very satisfied with the discharge information provided.[83] Two further survey studies from medical and emergency units in Turkey and Brazil also evidenced high levels of patient satisfaction with discharge information.[81 82]

3.5.2.2 *Factors affecting the quality of discharge communication*

System factors reported as affecting the quality of discharge communication were time constraints (i.e. from heavy workloads) and unsuitable areas for handover.[73 75 79] Observations from a mixed-methods study in Brazil indicated that the areas where nurses conducted discharge consultations were unsuitable due to excessive noise and disorganisation.[73] An organisational cultural factor affecting the quality of discharge communication between nurses and patients also observed in the same study from Brazil was distractions and/or interruptions from colleagues.[73]

Individual HCP factors affecting the quality of discharge communication were a lack of interest/motivation and unethical behaviour.[75 70] In a study of nurses' knowledge, perception and practices regarding discharge, 27% reported that they were unable to perform discharge planning well due to a lack of interest/motivation.[75] Regarding unethical behaviour, a qualitative study in India investigated discharge advice provided following childbirth and observations revealed that informal payments were occasionally demanded from mothers during discharge consultations.[70]

3.5.2.3 *Evaluated interventions for discharge communication*

Fourteen interventional studies regarding discharge communication were found during searches.[85-98] Six studies implemented specific patient training/education/planning at various points before hospital discharge, which all reported predominantly positive impacts on a range of outcomes including patient satisfaction, perceptions of post-discharge care and health outcomes.[85-87 91 96 97] For example, a randomised controlled trial (RCT) in the Philippines implemented nurse-led structured discharge planning sessions for patients with acute myocardial infarction. Following implementation, the

intervention group had significant improvements in perceived functional status (95% CI 4.02-13.16; p<0.01), cardiac self-efficacy (95% CI -7.87 to -3.36; p<0.01) and satisfaction scores (95% CI -22.78 to -11.89; p<0.01) within one month of discharge compared to the control group (receiving usual care). [91] In addition, compared to the intervention group, the control group had significantly more unplanned hospital revisits within one month of discharge (95% CI: Risk ratio, 1.23-2.37; p<0.01).[91]

Three further interventional studies focussed on implementing discharge training/education for HCPs and/or parents.[88-90] For example, two non-randomised pre-post studies (from the same authors) in India implemented discharge training regarding home care for nurses and/or parents of children who had undergone cardiac surgery.[89] [90] The first study implemented parent training and assessed nurse and parent perceptions of parental uncertainty and readiness for discharge.[89] Following implementation, there were significant reductions in parental uncertainty scores (mean scores reduced from 93 to 83; p<0.01). However, parents also rating themselves as being less able to cope with the transition to home (mean scores reduced from 24.3 to 23.1; p<0.01) and having less support than required (mean scores reduced from 31.5 to 30.9; p<0.01).[89] The second study implemented parental and nurse training and assessed a range of nurse, parent and child outcomes.[90] The results evidenced a 56% increase in nurse's documentation of discharge advice and a significant increase in parent's home-care knowledge scores (from 1.76 ± 1.4 for Cohort 1 to 3.68 ± 0.852 for Cohort 2; p<0.01). The proportion of children with surgical site infections also decreased significantly (from 27% in Cohort 1 to 2% in Cohort 2; p<0.05), but no differences were seen in length of hospitalisation or cost of primary hospitalisation and readmission.

Two interventional studies in India and Sri Lanka focussed on implementing new patient discharge summaries (Sri Lanka: native-language summaries, India: structured

summaries). [92 93] The study in India implemented standardised pre-formatted summaries in a hospital emergency department and found that key details, such as diagnosis, prescription and discharge instructions, were recorded for more than 80% of patients.[95] However, other information, such as follow-up advice and investigation results, were not documented for more than 80% of patients; no comparison of the completeness of previous discharge documents versus the new standardised summaries was completed.[95] The study in Sri Lanka was a randomised controlled trial that provided intervention group patients with discharge summaries in their native language, rather than English (i.e. usual practice).[96] At 2-week follow-up, compared to the control group, the intervention group had significantly higher mean scores for knowledge of diagnosis (6.58 vs. 8.02; $p<0.01$) and prescribed medications (12.56 vs 54.48; $p<0.01$).[96] In addition, compared to the control group, the intervention group had significantly higher numbers of patients that reported acquiring knowledge by reading the discharge summary for knowledge of diagnosis (3 vs. 53; $p<0.01$) and prescribed medications (4 vs. 52; $p<0.01$).[93]

Furthermore, two studies in China and Brazil utilised best practice standards to evaluate current discharge planning practices within hospital wards/units and guide the design and implementation of context-relevant interventions by HCPs working in those wards/units.[94 95]

Following implementation, the study in China evidenced increases in compliance rates for use of discharge checklists (from 0% to 100%), structured patient education (from 93% to 100%), completeness of patient education (from 7% to 100%) and scheduling outpatient clinic visits (from 0% to 100%).[98] The study in Brazil evidenced sustained high (i.e. 100%) compliance for written discharge instructions, discharge protocols and follow-up information, as well as a 45% increase in compliance for post-discharge care training, medication training and infection and mouth care training.[99]

The final type of discharge communication interventional study was an integration initiative between a hospital emergency department and primary health centres (PHCs) in Brazil.[98] The qualitative study explored HCP views and experiences of establishing communication through written and telephone contact between settings when patients were discharged. The following themes were identified: learning about each other's work setting; integration and communication; benefits for the patient. HCPs reported that the initiative improved their knowledge on patients' previous treatment and the network of available care – *"to see that there are other services that can be integrated into the care patients receive in the hospital, is becoming a routine in my practice".* The referral procedure was also considered to improve integration, communication and continuity of patient care - *"The referral mechanism signalizes a problem and is one more indicator that helps to identify what is not going well with the patient… collaborating with the work done in PHC, it allows the preparation and organization of care and actions focused on the patient"*.[98]

3.5.3 Referrals

3.5.3.1 *Observed/perceived quality of referral communication*

Intra-facility referrals

One study from Nigeria evaluated the quality of intra-facility referral letters sent to an oral and maxillofacial surgery clinic from other hospital departments.[99] Letters were graded from A (highest) to D (lowest) based on the amount of information they contained and it was found that only 3% of letters were grade A, the majority (77%) were grade B and the remaining 20% were grade C. It was also found that letters frequently lacked patient management information.[99]

Inter-facility referrals

The majority of studies that evaluated inter-facility referral communication utilised document content evaluation and evidenced suboptimal recording of clinical information.[100-111] For example, a study in Sudan found that 83% of letters sent to speciality hospitals were illegible.[102] In addition, a study in Nigeria found that notable proportions (24-86%) of referral letters sent to a hospital paediatric emergency unit lacked adequate information on the following: patient's age, history of presenting complaints, medical history, examination/investigation findings, diagnosis and therapy/interventions given.[103]

Other studies evaluated HCP and/or patient perceptions of the quality of inter-facility referral communication, with all reporting some deficiencies.[109 112-115] For example, in a mixed-methods study of city-wide health services in South Africa, HCPs unanimously agreed that communication between facilities was "grossly deficient".[112] Regarding patient perceptions, a survey across health networks in Colombia and Brazil found that continuity of clinical information was the lowest-rated type of continuity of care in both countries.[114]

There were also observational studies evaluating HCP/patient perceptions of inter-facility referral communication that demonstrated more positive views.[109 113] A HCP survey study across Argentina, Brazil, Colombia and Mexico found that whilst the worst-rated attributes of clinical coordination were information exchange and follow-up communication, more than 60% reported that they often/always received important referral information and used it during patient care.[113] Regarding patient perceptions, a survey study on information use in an Ethiopian hospital found that 68% were either satisfied or very satisfied with the referral information provided.[109]

3.5.3.2 *Factors affecting the quality of referral communication*

Inter-facility referrals

A system factor affecting the quality of inter-facility referral communication was a lack of structured/standardised practices.[102 109 112] For example, a study evaluating referral documents in Sudan found that referrals notes were provided on an array of (often non-specific) documents, such as pages, slips and cards.[102] In addition, during a workshop in a mixed-methods study of health services in South Africa, HCPs reported the following system factors: an ineffective administrative structure and a lack of specific training.[112] The following organisational cultural factors were also reported in the same study: professional jealousy between HCPs and a tendency for nurses to work in isolation.[112]

Another organisational cultural factor affecting the quality of inter-facility referral communication was the disregard of information sent from other HCPs.[109 112] For example, during interviews in a mixed-methods study in Ethiopia, hospital doctors reported that they often do not use the information sent from health centres as it is considered irrelevant and/or inadequate – *"No importance to use the information sent from the health centers since they don't properly assess the patients"*.[109]

3.5.3.3 *Evaluated interventions for referral communication*

Inter-facility referrals

Three interventional studies were found for referrals between healthcare facilities.[116-120] One study in a hospital in South Africa introduced structured pro forma referral letters.[116] Whilst the modification significantly improved the mean contents of referral letters sent from general practitioners to a hospital outpatient department from 2.9 to

3.4 ($p<0.01$; max score = 4), it did not have a significant impact on the quality of reply letters.[116]

Another study focussing on referrals between hospital and community-based HCPs in South Africa established optimal standards for referral, used the standards to review current practice and implemented an action plan to improve practice.[120] The action plan included HCP training, updating referral criteria, use of referral maps, use of specific referral forms (designed by HCPs), use of a designated file for referral forms and producing patient information pamphlets.[120] Following implementation, a review of patient referrals indicated improvements in the documentation and exchange of patient information and enhanced patient/carer awareness of the referral process.[120]

A more recent (2019) study in Indonesia implemented a digital communication mechanism called "SijariEMAS" across six health districts.[119] This system enabled community health workers and midwives to send messages (via phone/SMS/web) to a central server prior to referral, which would automatically route the referral to the most appropriate hospital.

The system also enabled community health staff to receive messages from the referral hospital about how to stabilise and prepare the patient for referral.[119] The SijariEMAS system was also supported by a "memoranda of understanding" that strengthened referral networks between HCPs and formal referral performance standards and monitoring tools.[119] Compared to those referred without SijariEMAS, patients referred using SijariEMAS had significantly higher levels of advanced notification (37% vs. 92%; $p<0.01$) and key information sent to hospitals (23% vs 70%; $p<0.01$). Patients referred using SijariEMAS also had significantly higher levels of stabilisation for pre-eclampsia/eclampsia prior to referral, including receipt of magnesium sulphate (47% vs. 81%; $p<0.01$) and anti-hypertensive medication (44% vs. 66%; $p=0.01$). Further,

those referred using SijariEMAS were also significantly more likely to be transported in an ambulance (61% vs. 89%; p<0.01), be accompanied by a health worker (70% vs. 90%; p<0.01) and have a referral slip (86% vs. 90%; p<0.01). Regarding back referral, patients referred using SijariEMAS had significantly higher levels of information sent back to community health workers regarding diagnosis (40% vs 59%; p<0.05), but no difference was seen in levels of patient follow-up information exchanged between HCPs.[119]

3.5.4 Transfers

3.5.4.1 *Observed/perceived quality of transfer communication*

Intra-facility transfers

All observational studies evaluating intra-facility transfers assessed HCP perceptions of the quality of handover communication between hospital departments and most evidenced reports of suboptimal information transfer.[40 42-45 121] For example, the majority of survey studies utilising the HSPSC found that most HCPs did not provide positive responses regarding the dimension “handoffs and transitions” (including sub-dimensions about intra-hospital transfer communication).[40-46] Additionally, in a study in Brazil focussing on handover communication between post-anesthetic recovery units (PACUs) and other hospital units, the majority of nurses reported that patient transfer records were either missing (85%) or contained incorrect (76%) or incomplete (58%) contents.[121]

Other studies indicated a mixture of HCP perceptions regarding intra-hospital transfer communication;[47 52 79] for example, a study in China using the HSPSC found that whilst the minority of HCPs provided positive responses about one sub-dimension regarding intrahospital transfers (things falling between the cracks – 45%), another sub-

dimension received predominantly positive responses (problems often occur in information exchange – 65%).[46 47] One study from Croatia using the HSPSC evidenced that just over half of all HCPs (57% - 78%) provided positive responses for all sub-dimensions related to intrahospital transfer communication.[46 53]

Inter-facility transfers

Three studies utilised document content evaluation to assess the quality of handover communication during inter-hospital patient transfers and evidenced inadequacies in the documentation and exchange of transfer communication.[122-124] For example, a study in Turkey found that almost a third (32%) of pre-transport information was inadequate and that no pre-transport information could be found for 42% of cases.[123]

3.5.4.2 *Factors affecting the quality of transfer communication*

Intra-facility transfers

A system factor reported regarding transfers within hospitals in one study was time constraints.[79] A mixed-methods study in Colombia evaluated nurse's views on the performance of the PACU and during interviews, it was reported that time constraints caused by busy workloads prevented nurses from receiving comprehensive patient information from surgical staff during transfers.[79] Regarding organisational cultural factors, disregard of information sent from other HCPs affected the quality of intra-facility transfer communication in hospitals; a study evaluating PACU performance in Brazil found that just 31% of nurses consulted the transfer record from surgical staff.[121]

3.5.4.3 *Evaluated interventions for transfer communication*

Intra-facility transfers

Three interventional studies from China were found for internal hospital transfers, which implemented structured handover protocols within hospital units and evidenced improvements in a range of outcomes including HCP satisfaction, handover attendance, preparation, communication and reduced patient complications.[125-127] For example, one study implemented the Situation, Background, Assessment and Recommendation (SBAR) procedure in a hospital emergency department and intensive care unit and found that compared to the control group, more HCPs in the SBAR intervention group were satisfied with handover content (90 vs. 94; $p<0.01$), disease focus (89 vs. 91; $p<0.01$), writing standards (90 vs.97; $p<0.01$), language expression (91 vs. 99; $p<0.01$), process management (91 vs. 95; $p<0.01$) and time spent on handover (93 vs. 99; $p<0.01$).[126]

Inter-facility transfers

Two interventional studies focussed on improving communication during emergency inter-facility transportation.[117 118] A study in Turkey implemented patient transfer rules and emergency medical staff education and evidenced significant improvements in the following compliance rates: adequate medical records (from 32% to 43%; $p<0.05$), adequate airway management (from 35% to 65%; $p<0.05$), open intravenous line (from 68% to 77%; $p<0.05$) and cervical collar placement (from 11% to 28%; $p<0.05$).[119] A study in Iran implemented emergency medical staff education regarding the Identify, Situation, Background, Assessment and Recommendation (ISBAR) procedure. Compared to pre-ISBAR performance, following implementation significant increases were evidenced in the following: Identify – presenting of patient's name (11% vs 81%;

p<0.01) and age (34% vs. 81%; p<0.01); Situation – presenting of reason for the emergency call (67% vs. 82%; p<0.05) and the possible changes that occurred in the patient's condition (31% vs. 60%; p<0.01); Background – presenting of the patient's history (9% vs.81%; p<0.01), any home therapy (5% vs. 69%; p<0.01) and allergies (0% vs. 69%; p<0.01); Assessment – presenting brief synopsis of treatment (15% vs. 69%; p<0.01); Recommendation – emergency medical assistant summarising the information received from the pre-hospital team leader (11% vs. 81%; p<0.01) and ISBAR acronym being used in the correct order (0% vs 65%; p<0.01).[120]

3.6 Discussion

3.6.1 Main findings

Given that this review included all LMICs and that handover occurs within and between levels of healthcare, the first notable finding was that there is a relative dearth of literature. Included studies consisted of 65 observational and just 29 interventional studies from 25 (out of a possible 138) LMICs, with the most studied LMIC being Brazil. The majority of studies were hospital-based and conducted in upper-middle income countries. A broad range of study designs were included, with observational cross-sectional studies being the majority. The quality of studies varied and whilst the majority of observational studies were of medium to high quality, interventional studies were predominantly of medium to low quality. Included studies covered handover communication during shift-change, discharge, referrals and transfers; hospital discharge was the most studied area in observational and interventional studies.

Regarding the observed and/or perceived quality of handover communication, sub-optimal recording and/or transfer of patient information was a commonly reported hindrance across all studied areas. Observational studies also described multiple system, organisational cultural and individual HCP factors affecting the quality of handover communication, with system-based factors being most commonly reported. Regarding interventions, strategies were largely reported as being effective and varied widely from simple medical artefact updates (e.g. structured discharge summaries) to a widespread technological system (e.g. a multi-district digital referral communication mechanism). To the author's knowledge, this is the first systematic review to explore and summarise the literature on the quality of handover communication, a central element of patient safety, in LMICs. The findings are enlightening and critical given the significant burden of diseases across LMICs and the key role that effective handover plays in integrating and strengthening health systems.

3.6.2 Strengths and limitations

A strength of this review is that a comprehensive search strategy was used across seven international databases with no time or language restrictions. Articles were not excluded based on methodological quality or cost of access and methodological appraisal scores were used to assess the quality of each included study. In addition, key factors affecting the quality of handover communication were categorised using handover-specific factors and evaluated interventions were summarised to assist in guiding further programmes and studies. A limitation is that publication bias could not be avoided, as unpublished literature databases were not searched. Additionally, further literature may have been found by including national databases and search engines, but searches were restricted due to time and resource constraints. Some findings may also be dated due to searches being conducted from the inception of

databases (with the earliest study included in this review published in 1973). Finally, the LMICs that were searched for and included in this review have since slightly changed (based on World Bank data), although this is not considered to have hindered the overall findings.

3.6.3 Findings in the context of wider published literature

3.6.3.1 *Hospital shift-change*

Many of the key LMIC issues regarding shift-change communication identified in this review have also been reported in the sizeable body of literature from HICs. Regarding the observed and/or perceived quality of communication, suboptimal recording and/or transfer of patient information during shift-change has been identified as a key issue in previous audits and reviews of hospital handover methods.[128 129]

As for factors affecting the quality of shift-change handover communication, akin to the current review the same HIC audits and reviews also found that inadequate shift-change communication was generally attributed to the system-based factor of a lack of formal and systematic processes.[128 129] In addition, the system factor of time constraints and the organisational cultural factor of distractions and/or interruptions from colleagues have been recognised as two of the commonest causes of nurse's dissatisfaction with shift handovers in a study conducted across Europe.[130] Another system factor affecting the quality of shift-change communication in the current review was a non-patient centred approach, which resulted in patients not having their needs met or feeling able to participate in decision-making. Similar challenges have previously been recognised in the HIC literature and have contributed to the development of alternative models of shift change, such as bedside handover, which places patients at the centre of their care management.[131 132]

Regarding shift-change interventions, those found to have been implemented across LMICs have largely mirrored guidelines, protocols and training that have been successfully implemented in HIC research.[9 21 133] In particular, structured tools such as SBAR (Situation, Background, Assessment, Recommendation) were reported as being effective in improving HCP satisfaction and practices in India and China.[58 61] However, no interventional shift-change studies in the current review evaluated impact on clinical outcomes. In addition, whilst a non patient-centred approach was identified as a factor affecting the quality of shift-change communication, only two interventional studies incorporated bedside handover.[56 62] It is also of note that only one LMIC bedside shift-change interventional study incorporated patient-reported outcomes.[56]

3.6.3.2 *Hospital discharge*

Deficient recording and transfer of patient information was an issue reported in the majority of observational discharge communication studies. In particular, discharge summaries frequently lacked key clinical information, which reflects HIC research that has often found deficiencies in the form and contents of discharge documentation.[134 135] Another notable discovery was that two LMIC studies had evaluated the impact of discharge communication on health outcomes, with one finding inadequate discharge planning to be a contributor to avoidable readmission for heart failure patients.[72] This finding is reinforced by a body of HIC literature, highlighted in Schwarz ***et al's*** recent review, that has established a link between the quality of discharge communication and patient outcomes.[134]

Regarding factors affecting the quality of discharge communication, the system factor of time constraints resulting from high workloads was considered by HCPs to hinder discharge planning. This is in line with findings from a study conducted across five

countries in Europe that investigated patient-centred discharge processes via interviews with patients, family members and HCPs. It was reported that discharge consultations were often negatively affected by insufficient HCP prioritisation, which resulted from busy schedules and subsequent lack of available time.[136] In addition, notable individual HCP-related factors identified in the current review included unethical behaviour and a lack of interest/motivation. Such findings reflect the results from wider healthcare research across LMICs that has demonstrated and established a link between unethical behaviour (such as demands for informal payments) and low levels of job satisfaction within corrupt and otherwise challenging care settings.[137-139]

LMIC discharge communication interventions predominantly focussed on structured patient/carer education sessions and tools, which have also been found to improve patient comprehension, adherence and self-efficacy in the HIC literature.[140]

Whilst a review of HIC evidence suggests that such interventions can reduce unplanned hospital visits,[140] just one randomised controlled trial, featuring a structured discharge planning programme, was found in the current review that utilised unplanned hospital revisits (within one month of discharge) as an outcome and found that intervention group patients had significantly fewer unplanned hospital revisits compared to those receiving usual care.[91] Another LMIC interventional study featuring parental discharge education evaluated and demonstrated mixed impacts on clinical outcomes relating to infections and length of hospital stay.[90] Other single and multi-faceted discharge interventions in the current review featured strategies to update HCP roles, HCP training and/or education, discharge summaries and communication methods between levels of care. However, aside from some basic use of multimedia equipment and telephone communications, no further interventional studies were found using technological systems to improve discharge communication. In addition, no further discharge interventional studies evaluated the impact on patient outcomes.

3.6.3.3 *Referrals*

Predominantly suboptimal recording and transfer of patient information were found to affect the quality of both intra and inter-facility referrals across numerous LMICs, resonating with much of the HIC-based literature. In particular, referral letters missing critical information mirrors findings from numerous HIC studies that have reported deficient referral documents sent between HCPs.[141-144]

Regarding factors affecting the quality of handover communication, a system factor found to affect inter-facility referral communication in the current review was a lack of specific training. This is perhaps unsurprising given the internationally recognised disconnect between expectations of the significance of handover and the emphasis actually received during medical education/training in the HIC literature.[5 145] In addition, a 2016 review of non-technical skills (including communication and teamwork) and healthcare provision in LMICs evidenced that research on communication skills training was limited and that poor HCP communication was likely linked to inadequate training.[146] An organisational cultural factor also found to affect the quality of inter-facility referral communication was the disregard of information sent from other HCPs. This reflects similar findings from a previous narrative review of healthcare communication in HICs, which demonstrated that specialist and primary care HCPs often shared negative mutual perceptions of one another's communication skills and availability.[147] Another organisational cultural factor affecting inter-facility referral communication was professional jealousy between HCPs. This is an issue that has been moderately discussed in HIC literature as affecting working relationships and communication between nurses and between nurses and doctors (in academic and professional settings).[148 149]

Only three interventional studies were found regarding referral communication in LMICs and they all addressed inter-facility referrals. Two reported improvements

following the implementation of revised/structured referral forms,[120 150] reflecting the HIC literature that has demonstrated superior information transfer between levels of care following the introduction of structured paper and electronic referral forms.[151 152] In addition, whilst one LMIC study successfully employed mobile telecommunications to improve inter-facility referral practices and communication,[119] no further studies were found utilising technological systems to improve the quality of referral handover communication.

3.6.3.4 *Transfers*

Similar to referrals, the majority of studies regarding intra and inter-hospital transfer evidenced issues of predominantly suboptimal recording and/or transfer of information. Such findings are in line with previous reviews of both prehospital to hospital and intrahospital transfer communication, which have evidenced regularly fragmented and deficient information exchange between HCPs in HICs.[153 154]

Regarding factors affecting the quality of transfer handover communication, the current review found that the system-based factor of time constraints negatively affecting inter-facility transfers between hospital departments following patient surgery. This echoes reports from Ong ***et al's*** review of communicative failings during intrahospital transfers, which found that considerable time pressures and a subsequent lack of focus on handover activities hampered the quality of post-surgical transfers.[153]

Similar to shift-change, interventions utilised to improve transfer communication in the current review resembled structured training, protocols and documentation strategies that have improved information transfer across HIC settings.[155 156] For example, the SBAR tool was reported as being effective in improving HCP satisfaction and transfer practices, both within and between healthcare facilities, in China and Iran.[118 127]

However, despite the critical nature of many patient transfers, only a handful (n=5) of LMIC transfer interventional studies were identified and just two intra-hospital interventional studies evaluated the impact on clinical outcomes and demonstrated improvements in the following: rate of ventilator weaning within six hours of admission, ventilation duration per patient and incidence of respiratory complications.[125 126]

3.6.4 Implications for research and practice

The findings regarding the quality of handover communication described in this review have highlighted a range of challenges in LMICs that must be addressed to ensure the successful integration and functioning of health systems. In addition, the identification of evaluated interventions has provided a foundation of information to inform key stakeholders and researchers, as well as assist in planning strategies to further investigate handover communication and patient safety in LMICs.

Regarding observational studies, this review has revealed a particular dearth of research regarding the quality of handover communication during intra-facility referrals and inter-facility transfers. It has also evidenced a large amount of heterogeneity in handover communication quality assessment methods and outcome measures, as well as some poorly defined outcome measures (i.e. HCP/patient perceptions of transfer of "important information", without clarification of what that information is). Such findings indicate a potential need for the development and validation of objective, standardised assessment tools; these could be based on minimal datasets of information that should be exchanged during specific care transitions. Such tools may improve the accuracy and efficiency of handover processes, which could prove particularly valuable in many resource and time-constrained LMIC settings.

Further, the plethora of system factors affecting the quality of handover communication suggests that governments and supporting agencies need to provide the necessary groundwork to address significant infrastructural issues that are resulting in policy, resource and HCP educational and training deficiencies. Findings regarding factors affecting the quality of handover communication have also highlighted several key areas likely to be affecting handover communication that have yet to be thoroughly explored across LMICs, including patient-related (e.g. patient attitudes, knowledge, engagement) and higher-level systems factors (e.g. regarding political, environmental and/or financial issues).

As for interventions, both LMIC and HIC research has shown that even relatively simple and cost-effective strategies, such as structured documents and procedures, can improve patient information transfer and health outcomes. However, findings from the current review indicate that there is a distinct need for high-quality handover communication interventional research across LMICs. They have also elucidated a particular dearth of and subsequent need for interventions focussing on the quality of handover communication during intra and inter-facility referrals and transfers.

Those LMICs that have yet to research handover communication or implement quality improvement projects for handover may use the insights gained from this review to guide future work. As well as the aforementioned areas that have been identified as requiring further exploration, further LMIC research is needed to investigate links between handover practices (between HCPs and between HCPs and patients) and health outcomes. This will assist in establishing novel and sustainable methods of improving continuity and safety of care for growing numbers of patients requiring long-term healthcare management.[157] In addition, more robust and larger-scale interventional studies (e.g. randomised controlled trials) may provide clearer evidence

of effective strategies for improving handover communication and related HCP and patient-related outcomes.

Looking to the future, there is a growing number of e-health projects being conducted across healthcare systems in LMICs that aim to improve the accessibility, efficiency and quality of care provided.[158] For example, the government of India has pledged to digitise and integrate public healthcare information systems across the nation, with multiple states already in the process of transition.[159 160] Given the impact that many of these projects will have on information exchange, the insights provided from this review should highlight the importance of conducting robust research and employing adequate measures to standardise and evaluate the quality of handover communication taking place.

3.7 Conclusion

Given the critical and pervasive nature of handover within healthcare, one of the main findings from this review is that there is currently a dearth of high-quality research focussing on the quality of handover communication and associated interventions in LMICs. Moving forward, it is imperative that there is robust implementation of handover communication quality improvement projects that can support health system priorities for each country, whilst also involving and addressing the needs of HCPs, patients and carers. It is additionally important, via improved policies and training, that a culture is developed amongst healthcare managers and providers that recognises and emphasises the importance of handover communication for the continuity and safety of patient care.

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4. INVESTIGATING HANDOVER AND HEALTHCARE COMMUNICATION DURING CHRONIC NCD OUTPATIENT CARE IN HIMACHAL PRADESH AND KERALA STATES, INDIA

The systematic review in Chapter 3 demonstrated a relative dearth of literature focussing on handover communication across LMICs. The small number of observational studies conducted in India have focussed on handover practices for hospital inpatients and demonstrated issues of deficient information transfer during hand-off, discharge and referral.[1-6] Further studies concentrating on handover during outpatient care (particularly in hospitals) are needed, as this is where chronic NCD patients commonly seek treatment due to poorly resourced primary care systems.

The mixed-methods study reported in this chapter investigates handover, healthcare communication and barriers to continuity of care for chronic NCD outpatients in Himachal Pradesh and Kerala states, India. It also explores potential interventions for improving the storage and exchange of chronic NCD patient information.

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RESEARCH ARTICLE

Investigating clinical handover and healthcare communication for outpatients with chronic disease in India: A mixed-methods study

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Abstract

Objectives

Research concentrating on continuity of care for chronic, non-communicable disease (NCD) patients in resource-constrained settings is currently limited and focusses on inpatients. Outpatient care requires attention as this is where NCD patients often seek treatment and optimal handover of information is essential. We investigated handover, healthcare communication and barriers to continuity of care for chronic NCD outpatients in India. We also explored potential interventions for improving storage and exchange of healthcare information.

Methods

A mixed-methods design was used across five healthcare facilities in Kerala and Himachal Pradesh states. Questionnaires from 513 outpatients with cardiovascular disease, chronic respiratory disease, or diabetes covered the form and comprehensiveness of information exchange between healthcare professionals (HCPs) and between HCPs and patients. Semi-structured interviews with outpatients and HCPs explored handover, healthcare communication and intervention ideas. Barriers to continuity of care were identified through triangulation of all data sources.

Results

Almost half (46%) of patients self-referred to hospital outpatient clinics (OPCs). Patient-held healthcare information was often poorly recorded on unstructured sheets of paper; 24% of OPC documents contained the following: diagnosis, medication, long-term care and follow-up information. Just 55% of patients recalled receiving verbal follow-up and medication instructions during OPC appointments. Qualitative themes included patient preference for

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hospital visits, system factors, inconsistent doctor-patient communication and attitudes towards medical documents. Barriers were hospital time constraints, inconsistent referral practices and absences of OPC medical record-keeping, structured patient-held medical documents and clinical handover training. Patients and HCPs were in favour of the introduction of patient-held booklets for storing and transporting medical documents.

Conclusions

Deficiencies in communicative practices are compromising the continuity of chronic NCD outpatient care. Targeted systems-based interventions are urgently required to improve information provision and exchange. Our findings indicate that well-designed patient-held booklets are likely to be an acceptable, affordable and effective part of the solution.

Introduction

Non-communicable diseases (NCDs) are the leading cause of death and disability across the globe and account for approximately 60% of mortality in India [1]. Due to the rising prevalence of NCDs, low and middle-income countries (LMICs) are having to move from the treatment of communicable disease, typically in single episodes, to focus on long-term management of chronic conditions involving multiple care episodes over long time periods. Such care is more challenging to organise since it must be coordinated across different healthcare professionals (HCPs) often working in different locations.

Chronic NCD management requires effective continuity of care, which is defined as: "the seamless provision of healthcare between settings and over time" [2]. This relies on high-quality information transfer at two levels. At the first level, information must be transferred effectively between HCPs within and between different settings. This is crucial as points of clinical handover, where critical information and responsibility for patient care is transferred from one HCP to another [3], are associated with increased risk to the patient. Such risks are the result of communicative failures and include incorrect treatment, diagnostic delays, life-threatening adverse events and an overall poorer quality and coordination of care [4, 5]. At the second level, efficient information transfer between HCPs and patients is necessary in order to enable patients to become active partners in their NCD management. This healthcare communication is a critical component of patient-centred care, which has been shown to improve clinical outcomes and increase satisfaction with care [6]. This is particularly important during care transitions, as the patient is the sole constant throughout the care process and can provide valuable information to those involved at different stages [7].

The issues regarding transitions in healthcare have been recognised for a long time in high-income countries (HICs). An extensive literature has accumulated over the years describing associated challenges and evaluating interventions to improve them [4–9]. However, a review of the literature has shown that there is currently a dearth of similar research in LMICs generally and India specifically [10]. This is problematic as designing health systems interventions to successfully improve processes such as clinical handover and continuity of care requires elucidation of context-specific challenges [11, 12]. Further, the small amount of LMIC research that has been done has focused on inpatients. Studies concentrating on LMIC outpatient care (particularly in hospitals) are urgently needed as this is where many chronic NCD patients seek regular treatment due to poorly developed primary care systems.

This study was designed to investigate clinical handover and healthcare communication for chronic NCD outpatients with respect to verbal and documented information exchange and medical record-keeping. It forms part of a mixed-methods development project aiming to provide an overview of handover and factors affecting continuity of care for chronic NCD patients in Kerala and Himachal Pradesh states, India [13].

The primary objectives of the study were: 1) To describe clinical handover and healthcare communication practices for chronic NCD patients attending outpatient clinics (OPCs) and 2) To identify barriers to continuity of care for chronic NCD outpatients. A secondary objective was to explore potential interventions to improve the storage and exchange of healthcare information between HCPs and between HCPs and patients.

Materials and methods

Overview

We conducted a mixed-methods study comprising structured questionnaires and semi-structured interviews. Qualitative and quantitative data was collected concurrently. Questionnaire data was used to describe the nature and comprehensiveness of clinical handover and healthcare information exchanged between HCPs and between HCPs and patients. Interview data was used to explore experiences and practices of clinical handover and healthcare communication, as well as intervention ideas. The data was then triangulated to elucidate barriers to continuity of care for chronic NCD outpatients.

Study setting

This study was conducted from December 2014 to November 2015 in seven healthcare facilities: one rural Primary Health Centre (PHC), one rural Community Health Centre (CHC) and one rural secondary-care hospital in Himachal Pradesh state and two rural PHCs, one peri-urban secondary-care and one urban tertiary-care hospital in Kerala state. These settings were selected to represent a range of geographical and public health service settings across India. Government health facilities were the target of this research as this is where many of the most vulnerable patient populations access healthcare and where clinical handover is needed between different levels of healthcare facilities. See S1 Methods for further information regarding the Indian healthcare system and S2 Methods for further information regarding the study settings.

Ethical considerations

This study was reviewed and approved by the Centre for Chronic Disease Control Independent Ethics Committee, India and the Amrita Institute of Medical Sciences Institutional Ethics Committee, India.

Informed consent. Participants who met the inclusion criteria for this study were provided with a study information sheet and were verbally informed by researchers about the purpose of the research. Written consent was obtained from literate patients. For illiterate patients, oral consent was obtained along with a thumb print and signature from a literate witness (e.g. family member or carer) in line with World Health Organisation ethical guidelines [14].

Patient recruitment

Patients were recruited opportunistically from outpatient clinic (OPC) waiting areas by trained researchers (n = 6). Purposive sampling [15] was used to select adult patients (18yrs+) with

one (or more) of the following chronic NCDs requiring follow-up: diabetes mellitus, chronic respiratory disease (CRD), hypertension, or cardiovascular disease (CVD) other than hypertension alone. For both the quantitative and qualitative study components, researchers identified eligible participants by approaching patients/carers and asked them about their health condition/s; patient-held medical documents were also consulted if patients gave their permission for this to be done. Patients were only recruited for the semi-structured interviews if they had not participated in the quantitative questionnaire. This is because participating in the questionnaire could have primed interview participants with pre-prepared and potentially biased responses. This method also ensured that data was gathered from a larger scope of participants.

HCP recruitment

HCPs were recruited opportunistically to take part in semi-structured interviews from hospitals, primary health centres, or community health centres and were included if they were currently working in an OPC. Due to the busy nature of the health facilities, HCPs who stated that they were too busy to answer questions were deemed as "unavailable" and were not included in the study.

Qualitative data collection (semi-structured interviews)

Qualitative study participants were recruited until theoretical saturation [16] was reached. Once consent was given, a clinical public health professional (SJ) conducted semi-structured interviews with outpatients in OPC waiting rooms and with HCPs in healthcare facility offices. Qualitative data collection took place in two stages. In the first stage (December 2014 –October 2015), a pre-prepared topic guide was used to guide interviews, which explored clinical handover experiences and practices, healthcare communication (between HCPs and between HCPs and patients) and possible interventions for improving information exchange. Then, on the 11th of October 2015, an expert's meeting took place in India in order to present some of the preliminary findings and discuss potential interventions.

Representatives from the University of Birmingham, UK and the University of Warwick, UK presented the findings and facilitated group discussions. The participants of the meeting were a range of representatives (n = 27) from the following international, Indian national and state-level organisations: The World Health Organisation (regional and country offices); The World Bank; ACCESS Health International; The Ministry of Health and Family Welfare; The Public Health Foundation of India; The National Centre for Disease Control; The Centre for Chronic Disease Control; The National Health System Resource Centre; The All India Institute of Medical Sciences; Aga Khan Health Services; AMRITA Institute of Medical Sciences and Fortis Hospitals. During discussions there was an overarching consensus that a patient-held booklet for storing and transporting medical documents was likely to be a suitable intervention. This was based on international successes of patient-held maternal and child health documents [17–21] and took into account the delays in developing universal electronic information systems that are accessible across all levels of care. Overall, the booklet was opted as the most pragmatic and affordable intervention to improve information exchange for chronic NCD patients in our study settings. It was also considered to hold potential for improving patient self-management, as booklets could contain disease-specific advice and information.

Therefore, following the meeting the second stage of qualitative data collection (October–November 2015) began. Topic guides were updated to include questions regarding the utility of a patient-held booklet containing detailed healthcare information and researchers were

instructed accordingly. In addition, researcher feedback regarding previous interviews indicated that HCPs and patients did not always have a lot of time to be interviewed. Therefore, during the second stage of interviews, if a participant stated that they had limited time to talk then researchers were instructed to interview them using a shortened topic guide; this contained targeted questions on the utility of patient-held medical documents and booklets.

All interviews were conducted and audio-recorded in Hindi, Malayalam, Tamil, English, or a mixture of these languages depending on interviewee preference. Recordings were transcribed verbatim and translated into English as required (SJ).

Quantitative data collection (structured questionnaires)

Trained social work graduate researchers identified eligible patients and sought written consent for them to take part. Patients were then interviewed by researchers using a questionnaire before and immediately after OPC doctor visits. The first section of the questionnaire (prior to seeing the doctor) covered patient demographics, previous HCP visits and healthcare information provided by previous HCPs. The second section (after seeing the doctor) covered check-up plans and verbal and documented healthcare communication during the OPC visit. Additionally, a checklist was included at the end of each section of the questionnaire to evaluate the contents of patient-held medical documents. See S3 Methods for information regarding the sample size calculation for the quantitative study component.

Analysis

Qualitative data. For qualitative data, Inductive Thematic Content Analysis [22] identified categories and themes; Outpatient and HCP transcripts were analysed separately and themes were then combined. An experienced qualitative researcher (SG) independently assessed the explanatory value of the developing categories against the transcripts.

Quantitative data. Descriptive statistics were utilised to outline demographic information and verbal and documented clinical handover and healthcare communication for chronic NCD outpatients.

Whilst it was not possible to assess patient information needs on a case-by-case basis, we aimed to categorise whether patients received all "key" information necessary for facilitating continuity of care both prior to and during OPC visits. Therefore, we selected key contents based on common themes across the literature regarding critical information needed to improve care transitions for patients with chronic/complex care needs [23–25]. This included: diagnosis, medication information (i.e. new prescription and/or details regarding current medication), long-term care advice (i.e. how to manage medication and/or other aspects of management/treatment) and follow-up information (i.e. where to go for the next check-up). For the purposes of this study, this information was considered the minimum required to be provided to each patient to sustain their ongoing management needs.

Triangulation. For establishing barriers to continuity of care, convergent triangulation [26] was used to compare and contrast quantitative and qualitative findings.

Results

Qualitative data

Table 1 displays participant demographic information. The qualitative study component included 11 outpatients and 22 doctors with various experience and specialties. Analysis revealed 5 major themes (Table 2).

Table 1. Qualitative study—Participant demographic information.

Outpatients Characteristic	No. (n = 11)	%
Sex		
Female	3	27.3
Male	8	72.7
Age group		
18-49yrs	0	0
50-69yrs	6	54.6
≥70yrs	5	45.5
Language/s spoken in interview		
English (only)	0	0
Hindi (only)	4	36.4
Malayalam (only)	5	45.5
English & Hindi	1	9.1
Malayalam & Tamil	1	9.1
Doctors Characteristic	**No. (n = 22)**	**%**
Sex		
Female	4	18.2
Male	18	81.8
Age group		
18-49yrs	16	72.7
50-69yrs	6	27.3
≥70yrs	0	0
Job title/position of doctor		
Medical Superintendent	1	4.6
Consultant	9	40.9
Chief Medical Officer	4	18.2
Medical Officer	3	13.6
General Surgeon	1	4.6
General Medicine	1	4.6
Medical Intern	3	13.6
Workplace		
Hospital	17	77.3
CHC	2	9.1
PHC	3	13.6
Language/s spoken in interview		
English (only)	20	90.9
English & Hindi (mixture)	2	9.1

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Theme 1: Patient preference for hospital visits. Overall, most patients preferred using government hospitals for regular check-ups rather than PHCs/CHCs. The reasons they gave were: it is part of their regular routine to go to the hospital, they prefer the central location of the hospital and they have increased confidence in and familiarity with hospital services and staff.

Theme 2: System factors. Both patients and doctors described the high patient loads at hospitals OPCs, which resulted in doctors having a short amount of time to see each patient. A contributing factor to this patient rush appeared to be a shortage of healthcare staff at PHCs

Table 2. Qualitative themes, categories and illustrative quotes.

Themes	Categories	Illustrative Quotations
Patient preference for hospital visits	a) Routine behaviours b) Convenience of hospital location c) Confidence in and familiarity with services and staff	a) OP3: "I come here for all check-ups" b) OP8: "For me, it is convenient to come here as I come to the city for work and I just get check-up also" c) OP1: ". . .I thought I will show to Dr. A because I believe him"
System Factors	d) High patient load at hospital OPCs e) Lack of PHC/CHC medical staff f) Absence of hospital outpatient department medical record-keeping g) Absence of formal clinical handover and referral communication training for doctors h) Absence of structured/standardised referral documents at some facilities i) Basic computerised OPC registration system at some facilities a) Inter-hospital telephone referrals from OPC doctors to jother departments k) Inter-hospital transfer forms at one facility l) PHC NCD register and treatment cards m) PHC referral documents n) Future transition to state-wide paperless/computerised systems	d) Doc15: "OPC. . . will come around 800–900 and then afternoon is 300" e) OP3: ". . .why will I go to community health where all doctors are not available" f) Doc4: "Yeah if it's outpatient we don't keep record" g) Doc14: ". . .we have to develop our communication skills ourselves no formal training is there" h) Doc15: "There is no referral format we are only writing in the outpatient ticket" i) Doc 6: "Here outpatients are already computerized. . .doctor sign in the OPC register and write that OP number. . .. regarding outpatients that's all". j) Doc7: "We call the doctor and discuss the case" k) Doc4: "Yeah there is a inter hospital transfer form" l) Doc17: ". . . we issue a NCD card. . . this is the NCD client register. . . this is the treatment care we give to the patient" m) Doc17: "Yeah we have a referral form. . . we use a referral form" n) Doc 6: "We have submitted a proposal for paperless computerization system for doctors, so I think state-wide they are planning to do that"
Inconsistent doctor-patient communication	o) Inconsistent check-up requests p) Little advice given regarding physical activity, diet and lifestyle q) Sometimes advice is given to patients to bring documents/records	o) OP2: "No they don't tell us. We come on our own" p) OP3: "I was asked to take less salt, less meat. . . Doctor didn't say anything about exercise" q) Doc13: "Some of the time, I fully refuse it. . . I will not give you any medication unless you bring old record"
Attitudes towards medical documents	r) Some patient understanding of the value of keeping medical documents s) Lack of consistent (patient) maintenance and transportation of patient-held medical documents t) Intervention suggestion of a patient-held booklet for holding/transporting medical documents considered acceptable by many patients u) Intervention suggestion of a patient-held booklet for holding/transporting medical documents considered acceptable by several HCPs. v) Doctors' awareness of the importance of patients keeping/transporting medical documents w) Some doctor preference for paper-based patient-held medical documentation	r) OP 9: "We are afraid sometimes that we might misplace, so we put staple pins and keep all the papers together" s) Doc17: ". . .patients [that] bring old medical records are few!" t) OP9: ". . .for me notebook is convenient. . . it's much better than holding onto bunch of papers" u) Doc 20: "It is useful. If there are enough funds, it will be useful. Just like discharge we can give some instructions booklet" v) Doc14: "It's good to have medical records but we don't get it always" w) Doc 11:" . . .actually they provided us the computer, then I returned computer. How can I enter? Even I don't know how to run a computer and all that. If it is paper based it will help".

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and CHCs, which resulted in many patients preferring to visit hospital. With regard to referrals, only one doctor mentioned that specific referral documents were available at their PHC facility, while others reported often having to write referral notes on other patient-held documents (e.g. prescription cards) due to an absence of formal documentation. Computerisation of OPC registration systems at some facilities was reported by doctors, but these do not double as a medical record. There was no system of medical record-keeping and retrieval for outpatients at any facility. Additionally, no specific clinical handover or referral training was provided for HCPs at medical school or work. Doctors at two facilities in Kerala reported that there are plans in motion for all government healthcare facilities in the state to transition to "e-health" (i.e. fully computerised health information systems).

Some examples of good handover procedures emerged—such as use of an inter-hospital transfer form at one hospital, some doctors telephoning colleagues in other departments/hospitals to notify them of a referral and one PHC kept an NCD register and each patient was given a treatment card to bring to appointments.

Theme 3. Inconsistent doctor-patient communication. Patient reports indicated that the information doctors gave to them was notably inconsistent across OPC appointments. There was a range of ways follow-up check-ups were communicated: some patients were given no instructions and planned to either self-refer to another HCP or return to the same clinic, whereas some were asked to return after a specific amount of time and given medication prescriptions to cover that period. With regard to physical activity, diet and/or lifestyle advice, many patients reported receiving either minimal or none of this type of information. In addition, one patient who recalled receiving a "diet plan" felt that it was not suitable for them because of their socio-economic deprivation.

Theme 4. Attitudes towards medical documents. Some patients valued documentation provided by HCPs and kept hold of everything they were given. However, others admitted throwing documents away and some doctors reported that it was uncommon for them to see patients who brought previous healthcare documents. Regarding possible interventions, the majority of patients who were asked expressed positive attitudes towards the introduction of patient-held booklets for storing and exchanging more detailed healthcare information between HCPs and between HCPs and patients.

OPC doctors stressed the importance of patient retention and transportation of medical notes for facilitating continuity of care, but reported that many patients do not bring them. When asked, most doctors supported the intervention suggestion of a patient-held booklet to store and transport documents as they felt it would improve the accessibility and storage of key information. One doctor expressed preference for using paper-based medical documentation rather than computerised documents due to a lack of time and computer skills.

Quantitative data

Demographics. A total of 513 outpatients completed questionnaires. More women (58.1%) participated than men (41.9%). The majority of outpatients were aged 50–69 years (66.1%) and were literate (88.8%) (Table 3).

Sources of referral to the OPC. The most common source of referral to the OPC was patient self-referral (46.2%), followed by referrals from doctors at the same hospital from a previous visit to the inpatient/outpatient department (38.0%) (Table 4).

Patient-held medical documents brought to the OPC. Over half of all patients (60.6%) brought medical documents to the OPC that they received from previous HCP visits. The most common type of documents brought to OPCs were prescription cards (72.7%). Only 32.8% of patient-held documents contained all four items of key information necessary for facilitating continuity of care (i.e. diagnosis, medication information, long-term care advice and follow-up information). In addition, 201 (39.2%) patients reported that they had left either some or all of their medical documents from previous HCPs at home; in this case "medical documents" were classified as anything other than prescription cards (Table 4).

During OPC visits—Nature of OPC documents. The OPC documents given to patients by doctors during outpatient appointments were sheets of paper often provided for other purposes (usually prescription slips or OPC registration papers), on which a HCP had recorded additional notes (e.g. regarding diagnosis, test results, etc.).

Information exchange during OPC appointments. Most patients (97.1%) recalled that they had their health condition explained to them during their OPC visit. Only 55.2% of patients recalled receiving both follow-up and medication instructions. All patients received a document with written information during OPC appointments, but only 24.0% of these contained all four items of key information necessary for facilitating continuity of care (i.e. diagnosis, medication, long-term care and follow-up information) (Table 5).

Table 3. Quantitative study–participant demographic information.

Characteristic	Males (n = 215) Frequency (%)	Females (n = 298) Frequency (%)	Total (n = 513) Frequency (%)
Age Group (Years)			
18–49	33 (15.4)	62 (20.8)	95 (18.5)
50–69	138 (64.2)	201 (67.5)	339 (66.1)
≥70	44 (20.5)	35 (11.8)	79 (15.4)
Level of Education			
Illiterate	24 (11.2)	57 (19.1)	81 (15.8)
Literate with Partial/Complete Primary School Education	92 (42.8)	125 (42.0)	217 (42.3)
Higher Vocational studies and/or Complete Secondary School Education	80 (37.2)	99 (33.2)	179 (34.9)
Graduate or above	19 (8.8)	17 (5.7)	36 (7.0)
Employment Status			
Employed	93 (43.3)	51 (17.1)	144 (28.1)
Unemployed	99 (46.1)	239 (80.2)	338 (65.9)
Retired	23 (10.7)	6 (2.0)	29 (5.7)
Student	0 (0)	2 (0·7)	2 (0.4)
Chronic NCD*			
Chronic Respiratory Disease	64 (29.8)	81 (27.2)	145 (28.3)
Diabetes	78 (36.3)	118 (39.6)	196 (38.2)
Hypertension	80 (37.2)	130 (43.6)	210 (39.0)
Cardiovascular Disease (other than hypertension alone)	81 (37.7)	63 (21.1)	144 (28.1)

*Please note that participants could select more than one answer for this question

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Barriers to continuity of care

Table 6 displays barriers to continuity of care that were established following convergent triangulation of the data. Barriers were predominantly systems-based and included: Hospital OPC time constraints, absence of hospital OPC record-keeping, absence of structured patient-held medical documents, absence of clinical handover training and inconsistent referral practices.

Discussion

Main findings

This study presents mixed-methods data on clinical handover, healthcare communication and continuity of care for chronic NCD outpatients in two states of India. It was found that whilst elements of good clinical handover practice did take place in some primary and secondary-level healthcare facilities, they predominantly happened in isolation and without the existence of structured training or systems to aid their development. It was also found that the patient population attending hospital OPCs seldom received care in the community. These patients were likely to see a different doctor each time they visited the OPC and there were no hospital-based outpatient medical records on which successive HCPs could rely. This meant that communication between HCPs was dependent on patient recall and documented information from previous HCPs that were held and transferred by patients.

These patient-held documents were predominantly re-purposed sheets of paper with minimal structure. However, the contents of these differed substantially between patients and were often insufficient for facilitating continuity of care; only just under a quarter of outpatients received OPC documents containing all the following: diagnosis, medication, long-term care

Table 4. Descriptive results–before OPC visits.

Before OPC Visits	No. (n = 513)	%
Source of referral to OPC*		
Self-referrals	237	46.2
Government primary-care	50	9.8
Doctor at OPC or inpatient department of this (same) hospital	195	38.0
Other government hospital	38	7.4
Private hospital or nursing home	45	8.8
Private doctor or nurse	4	0.8
Traditional healer / Religious healer	2	0.4
Family or friends	9	1.8
Brought medical document/s from previous HCP/s to hospital (seen by a researcher)		
Yes	311	60.6
No	202	39.4
Types of medical documents brought to hospital (seen by a researcher)	**No. (n = 311)**	**%**
Discharge summary	42	13.5
OPC document	20	6.4
Prescription card	226	72.7
Formal referral document (i.e. letter/form)	18	5.8
Test results	2	0.6
Unspecified †	3	1.0
Contents of document/s from previous HCP/s (checked by a researcher)	**No. (n = 311)**	**%**
Illegible notes	62	19.9
Name of doctor/contact at hospital	262	84.2
Date	281	90.4
Name, age and sex of patient	296	95.2
Past medical history for current condition	219	70.4
Past medical history for other conditions	71	22.8
Patient's symptoms, signs and problems	181	58.2
Tests performed (without results)	60	19.3
Tests performed (with results)	187	60.1
Diagnosis	283	91.0
Medication information	205	65.9
Long-term care advice	155	49.8
Lifestyle change recommendations (e.g. diet, tobacco, alcohol, exercise, etc.)	116	37.3
Follow-up information	163	52.4
Unspecified †	13	4.2
Document/s contained all key information ¶	**102**	**32.8**
Did not bring medical document/s from previous HCP/s to hospital (despite having them at home) §	**No. (n = 513)**	**%**
Yes	201	39.2
No	312	60.8
Reason for not bringing medical document/s to hospital	**No. (n = 201)**	
Forgot it at home	33	16.4
Lost it	12	6.0
I've always had it before but the HCPs never used it so I did not bring it this time	45	22.4
I didn't think that it was relevant to bring the note/s with me	52	25.9
I've never been asked for it here so did not bring it this time	16	8.0
My children/spouse handle such documents, so I don't know where they are	14	7.0
No data †	29	14.4

*Please note that patients could select more than one answer for this question

† Unspecified/No data = missing responses

¶ Patient-held medical documents containing all of the following: diagnosis, medication, long-term care and follow-up information

§ Patients who reported leaving some/all medical document/s (i.e. anything other than prescription card) from previous HCPs at home

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Table 5. Descriptive results–during OPC visits.

During OPC Visits	No. (n = 513)	%
Verbal healthcare communication*		
Health condition explained to patient/carer	498	97.1
Patient instructed to return to a HCP for follow-up	435	84.8
Patient given medication instructions (i.e. new prescription and or/continue with previously prescribed medication)	352	68.6
Patient instructed to go for test/s	135	26.3
Patient received verbal follow-up and medication instructions†	**283**	**55.2**
Written information/recommendations provided during OPC visit		
Patient received an OPC document during visit (seen by a researcher)	513	100
Contents of OPC documents received during visit	**No. (n = 509) ¶**	**%**
Illegible notes	36	7.1
Date	491	96.5
Name of doctor/contact at hospital	288	56.6
Name, age and sex of patient	502	98.6
Patient's symptoms, signs and problems	280	55.0
Diagnosis	482	94.7
Past medical history for current condition	195	38.3
Past medical history for other conditions	56	11.0
Tests performed (without results)	46	9.0
Tests performed (with results)	224	44.0
Medication information	347	68.2
Long-term care advice	180	35.4
Lifestyle change recommendations (e.g. diet, tobacco, alcohol, exercise, etc.)	225	44.2
Follow-up information	256	50.3
OPC documents contained all key information §	**122**	**24.0**

*Please note that participants could select more than one answer for this question

†(i.e. "come back for check-up"/"go to local healthcare provider for check-up" and "get some new medication" and/or "continue with old medication")

¶ Please note that 4 participants did not give permission for the content of their OPC document to be examined

§ OPC documents containing all of the following: diagnosis, medication, long-term care and follow-up information

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and follow-up information. In addition, a notable proportion of patients did not bring previous documents to the OPC and reports indicated that HCPs did not consistently advise patients to bring them. This meant that HCPs were, at best, having to rely on inadequate and poorly maintained information and, at worst, no information whatsoever.

Notable deficiencies were also evidenced in verbal healthcare communication, with numerous patients reporting either minimal or no provision of lifestyle advice (including diet & activity) during OPC visits. In addition, only just over half of outpatients recalled receiving both follow-up and medication information. Whilst we could not definitively assess the extent to which this was caused by HCP communication or patient recall, the result is equally problematic. This is because many chronic NCD patients left OPC visits unclear about how to effectively manage their condition and engage in self-care activities that could help to prevent further deteriorations. Overall, this shows that continuity of care for NCD outpatients is currently substandard. The finding that key healthcare information is often poorly recorded on patient-held documents is also particularly critical, as there is evidence to indicate that this may compromise patient safety. Research from high-income countries has repeatedly

Table 6. Barriers to continuity of care for chronic NCD outpatients.

Barriers	Data Source (QN / QL*)	Description
Hospital OPC time constraints	Hospital OPC Drs and outpatients (QL)	The large patient loads reported at hospital OPCs meant that doctors did not have much time to see each patient. Doctors reported that this had a negative impact on their ability to provide detailed verbal and documented information when consulting patients. As a result, many patients were not provided with all the key information necessary to facilitate effective continuity of care. A contributing factor to large patient loads appeared to be to patient preference for visiting hospitals due to a lack of resources at local primary health centres.
Absence of hospital OPC record-keeping	Hospital OPC Drs (QL)	No outpatient healthcare records were maintained at the study Hospital OPCs. Therefore, patient medical details could not be accessed at each OPC visit unless patients brought their previous medical documents and/or could recall relevant information.
Absence of structured patient-held medical documents	Hospital OPC Drs and outpatients (QN, QL)	The majority of patient-held medical documents seen by researchers were scraps/sheets of paper with minimal structure. Additionally, some doctors reported not having access to formal referral documents and only one mentioned the use of a specific inter-hospital transfer form. This resulted in inconsistent and often deficient information transfer between HCPs and between HCPs to patients.
Absence of clinical handover training	Hospital OPC Drs and PHC Drs (QL)	Doctors reported that they had not received structured training for clinical handover at medical school or whilst working. Therefore, they had not been provided with the necessary knowledge, skills or structures to effectively and consistently complete clinical handover processes.
Inconsistent referral practices	Hospital OPC Drs, PHC Drs, outpatients (QN, QL)	Doctor reports of varying referral practices indicated an absence of standardised referral systems between primary and secondary government healthcare facilities. Additionally, very few patients arrived at the OPC with formal referral forms and many doctors reported not having access to specific referral documents. This resulted in fragmented information transfer and poor integration between levels of care.

*QN = Quantitative / QL = Qualitative

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demonstrated a link between deficiencies in documented information transfer between HCPs during care transitions and an increased risk of adverse events, including medical errors and readmissions [27, 28].

Barriers to continuity of care for chronic NCD outpatients

Barriers to continuity of care found in our study settings were: hospital OPC time constraints, absence of hospital OPC record-keeping, absence of structured patient-held medical documents, absence of clinical handover training and inconsistent referral practices. Whilst our study focused on outpatients and similar LMIC-based studies could not be found, our findings are generally consistent with the limited research from India and other LMICs regarding inpatients. These studies have also found predominantly system-based issues with handover and continuity of care including: poor integration between primary and secondary healthcare facilities, inadequate medical record-keeping, deficient HCP-to-patient communication during

care transitions and a scarcity of standardised information exchange systems [29–34]. The descriptions of limited primary care resources are also in line with reports from LMIC literature [35].

The barriers we have found that relate to adverse staff-to-patient ratios at hospital OPCs and limited primary care resources will be challenging to remedy. However, we have also found barriers, such as a lack of record-keeping and an absence of structured patient-held medical documents, which can be remedied at a much lower unit cost. Based on preliminary findings from this study, experts from international, national and state-level healthcare organisations supported the introduction of patient-held record booklets for organising and transporting medical documents; similar patient-held records have proven both affordable and effective for improving continuity of care for maternal and child health globally [17–21, 36, 37]. During subsequent interviews this suggestion was well received by both patients and HCPs. Therefore, this seems to be an acceptable, engaging and relatively inexpensive measure for improving information exchange. These booklets could be specialised to contain structured, disease-specific documentation (e.g. blood pressure charts etc.), which have been proven to improve the quality of recorded healthcare information in both HIC and LMIC settings [38–41] Further, the inclusion of accessible lifestyle advice may help to reduce the burden on government health services by minimising avoidable health crises.

As the utility of booklets would rely on both patient and HCP engagement, it would also be necessary to address the challenges regarding patient understanding, retention, and transportation of medical documents witnessed in this study. Initially, the involvement of both patients and HCPs in the booklet design process would help to create a patient-centred and context-appropriate resource. This is also likely to invoke a sense of ownership amongst its users. The introduction of the booklet could further be accompanied by relevant training and/or education to assist in promoting and normalising utilisation. If necessary, additional incentivisation strategies could be employed to encourage booklet retention such as charging fees for replacement.

Looking further to the future, it should be noted that the implementation of computerised health information systems holds promise for improving the storage and exchange of critical healthcare information; similar systems in HICs and other LMICs have improved guideline adherence, information accessibility and overall efficiency and quality of healthcare [42–44]. Presently in Kerala, electronic information systems are being installed in government primary healthcare facilities and some smaller hospitals [45]. However, this state-wide e-health reform remains in its very early stages and is dependent on strong internet and electrical supplies, which are not available in many areas. This development will also not be able to address the lack of integration between public and private providers that use different information systems, which could further compromise continuity of care for many patients who visit a mixture of providers. Further, patient access to handover and healthcare information may be limited with electronic records. This is because electronic systems require online interfaces for patients to access their information, which also relies on patients owning and using computers/hand-held devices. As far as the authors are aware, this is not currently an area of e-health systems development in Kerala. The authors are also not aware of any plans for electronic health information systems reform in Himachal Pradesh.

Overall, our findings and knowledge of current developments within our study areas suggest that patient-held booklets have great potential to strengthen both current and future health systems. In particular, making patients the custodians of high-quality medical information would facilitate their continuity of care regardless of which HCP they choose to visit. Therefore, further trial and evaluation of this strategy is warranted.

Strengths and limitations

A key strength of this study is the utilisation of mixed methods, which has provided valuable and in-depth insight to the transfer of critical healthcare information for patients with chronic NCDs. In addition, collecting data from a range of healthcare providers and chronic NCD patients from two diverse states has enhanced the breadth and generalisability of findings. This study is also the first to establish context-specific barriers to aid the targeted improvement of continuity of care for outpatients in an LMIC. However, given the vast size of India and the complexity of the healthcare system, our findings may be difficult to generalise to all areas of India and the fact that private facilities were not assessed is a limitation. In addition, although data saturation was reached and qualitative findings correlated well with quantitative questionnaire data, the absence of participants aged between 18–49 years in interviews may have restricted the representativeness of findings. A lack of adequately recorded inclusion/exclusion rates for participation is also a limitation as this could not be reported.

Conclusions and next steps

This study is one of the first from an LMIC to systematically report on a range of handover and healthcare communication practices both within and between levels of healthcare. We have found that continuity of care is of poor quality for outpatients with chronic NCDs in our study areas of India. Crucial healthcare information is often not transferred between HCPs and between HCPs and patients, which may be compromising patient safety. The barriers found indicate that these weaknesses are mainly the result of systems-based issues. Ultimately, alongside the development of accessible and fully integrated e-health systems, it would be appropriate to increase the provision of primary and community healthcare resources in line with the declaration of Alma Ata [46]. Clinical handover could then be assisted by technology and formal protocols that strengthen integration [7]. In the meantime, we advocate the production of relatively inexpensive patient-held NCD booklets that will facilitate communication across all levels and types of healthcare.

Finally, given the increasing burden of chronic NCDs in LMICs, we propose that further robust LMIC studies are needed to explore and evaluate the processes involved in clinical handover and continuity of care and identify areas for sustainable intervention.

Supporting information

S1 Methods. Additional information regarding the national healthcare structure in India.
(DOCX)

S2 Methods. Additional information regarding the study settings.
(DOCX)

S3 Methods. Sample size calculation for the quantitative study component.
(DOCX)

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5. INVESTIGATING HANDOVER AND HEALTHCARE COMMUNICATION DURING CHRONIC NCD INPATIENT CARE IN HIMACHAL PRADESH AND KERALA STATES, INDIA

Previous studies from India concentrating on handover communication during inpatient care have been predominantly quantitative, limited to single healthcare sites and focussed on one area of care transition.[1-6] These studies have demonstrated deficiencies in information transfer during hand-off, discharge and referral, but have not explored patient and HCP attitudes and experiences of handover.[1-6] Further wide-scale and in-depth evaluation of handover and healthcare communication during inpatient care in India is needed, particularly as this is an area of healthcare where poor practice has been shown to have severe consequences for patient safety.[7 8]

The qualitative study reported in this chapter investigates handover and healthcare communication during chronic NCD inpatient care in Himachal Pradesh and Kerala states, India. It also explores potential interventions for improving the storage and exchange of chronic NCD patient information.

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- Global Symposium on Health Systems Research, Liverpool, England, October 2018 (poster presentation)

BMJ Open

Patient and healthcare provider knowledge, attitudes and barriers to handover and healthcare communication during chronic disease inpatient care in India: a qualitative exploratory study

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ABSTRACT

Objectives 1) To investigate patient and healthcare provider (HCP) knowledge, attitudes and barriers to handover and healthcare communication during inpatient care. 2) To explore potential interventions for improving the storage and transfer of healthcare information.

Design Qualitative study comprising 41 semi-structured, individual interviews and a thematic analysis using the Framework Method with analyst triangulation.

Setting Three public hospitals in Himachal Pradesh and Kerala, India.

Participants Participants included 20 male (n=10) and female (n=10) patients with chronic non-communicable disease (NCD) and 21 male (n=15) and female (n=6) HCPs. Purposive sampling was used to identify patients with chronic NCDs (cardiovascular disease, chronic respiratory disease, diabetes or hypertension) and HCPs.

Results Patient themes were (1) *public healthcare service characteristics*, (2) *HCP to patient communication* and (3) *attitudes regarding medical information*. HCP themes were (1) *system factors*, (2) *information exchange practices* and (3) *quality improvement strategies*. Both patients and HCPs recognised public healthcare constraints that increased pressure on hospitals and subsequently limited consultation times. Systemic issues reported by HCPs were a lack of formal handover systems, training and accessible hospital-based records. Healthcare management communication during admission was inconsistent and lacked patient-centredness, evidenced by varying reports of patient information received and some dissatisfaction with lifestyle advice. HCPs reported that the duty of writing discharge notes was passed from senior doctors to interns or nurses during busy periods. A nurse reported providing predominantly verbal discharge instructions to patients. Patient-held medical documents facilitated information exchange between HCPs, but doctors reported that they were not always transported. HCPs and patients expressed positive views towards the idea of introducing patient-held booklets to improve the organisation and transfer of medical documents.

Conclusions Handover and healthcare communication during chronic NCD inpatient care is currently suboptimal. Structured information exchange systems and HCP training are required to improve continuity and safety of care during critical transitions such as referral and discharge. Our findings suggest that patient-held booklets may also assist in enhancing handover and patient-centred practices.

Strengths and limitations of this study

- This is the first qualitative study, as far as the authors are aware, to explore both patient and healthcare provider knowledge, attitudes and barriers to multiple areas of handover and healthcare communication for inpatients with chronic disease in India.
- The number of interviews from both patients and healthcare providers facilitated data saturation and provided a range of significant perspectives.
- Analyst triangulation corroborated data analysis and strengthened the credibility of the study.
- The accuracy of recall of patients interviewed at home (ie, following hospital discharge) may have been limited by the delay between study recruitment and subsequent data collection.
- Awareness of the interviewer's context as a public health researcher may have resulted in participants distorting their responses to minimise critical judgement.

INTRODUCTION

The increasing burden of chronic, non-communicable diseases (NCDs), such as cardiovascular disease, diabetes and chronic respiratory disease, has become a global pandemic that is disproportionately affecting low-income and middle-income

countries (LMICs).[1] This is placing great demand on under-resourced health systems that can only be relieved by employing efficient and integrated approaches to healthcare management. Central to efficiency and integration in healthcare is effective handover communication, which involves the exchange of patient-specific information between healthcare providers (HCPs) and between HCPs and patients/carers to ensure continuity and safety of care.[2]

Between HCPs, information exchange is critical during clinical handovers, which are the points in care where information, responsibility and accountability for patient care are transferred from one HCP to another.[3] This is because safe and effective treatment can only be maintained if all relevant information has been shared and understood.[4] A wealth of research from high-income countries (HICs) has evidenced the association between communicative breakdowns during care transitions and risks to patient safety. These risks are pervasive throughout inpatient care and include delays in diagnosis, medication errors and life-threatening adverse events.[5 6] In addition, one in five patients experience adverse events following hospital discharge, and research has established a link between such events and deficient handover communication.[7–10] Between HCPs and patients, effective information exchange is also vital as patients can provide valuable information to those involved at various stages of their care pathway.[4] Excellent HCP–patient healthcare communication further empowers patients to become active participants in their healthcare management; this is a key aspect of patient-centred care which has been linked to improved patient satisfaction and outcomes.[11]

Despite the established importance of handover communication for health systems functioning and patient safety in HICs, there has been a relative dearth of LMIC-based research focusing on this topic.[12] A recent (2019) study from South Africa has found inadequate discharge planning to be a significant contributor to avoidable causes of hospital readmission.[13] Across India, a handful of predominantly single-site studies have evaluated and described deficiencies in information exchange during referrals, hospital shift change and discharge.[14–19] The current study forms part of a series completed for a project investigating handover and continuity of care for patients with chronic NCDs in the states of Kerala and Himachal Pradesh in India. The first study to have been disseminated focused on outpatient care, which found issues such as suboptimal recording of information within patient-held medical documents and a lack of formal information exchange systems between levels of care.[20]

Given these emerging challenges and the established link between deficient handover communication during inpatient care and risks to patient safety, the current study was conducted to gain novel insight into healthcare information transfer during chronic NCD inpatient care across the same study areas of India. The primary objective was to explore knowledge, attitudes and barriers to handover and healthcare communication during the following points of inpatient care: (1) referral/transfer (ie, communication between HCPs and between HCPs and patients when referring and/or transferring patients) and (2) hospital admission and discharge (ie, communication between HCPs and patients regarding condition, treatment and/or management during hospital admission and discharge). A secondary objective was to explore potential interventions to improve the storage and transfer of key healthcare information.

METHODS

Overview

We report findings from a qualitative study of handover and healthcare communication for inpatients with chronic NCDs in two Indian states. This study was conducted from December 2014 to November 2015 across three public hospitals: one rural secondary-care hospital in the state of Himachal Pradesh, and one periurban secondary-care and one urban tertiary-care hospital in the state of Kerala. These settings were selected to capture a range of hospital types within different geographical settings. We selected public rather than private facilities as these are where a large proportion of socioeconomically vulnerable patients access healthcare. See online supplementary files S1 and S2 for further information regarding the Indian healthcare system and study settings.

Participant recruitment

Patients

Patients were recruited opportunistically from hospitals by trained research assistants (n=6).[21] Purposive sampling was used to identify individuals who met the following inclusion criteria[22]: adults (18+ years) admitted to hospital within 24 hours of a researcher first meeting them due to complications from one of the following chronic NCDs: diabetes mellitus, cardiovascular disease, chronic respiratory disease or hypertension. The identification process took place via researchers approaching ward nurses and asking them about patient demographics and admission details; patients were excluded if judged too unwell to participate by ward nurses. Patients who met the inclusion criteria were provided with verbal and documented study information. Written consent was obtained from literate patients. For illiterate patients, oral consent was obtained along with a thumbprint and signature from a literate witness (ie, family member/carer) in line with WHO guidelines.[23] Patients were recruited until theoretical saturation was achieved.[24] A total of 20 patients participated.

Healthcare professionals

HCPs were recruited from study hospitals by trained research assistants (n=6). Due to the busy nature of the study settings, opportunistic sampling was used to recruit as many HCPs as possible with a range of roles and experience.[21] During recruitment, if HCPs stated they were too busy to answer questions, they were marked

as 'unavailable' and not approached again that day; this did not exclude them from participating at another time. HCPs were also recruited until theoretical saturation was achieved.[24] A total of 21 HCPs participated.

Sample size

As well as saturation being reached for both participant groups independently, the resulting sample size of 41 participants for this study was in accordance with Baker *et al*'s[25] review of sample sizes used in qualitative literature, indicating it was sufficient for achieving overall data saturation.

Data collection

The inpatient data analysed for this study are independent from the outpatient study and were collected from different patients using separate topic guides. Regarding HCP data, this study involves secondary analysis of HCP interviews (n=17) included in the outpatient study from participants who were also involved in inpatient care. A small number of additional interviews with HCPs solely involved in inpatient care (n=4) have also been analysed in this study. All HCP interviews in the India handover project were conducted within the same study period and used the same topic guide (as most HCPs in the study areas worked with both outpatients and inpatients on a daily basis).

All interview data were collected entirely by the lead Indian researcher (SJ, an experienced public health researcher), who was familiar with the study areas and fluent in alllanguages used during interviews. Full consideration was given prior to and throughout data collection to ensure that SJ was aware of the potential limitations of working with participants from culturally and linguistically diverse backgrounds. SJ was not involved in the treatment of patients or previously known to HCPs.

The majority (n=16) of patient interviews took place in study hospitals. Due to a lack of private spaces, interviews were conducted on inpatient wards in as quiet and private a manner as possible. All participants consented to this and it was ensured that HCPs were not present during patient interviews. In addition, a small number of patient interviews (n=4) took place in patients' homes either 5 weeks (n=2) or 4 months (n=2) following hospital discharge, as this was more convenient for them (ie, during recruitment they were in the process of being discharged and leaving hospital). The specific follow-up times coincided with community visits being completed for another quantitative study within the India handover project, which the four patients were also participating in. All HCP interviews took place in hospital offices. Interviews with patients and HCPs were conducted in either English, Hindi, Malayalam or a mixture, depending on interviewee preference, and audio-recorded using a digital Dictaphone.

Data collection took place in two stages. In the first stage (December 2014–October 2015), preprepared topic guides were used to guide interviews. These were developed using relevant handover literature and local knowledge of health systems functioning within the study areas. They were also piloted over three rounds prior to commencement of data collection to ensure they were clear, as well as culturally and contextually appropriate. Patient topic guides included open-ended questions focusing on healthcare utilisation and experiences and attitudes of healthcare visits and information exchange. The HCP topic guides differed slightly to capture information on health systems policies and/or practices; they also included questions regarding handover training and potential strategies for improving practices.

Following the first stage of data collection, on 11 October 2015, a handover expert meeting took place in Delhi, India to present preliminary findings from the India handover project and discuss possible interventions. Researchers from the University of Birmingham and the University of Warwick (UK) facilitated the presentation of results and group discussions at the meeting. Representatives (n=27) from the following international, Indian national and state-level organisations participated: WHO, The World Bank, ACCESS Health International, the Ministry of Health and Family Welfare, the Public Health Foundation of India, the National Centre for Disease Control, the Centre for Chronic Disease Control, the National Health Systems Resource Centre, the All India Institute of Medical Sciences, Aga Khan Health Services, Amrita Institute of Medical Science, and Fortis Hospitals. During discussions, a consensus was reached that patient-held booklets were likely to be an acceptable and sustainable intervention to improve information exchange. This was based on the international success of similar patient-held records used in maternal healthcare around the world.[26–30] It also took into account the delays in developing universal electronic information systems and the fact that such systems will not necessarily address the quality of communication between HCPs and patients. Overall, it was opted as the most pragmatic, cost-effective intervention. Multiple experts also felt that booklets could improve patient self-management if they contained disease-specific advice.

Therefore, following the meeting, the second stage of qualitative data collection (October–November 2015) commenced. Topic guides were updated to include questions regarding the utility of patient-held booklets. In addition, if participants stated they had limited time, researchers interviewed them using a shortened topic guide containing targeted questions on patient-held booklets and medical documents.

Data analysis

All audio recordings of interviews were transcribed verbatim and, if necessary, translated into English by SJ. All translations were crosschecked for accuracy by a qualitative expert in India (SGo, professor of bioethics and social and behavioural sciences with expertise in NCDs), who was also familiar with the study settings and fluent in all languages used during interviews. Following this,

the transcripts were sent to the lead UK researcher (CH, public health PhD student) for analysis. CH became familiar with the study settings prior to analysis during multiple research-related site visits that were facilitated by the Public Health Foundation of India and the Ministry of Health and Family Welfare in Kerala.

Data were analysed using the Framework Method,[31] as this is the method most commonly used for semi-structured interview transcripts. An inductive thematic approach to analysis used in grounded theory was employed,[32 33] which focused on analysing interviews in their entirety and identifying concepts relevant to handover and healthcare communication during inpatient care that emerged from interviews. Analysis occurred through the following stages central to the Framework Method: transcription, familiarisation, coding, charting and interpretation. Over a 1-month period, familiarisation with the data took place via the slow reading of transcripts, and CH consulted with SJ to gain a clear understanding of interview contexts. Once this was complete, coding began and two transcripts were chosen at random from each batch of interviews (ie, two patient and two HCP transcripts) for independent coding by an additional UK analyst (SGr, professor of medical sociology with expertise in cross-cultural research) for analyst triangulation.[34] Patient and HCP transcripts were coded separately in order to be able to assess similarities and differences between participant groups; patient transcripts were coded first. The coding process involved further familiarisation with the data, followed by open coding where certain transcript content was highlighted and allocated descriptive labels (codes) to interpret the phenomena identified in the text. The development of codes and themes was entirely data-led and analysed manually.[35]

Microsoft Excel was used to organise participant codes. CH created initial categories by clustering similar codes developed from the two randomly selected patient and HCP transcripts. CH and the additional UK analyst (SGr) then met to discuss their analyses. As both had produced similar codes and concepts, the categories that were created were mutually agreed on. CH then continued with category development until all transcripts had been coded and inserted into the spreadsheet. Following analysis of 20 patient and 21 HCP transcripts, no new categories had been produced. This served as confirmation that data saturation had been met.[24]

Following coding, categories were grouped into subcategories and linked to produce themes. Then, via the process of charting,[31 35] themes for each participant group were used to create a framework matrix into which participants' quotes were inserted, corresponding to their representative subcategory. This provided a visual representation of themes, which facilitated the mapping and interpretation of the data. After completing separate analysis of patient and HCP data, the results of both participant groups were compared to assess similarities and differences between their reports of knowledge, attitudes and barriers to handover and healthcare communication. A Venn diagram was used to summarise the separate and overlapping content, which was linked to subcategories from the original themes.

Patient and public involvement

Patients and the public were not involved in the initial design of this study. Patients and carers were first involved during the pilot phase prior to formal data collection, where the topic guides, consent and study information sheets were piloted over three rounds. During this time, they were consulted and given the opportunity to provide feedback to ensure the study materials were clear and culturally and contextually appropriate. Patients and the public were not involved in any other aspect of the study recruitment or conduct, but findings have been disseminated publicly via an expert meeting (including professionals working with patient groups) and open access web pages.

RESULTS

Patient characteristics

Twenty male (n=10) and female (n=10) patients aged between 25 and 72 years old were interviewed. Participants' background characteristics varied (table 1). Patients completed interviews in English (n=11), Hindi (n=4), Malayalam (n=4) and a mixture of Hindi and English (n=1).

Healthcare professional characteristics

Twenty-one male (n=15) and female (n=6) HCPs aged between 22 and 55 years old were interviewed. HCP roles included doctors (n=17), nurses (n=2), a pharmacist (n=1) and a medical records officer (n=1). HCP qualifications and experience varied (table 2). HCPs completed interviews in English (n=15), Hindi (n=2), Malayalam (n=2) and a mixture of Hindi and English (n=2).

Charted data

During analysis of patient and HCP data, three themes (with subcategories) emerged for each participant group. Patient themes were (1) public healthcare service characteristics, (2) HCP to patient communication and (3) attitudes regarding medical information (table 3). HCP themes were (1) system factors, (2) information exchange practices and (3) quality improvement strategies (table 4).

Following separate analysis of patient and HCP data, the results of both participant groups were compared to assess similarities and differences between their reports of knowledge, attitudes and barriers to handover and healthcare communication; the results of this comparison are displayed in figure 1. The similarities will be described first, followed by the differences. To ensure confidentiality, numerical pseudonyms have been used when presenting quotes.

Overlapping content

Public healthcare constraints

During interviews, a number of patients reported that they chose to visit public hospitals because of the better

Table 1 Patient characteristics

Characteristics	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	n (%)
Age	65	45	70	58	71	56	57	70	55	25	72	50	55	69	70	50	70	70	70	70	25–72
Sex																					
Male	✓	✓	✓	✓	✓				✓	✓	✓	✓				✓					10 (50.0)
Female						✓	✓	✓					✓	✓	✓		✓	✓	✓	✓	10 (50.0)
Literacy																					
Illiterate								✓					✓		✓	✓	✓	✓	✓	✓	8 (40.0)
Literate	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓		✓							12 (60.0)
Education level																					
None/minimal primary school level								✓				✓	✓		✓	✓	✓	✓	✓	✓	9 (45.0)
Completed lower primary school					✓		✓														2 (10.0)
Completed upper primary school						✓															1 (5.0)
Completed secondary school									✓												1 (5.0)
University graduate (or above)	✓			✓						✓	✓										4 (20.0)
No data		✓	✓											✓							3 (15.0)
Employment status																					
Employed		✓		✓	✓				✓			✓	✓	✓		✓					8 (40.0)
Unemployed						✓	✓	✓							✓		✓	✓	✓	✓	8 (40.0)
Student										✓											1 (5.0)
Retired	✓		✓								✓										3 (15.0)
Chronic NCD(s) (related to admission)*																					
Chronic respiratory disease			✓	✓		✓		✓					✓			✓					6 (30.0)
Diabetes	✓													✓	✓	✓	✓	✓	✓	✓	8 (40.0)
Hypertension									✓		✓	✓				✓	✓	✓			6 (30.0)
Cardiovascular disease (other than hypertension alone)	✓	✓			✓		✓	✓	✓	✓	✓	✓									9 (45.0)
Language(s) used during interview																					
English (only)	✓	✓	✓	✓										✓	✓	✓	✓	✓	✓	✓	11 (55.0)
Hindi (only)						✓	✓	✓	✓												4 (20.0)
Malayalam (only)										✓	✓	✓	✓								4 (20.0)
English and Hindi (mixture)					✓																1 (5.0)

*Patients could select more than one answer to this question.
NCD, non-communicable disease.

Table 2 Healthcare professional characteristics

Characteristics	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	n (%)
Age	44	24	33	25	23	39	44	35	52	50	50	43	50	40	46	55	22	35	35	45	35	22–55
Sex																						
Male	✓		✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓			✓		15 (71.4)
Female		✓				✓		✓										✓	✓		✓	6 (28.6)
Qualification/s*																						
Doctor of Medicine (MD)	✓		✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					13 (61.9)
Master of Public Health (MPH)						✓																1 (4.8)
Bachelor of Medicine (MBBS)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					17 (81.0)
BSc Nursing																		✓			✓	2 (9.5)
BSc Pharmacy																			✓			1 (4.8)
Graduate (ie, non-medical degree)																				✓		1 (4.8)
Official position																						
Medical superintendent						✓																1 (4.8)
Chief medical officer									✓													1 (4.8)
Medical officer												✓										1 (4.8)
Consultant	✓		✓				✓	✓					✓	✓	✓	✓	✓					9 (42.9)
Surgeon		✓								✓												2 (9.5)
General medicine											✓											1 (4.8)
Intern doctor				✓	✓																	2 (9.5)
Ward nurse																		✓			✓	2 (9.5)
Pharmacist																			✓			1 (4.8)
Medical records officer																				✓		1 (4.8)
Years of experience in position																						
<1		✓			✓																	2 (9.5)
1–3				✓																		1 (4.8)
4–6						✓		✓										✓		✓	✓	5 (23.8)
7–10			✓				✓												✓			3 (14.3)
>10	✓								✓	✓	✓	✓	✓	✓	✓	✓	✓					10 (47.6)
Place of work																						
General hospital		✓	✓	✓	✓									✓		✓	✓	✓	✓			9 (42.9)

Continued

Table 2 Continued

Characteristics	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	n (%)
Regional hospital	✓								✓	✓	✓		✓							✓	✓	7 (33.3)
Taluk hospital						✓	✓	✓				✓			✓							5 (23.8)
Language(s) used during interview																						
English (only)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓					15 (71.4)
Hindi (only)																				✓	✓	2 (9.5)
Malayalam (only)																		✓	✓			2 (9.5)
English and Hindi (mixture)	✓												✓									2 (9.5)

*Healthcare providers could select more than one answer to this question.

availability of healthcare staff compared with local healthcare facilities, such as smaller hospitals and primary/community health centres:

> We have very limited time, we did go to local hospital but doctors are not there. So if we get time we will come here rather than going to a hospital where there are no doctors. (IP 15)

However, multiple patients also reported that public hospitals were often crowded with high daily patient loads:

> There is so much crowd there you can't ask or hear anything there… so many people are there now, you cannot do anything. (IP 11)

The human resource issues at public primary and community healthcare facilities were also mentioned by HCPs:

> It will be useful if availability of doctors is ensured at the peripheral institutions around the clock. At times it is not there. (DOC 1)

Additionally, in our study settings most hospital doctors worked in both outpatient clinics and inpatient wards on a daily basis. Many doctors expressed concerns of time pressures due to the large patient volumes seen at hospital outpatient clinics and the subsequent lack of time they had to attend to all patients:

> We can hardly spend five minutes with each patient, seeing the crowd you will just want to finish everyone soon. (DOC 7)

Some doctors also reported that human and medical resource constraints across public healthcare facilities were hindering the quality of care that could be provided:

> [It's] not [about] motivation, [it's about] resource limitation. It's not humanly possible to see people every day for seven days. Quality definitely gets compromised. (DOC 3)

Referral communication

A number of patients who recalled being referred from a previous healthcare facility to the hospital reported that they were not provided with any referral information:

> No, they didn't give any parchi [papers]. We were getting medicines right only that is with us. (IP 8)

HCPs also discussed referral communication. Doctors explained that there were no structured processes to follow for information exchange during referrals:

> Yeah there is no proper way of doing it… inpatients sometimes we have to [refer] but as I told you we never had a structured format. (DOC 14)

Despite the lack of structured systems, some doctors explained that they would make ad-hoc calls to ensure that some information was transferred when referring a patient.

Table 3 Summary of charted data for inpatients (IPs)

IP	Public healthcare service characteristics		Healthcare provider to patient communication			Attitudes regarding medical information		
	Large patient loads	Deficient primary care services	Verbal healthcare information during admission	Referral information	Impoliteness/ impatience	Transportation of medical documents	Patient-held booklet intervention	Dissatisfaction with lifestyle advice
1						✓		
2			✓					
3	✓		✓		✓	✓		
4			✓			✓		
5		✓	✓	✓	✓			
6				✓		✓		
7	✓	✓		✓		✓		
8				✓				
9			✓					
10			✓					
11	✓		✓			✓		
12			✓	✓		✓		
13			✓			✓		
14		✓	✓				✓	✓
15		✓	✓		✓		✓	✓
16		✓	✓			✓	✓	
17			✓			✓	✓	✓
18		✓	✓			✓	✓	
19			✓			✓	✓	
20			✓				✓	✓

Table 4 Summary of charted data for healthcare professionals (HCPs)

	System factors					Information exchange practices			Quality improvement strategies			
HCP	Time and resource constraints	Absence of handover communication training	Absence of structured formats for information exchange between HCPs	Hospital record keeping	Ad-hoc phone calls	Patient-held medical documents	Discharge instructions	Hierarchical transfer of responsibility	Increase resource provision	Introduce formal referral systems	Implement 'e-health' systems	Patient-held booklet intervention
1			✓			✓	✓		✓			
2			✓			✓	✓					
3						✓			✓	✓	✓	
4	✓		✓			✓	✓					
5			✓	✓		✓						
6	✓		✓						✓		✓	
7	✓		✓		✓							
8	✓				✓							
9									✓			
10	✓	✓	✓		✓		✓					
11	✓	✓	✓						✓	✓		
12				✓		✓			✓		✓	
13	✓										✓	✓
14	✓											✓
15	✓					✓						✓
16												✓
17	✓							✓				✓
18				✓		✓	✓	✓				
19	✓			✓								
20				✓								
21	✓							✓				

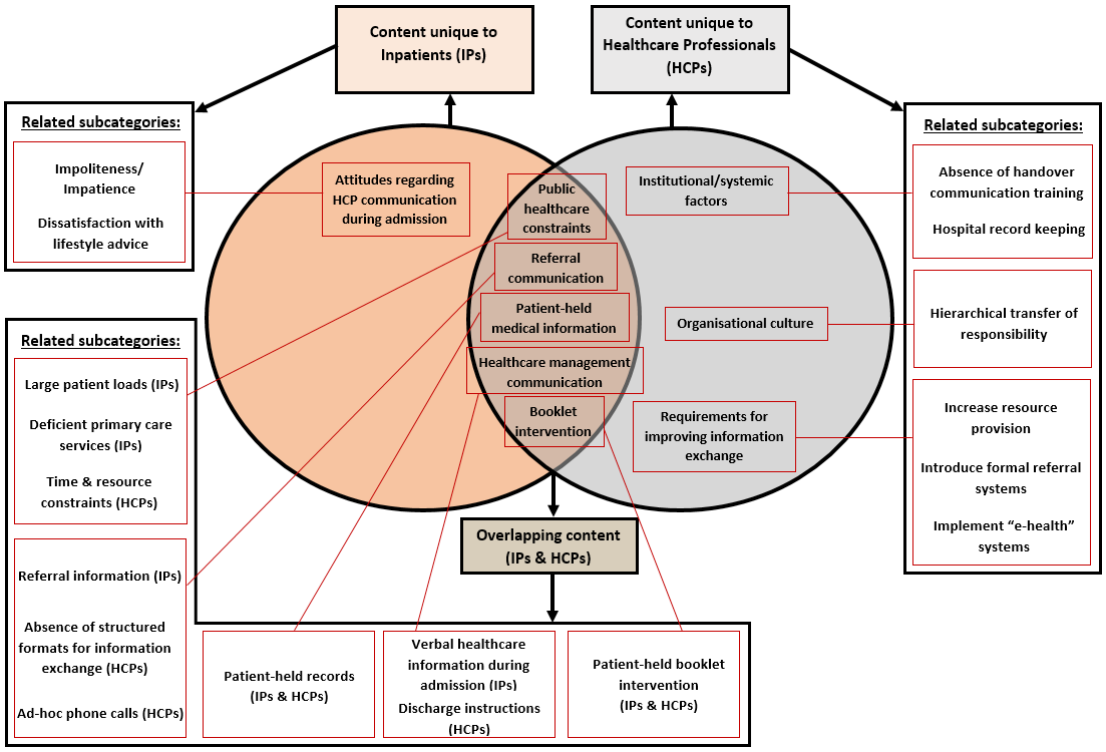

Figure 1 Similarities and differences between the content of patient and healthcare provider data with related subcategories. IP, inpatients.

However, this appeared to depend on how well they knew the patient or doctor:

> Sometimes I call the doctor to tell them that so and so is coming. Please do the needful. If I know the patient or doctor. (DOC 11)

Patient-held medical information

At the point of hospital admission, patient-held notes and/or medical records can facilitate optimal care by providing HCPs with key patient-specific information. When asked about whether they brought medical papers to the hospital, most patients reported that they regularly stored and transported papers to HCP visits; these included referral notes, prescription cards, test results and other records from inpatient/outpatient/primary care:

> Yeah we have always kept everything safely. [Shows researcher a bag with all sort of papers like reports, lab tests, etc.] (IP 3)

Doctors also talked about patient-held medical information during interviews. For example, some doctors reported that patients regularly kept and transported their medical records:

> Almost everyone comes with medical reports. (DOC 11)

However, other doctors described that, in their experience, the availability of patient-held records was less consistent and that this could have a negative impact on the continuity of care provided:

> Some of them do bring investigations and all others don't bring much and we have to work out what happened from the start. (DOC 3)

Healthcare management communication

When asked about verbal HCP communication, many patients reported that during admission and/or discharge, HCPs had provided them with some basic verbal healthcare management information (ie, medication, treatment, lifestyle and/or follow-up requirements). However, the quantity of information received appeared to vary notably between patients. For example, some recalled being given detailed instructions:

> Doctor says everything. I was given medicines and now they asked me to take injections also. Doctor is saying I am not controlling my sugar. The nurse taught me how to take injection. (IP 19)

Conversely, others appeared to receive relatively limited information, and one carer reported having to seek healthcare advice from alternative sources:

> Doctors don't explain everything. We speak to our friends and get details from them. (Carer-IP 16)

HCPs also discussed their healthcare communication practices with patients. While talking about discharge, a nurse explained that they predominantly provided verbal instructions and described the usual amount of time taken to explain information to each patient:

> Usually we take twenty to twenty-five minutes to instruct the patients. If the patients understand then it can be even faster. (NUR 1)

Doctors reported that they provided patients with documented information on discharge cards and verbally advised patients to return to their local HCP/healthcare institution during the discharge consultation:

> We give them a discharge card. Discharge card is there we have written and then we refer them to the local hospital or where they come from. (DOC 15)

Booklet intervention

During interviews that took place after the handover expert meeting, patients were asked for their opinion regarding the utility of a patient-held booklet where medical documents could be stored, organised and transported to HCP visits. Most appeared to think that it could be effective and help with self-management, including those who were illiterate:

> Yeah, sometimes we don't know what to do so it would be good if some paper is there to help us. We can't read it ourselves but our son or daughter-in-law can help us. (IP 17)

HCPs were also asked for their opinions regarding the booklet intervention. Many generally felt it could be useful, but various conditions and/or reservations were also expressed. For example, doctors felt that the success of the booklet would rely on patient attitudes:

> That will depend on the patients, if they maintain that and bring it every time. For us there is no change, we write our observations in paper or notebook, doesn't matter… Might be helpful. (DOC 22)

Related to this, one doctor felt that in order to see the most benefit, patients needed to be regularly instructed to keep and transport their medical documents:

> We write the communication but the patients don't keep them proper. I think we have to tell the patients to keep the letters and papers. (DOC 4)

Content unique to patients

Attitudes regarding HCP communication during admission

A few patients recalled receiving some impolite and/or impatient treatment from healthcare staff during their hospital admission:

> The doctors don't speak much. They explain but get angry if you don't understand them. (IP 3)

In addition, some patients expressed dissatisfaction with the lifestyle advice provided. In particular, patients of lower socioeconomic status felt that nutritional instructions were not suitable for them due to time and financial constraints:

> We are daily labourers we can't follow all the instructions… We can't follow that, we are poor we do hard work and we just can't concentrate on eating. Whatever is there we just eat. (IP 15)

Content unique to HCPs

Institutional/systemic factors

Some doctors displayed good knowledge of the key information that should be transferred during patient referrals, transfers and/or hospital discharge:

> To another hospital, yeah first we have to write what are the main complaints of patients presenting illness and write about the past history, then we will write about what all investigations we have done here 'til the day of transfer, then what is the condition of the patient we are discharging, why we are discharging (and) any investigations, major investigations, to be done. (DOC 2)

However, when asked about training opportunities, numerous doctors mentioned that they had not received any formal handover training. Some recalled that this type of training was not provided at medical school:

> I think it was not there in medical curriculum. (DOC 1)

Others reported that training was not provided in their workplace/s and instead they learnt on the job:

> We are sent to the wards, we see what our seniors do and we do that's all. We have to develop our communication skills ourselves no formal training is there. (DOC 14)

When asked about hospital record keeping, a medical records officer stated that inpatient records are stored in hospitals for up to 10 years following patient discharge. However, the same officer also indicated that these paper-based records are not easily accessible:

> Definitely I can locate any record but it might take some time to locate them. (MRO 1)

Organisational culture

Based on reports from both doctors and nurses, it appeared as though some hierarchical transfer of responsibility for documented handover and healthcare communication took place in hospitals. For example, a senior doctor mentioned that they instructed medical interns to write notes for them when their patient load was high:

> We do write in the papers, whether it's discharge card or outpatient sheets. When patient load is high, then we tell our interns to do it for us, we check that and then sign. (DOC 22)

Requirements for improving information exchange

During interviews, HCPs were asked for their thoughts on requirements to improve information exchange between HCPs and between HCPs and patients. Numerous doctors

felt that there needed to be a notable increase in public healthcare resource provision:

> Infrastructure is very small but the outpatient department is ten times more than it can manage, so more posts should be created… We have to increase the manpower and also our materials. (DOC 15)

Some doctors also discussed the idea of introducing standardised referral documents and systems to improve referral communication:

> You can supply people with [referral] forms and make it mandatory that residents have to maintain a register. In that case they will maintain the register. (DOC 3)

In addition, while discussing current information systems, one doctor in Kerala reported that an application had been made for a near-future transition to computerised healthcare information systems. This appeared to be a state-wide plan for public healthcare facilities:

> We have submitted a proposal for paperless computerisation system for doctors, so I think state-wide they are planning to do that. (DOC 6)

DISCUSSION

Main findings

This study presents qualitative data on patient and HCP knowledge, attitudes and barriers to handover and healthcare communication during public hospital inpatient care in the states of Kerala and Himachal Pradesh in India. The main finding is that verbal and documented information exchange between HCPs and between HCPs and patients is often suboptimal during referrals, hospital admission and discharge, with a lack of structured systems and HCP education in place to ensure sufficient continuity of care. While unique themes emerged for both patients and HCPs, a comparison of the results from each participant group showed that there was also a notable amount of overlapping content. The results have highlighted the challenging and multifaceted nature of handover and healthcare communication during inpatient care in India. With regard to public health, the findings have also elucidated a number of key areas to address to improve the continuity and safety of chronic NCD patient care.

Some of the results from the current study reflect and reinforce findings from previous research focusing on outpatient care in the same study areas of India.[20] In particular, during interviews in both studies, patients and HCPs recognised the resource constraints affecting public healthcare. The main issue reported was deficient primary healthcare services, which is in line with well-established findings of limited primary care infrastructure across India and numerous LMICs.[36] In our study settings, under-resourced primary care resulted in many patients preferring to visit hospitals as the first point of care. Subsequently, large patient loads were seen in both outpatient and inpatient departments, which limited HCP consultation times. Other key areas of discussion in the current study reflected in the outpatient findings were inconsistent transportation of patient-held medical documents and views regarding the utility of patient-held booklets. While more inpatients than outpatients reported that they regularly transported records to HCP visits, some doctors recalled seeing many patients who did not bring information to the hospital. This was problematic because if patients did not bring their records then doctors had to gather details from scratch, potentially compromising their continuity of care. When asked about the possible utility of introducing patient-held booklets to store and transport medical documents, inpatients had similar views to outpatients, which were generally positive, but also felt that the inclusion of self-management information would be beneficial. Doctors in the current study expressed a wider variety of views regarding booklets, but broadly thought that they could be useful if patients had positive attitudes towards their maintenance and use.

Regarding referral communication, the current study also highlighted similar issues of deficient information exchange between levels of care observed in the previous outpatient study.[20] For example, reports from both HCPs and patients revealed that that documented information was often provided in the form of minimal, handwritten notes on papers provided for other purposes (eg, prescription cards). These findings reflect results from other LMIC studies that have evidenced the exchange of poor-quality referral documents.[14 37–39] However, the current study also evidenced patient reports of not being provided with any documented information during referrals. Further, while a small number of inpatient doctors in the current study explained that they called HCPs to discuss a referral case, this appeared to be dependent on how well they knew the patient or HCP. Such findings indicate that there are further inconsistencies in referral communication practices than previously described. Overall, these deficits are unsurprising given that multiple HCPs in both the current and previous outpatient study reported an absence of structured systems and education provided for handover communication. These findings are also in line with the few previous descriptions from India of a paucity of training and protocols for handover practices.[15–17]

In addition to similarities found with previous research, the current study has elucidated numerous novel insights regarding handover and healthcare communication during critical points in inpatient care, which were previously unexplored in the study areas of India. Regarding inpatient medical record keeping, a records officer indicated that hospital records were not easily accessible when reporting that retrieving a specific record from storage could take "some time". Alongside the inconsistent transportation of patient-held records, this limited accessibility of medical information carries notable risks for patient safety. This is because,

without timely key patient background and/or treatment details, critical oversights can be made that result in adverse events.[4 5 7] Additionally, there were notable variations in patient reports of the provision of healthcare management information during hospital admission and discharge; while some patients reported being given clear self-care instructions, others stated that they sought information from external sources due to the lack of detail provided by hospital HCPs. It appears that the time pressures experienced by HCPs were a significant contributory factor to inconsistencies in HCP to patient communication, particularly at the point of discharge. During interviews, multiple HCPs reported often being busy with high patient loads and it was explained that the duty of writing discharge notes was passed from senior doctors to interns or nurses during busy periods. Additionally, it seemed that more time was spent on verbal discharge communication, with a nurse reporting that they typically took around twenty minutes per patient to explain discharge instructions. Such practices may be compromising the retention of key healthcare information, as global literature suggests that patients can struggle to absorb verbal details provided during consultations.[40] The potential implications of these findings are significant, given the associations that have been found between deficient discharge communication and an increased likelihood of adverse events.[7–10]

Furthemore, a key issue affecting handover and healthcare communication mentioned solely by patients was the receipt of impolite and/or impatient treatment from hospital doctors during admission. A small number of patients were also dissatisfied with the take-home nutritional advice provided, as they felt it failed to take into account their socioeconomic deprivation. These results may be explained by the reported lack of communication training in medical education, as well as a historical tendency for paternalistic physician conduct in India.[41] In other areas of India and Asia, research on HCP–patient communication has evidenced asymmetric power balances and patient dissatisfaction during patient consultations.[42] Such findings reveal the need for more patient-centred communication, particularly for poorer patients, who make up a significant proportion of public healthcare users in India. As for requirements for improvement reported by HCPs, during interviews many doctors recognised the need for an increase in public healthcare resource provision, as well as structured systems for information exchange. Some also discussed the promise of implementing 'e-health' systems, with a doctor in Kerala reporting that public healthcare facilities across the state will be transitioning to computerised systems. While our colleagues from Kerala report that this development is in its early stages, it holds potential as similar systems in HICs and other LMICs have helped to advance information accessibility and the overall quality of healthcare provided.[43 44]

Strengths and limitations

As far as the authors are aware, this is the first study to qualitatively explore both patient and HCP knowledge, attitudes and barriers to multiple areas of handover and healthcare communication during chronic NCD inpatient care in India. The use of qualitative methodology and inclusion of multiple healthcare sites have revealed a number of key issues that are reflected among the emerging LMIC literature, suggesting likely transferability to other settings. Interviews with both patients and HCPs have provided a variety of valuable perspectives, which has helped to identify critical areas impacting the continuity of chronic NCD inpatient care. The number of interviews conducted helped to achieve data saturation for both participant groups and study credibility was strengthened via the use of multianalyst triangulation.[34]

The lack of documented inclusion/exclusion rates for participation is a limitation, as this could not be recorded. In addition, the accuracy of recall of the minority of patients interviewed at home may have been limited by the delay between recruitment and data collection. Recruitment challenges meant that patient participants were predominantly older (ie, 45+ years), which limited exploration of younger patient experiences; this was, however, largely unsurprising given that the study exclusively recruited patients with chronic NCDs. The cross-cultural nature of this research may have resulted in constraints during data collection and analysis, as ingroup bias could have affected participants' willingness to openly converse with a non-local researcher.[45] Social desirability bias from the use of individual interviews and participants' awareness that the interviewer was a public health professional may have also affected truthfulness of the data.[46] Despite these challenges, the recurrence of themes indicating data saturation and the finding that our results are supported by existing literature suggest that they had minimal impact.

Conclusions and next steps

This study has found that handover and healthcare communication for inpatients with chronic NCD during referrals, hospital admission and discharge is often fragmented. The critical barriers appear to be a lack of structured information exchange systems and HCP education. There is also a growing recognition of the need for the government to strengthen primary healthcare infrastructure in line with the Declaration of Alma-Ata.[47] This will greatly assist in increasing accessibility of care and subsequently reducing pressure on hospital services. It will also be required to address the United Nations' sustainable development goals regarding universal health coverage and reducing premature deaths from NCDs.[48] In addition, the implementation of structured documentation, systems and training is urgently required to manage critical care transitions such as referrals, transfers and discharge. Research from both HIC and LMIC settings has proven that such interventions can improve the continuity and safety of care.[4 17 37 49] Regarding future steps, during HCP

interviews it was reported that public healthcare facilities in Kerala will be transitioning to computerised 'e-health' information systems. The Indian government has also since pledged to digitise all public healthcare information systems in the country via an 'Integrated Health Information Platform'.[50] While such developments hold promise and are progressing, they remain in their initial stages in many states and face numerous infrastructural challenges. Additionally, they are not likely to target issues regarding HCP to patient communication, patient access to healthcare information and information exchange between public and private HCPs.

Therefore, a mixed-methods pilot study exploring the design and implementation of patient-held record booklets is suggested. This could ameliorate some of the current issues by incorporating disease-specific and structured documents, which have been shown to improve the recording of clinical information and can provide a means of organising records in a logical and accessible way.[49 51 52] The patient-held nature of this strategy could also increase patient access to key healthcare information, which may improve self-management. Given the unstructured, predominantly paper-based systems used across the study sites, this is an area for development that has been welcomed by Indian national and international experts, as well as by patients and HCPs in our study areas. There have also been multiple international successes of improved continuity of care via utilisation of similar patient-held/home-based records in both outpatient and maternal and child healthcare.[26–30 53] In order to maximise booklet utilisation, it would be necessary to address the issues surrounding patient retention and understanding of the importance of medical documents. Initial key steps could be to involve both patients and HCPs in the design process and accompany the introduction of booklets with relevant promotion, training and incentives.

Finally, given the rising burden of NCDs across LMICs, this research is timely and crucial for effective health systems development. Further LMIC research is required to continue exploring the critical factors affecting handover, continuity of care and health systems integration and to develop sustainable and cost-effective interventions.

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6. INVESTIGATING DISCHARGE COMMUNICATION FOR CHRONIC NCD INPATIENTS IN HIMACHAL PRADESH AND KERALA STATES, INDIA

Hospital discharge is a critical area of handover, with evidence indicating that as many as one in five patients experience an adverse event following this transition of care.[1] Despite its importance, studies have shown that discharge communication is often under-prioritised by HCPs, which can result in rushed and subsequently deficient exchanges of key healthcare information between HCPs and between HCPs and patients.[2-8] Evidence from high-income countries has also established an association between the untimely and/or incomplete exchange of documented discharge information between levels of care and adverse events, such as hospital readmission.[1 9 10] However, discharge communication from India research remains limited; a small number of descriptive studies have demonstrated suboptimal transfer of verbal and documented information between HCPs and patients, particularly regarding post-discharge management and follow-up advice.[11 12]

The quantitative prospective cohort study reported in this chapter investigates verbal and documented discharge communication for chronic NCD patients across three hospitals in Himachal Pradesh and Kerala states, India. It also explores the relationship between quality of discharge communication and the following chronic NCD patient outcomes at 5 and 18-week follow-up: Death, hospital readmission and self-reported deterioration of NCD/s.

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RESEARCH ARTICLE

Investigating discharge communication for chronic disease patients in three hospitals in India

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Abstract

Objectives

Poor discharge communication is associated with negative health outcomes in high-income countries. However, quality of discharge communication has received little attention in India and many other low and middle-income countries.

Primary objective

To investigate verbal and documented discharge communication for chronic non-communicable disease (NCD) patients.

Secondary objective

To explore the relationship between quality of discharge communication and health outcomes.

Methods

Design

Prospective study.

Setting

Three public hospitals in Himachal Pradesh and Kerala states, India.

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Competing interests: The authors have declared that no competing interests exist.

Participants

546 chronic NCD (chronic respiratory disease, cardiovascular disease or diabetes) patients. Piloted questionnaires were completed at admission, discharge and five and eighteen-week follow-up covering health status, discharge communication practices and health-seeking behaviour. Logistic regression was used to explore the relationship between quality of discharge communication and health outcomes.

Outcome measures

Primary

Patient recall and experiences of verbal and documented discharge communication.

Secondary

Death, hospital readmission and self-reported deterioration of NCD/s.

Results

All patients received discharge notes, predominantly on sheets of paper with basic pre-printed headings (71%) or no structure (19%); 31% of notes contained all the following information required for facilitating continuity of care: diagnosis, medication information, lifestyle advice, and follow-up instructions. Patient reports indicated notable variations in verbal information provided during discharge consultations; 50% received ongoing treatment/management information and 23% received lifestyle advice. Within 18 weeks of follow-up, 25 (5%) patients had died, 69 (13%) had been readmitted and 62 (11%) reported that their chronic NCD/s had deteriorated. Significant associations were found between low-quality documented discharge communication and death (AOR = 3.00; 95% CI 1.27,7.06) and low-quality verbal discharge communication and self-reported deterioration of chronic NCD/s (AOR = 0.46; 95% CI 0.25,0.83) within 18-weeks of follow-up.

Conclusions

Sub-optimal discharge practices may be compromising continuity and safety of chronic NCD patient care. Structured protocols, documents and training are required to improve discharge communication, healthcare integration and NCD management.

Introduction

Continuity of care can most simply be defined as: "the seamless provision of healthcare between settings and over time".[1] It is crucial for managing patients with chronic non-communicable disease (NCDs), who often require regular check-ups and care episodes across a variety of healthcare settings. Continuity of care is built around effective communication between healthcare professionals (HCPs) and between HCPs and patients. This is imperative during transitions of care, where poor handover communication can have far-reaching consequences such as delays in care, incorrect treatment and readmission.[2, 3]

Hospital discharge is one point of care transition that has proven to be particularly critical for continuity and safety of patient care. Evidence from high-income countries (HICs) has indicated that one in five patients experience an adverse event following discharge and that one-third of these events are preventable.[4] Regarding the impact of discharge communication for patient safety, there is an established link between the deficient exchange of documented information between hospital and primary care HCPs and adverse patient outcomes.[4–7] Ineffective communication between HCPs and patients/carers during discharge consultations, particularly regarding condition and/or ongoing treatment needs, has also been identified as an issue that can lead to patient misunderstanding and adverse events such as medication errors and unplanned readmissions.[4, 8–10] With regard to interventions, the literature has continually advocated the timely and accurate exchange of patient-specific information to improve coordination and safety during care transitions.[11, 12] Effective discharge education and documented summaries are particularly vital tools that have been shown to reduce a number of post-discharge complications and unplanned readmissions.[7, 13–18] However, in practice the delivery of discharge instructions often remains rushed and essential details for facilitating continuity of care such as diagnosis, medication, lifestyle and follow-up information are not always exchanged.[13, 19–24]

Despite the growing body of literature on quality of discharge communication and its impact on HCP and patient-related outcomes in HICs, similar evidence from low and middle-income countries (LMICs) remains relatively scarce.[25] Some single-site observational studies have evaluated discharge practices and found issues regarding deficient documentation, guidelines, standardised procedures and patient education.[26–30] In addition, a recent (2019) study from South Africa found inadequate discharge planning (a process which involves healthcare information transfer between HCPs and between HCPs and patients/carers to ensure coordination and continuity of care) to be a significant contributor to potentially avoidable causes of readmissions.[31] Across India, a handful of studies have found inconsistencies in the provision of discharge information via HCP and patient reports and discharge ticket evaluations.[32–34] In addition, a study in an Indian hospital emergency department reported improvements in recorded discharge information following the implementation of pre-formatted discharge summaries.[35]

The importance of investigating factors affecting continuity of care in LMICs and India, in particular, is increasing due to the rising prevalence of chronic NCDs, which require sustained care across settings.[36] Given the resource constraints across numerous LMIC settings, the need to elucidate context-relevant strategies to improve patient self-management and avoid unnecessary healthcare utilisation is also vital. In the study areas of India (i.e. Himachal Pradesh and Kerala states), a lack of standardised information systems within and between levels of healthcare has resulted in patient-held medical information serving as the predominant vehicle for handover communication between HCPs and between HCPs and patients.[37, 38] As well as verbal advice/instructions, patients are often provided with medical documents (including discharge notes) during healthcare visits that can be transported between HCPs whilst seeking care from a variety of public and private providers. Therefore, the quality of both verbal and documented information exchanged between HCPs and patients is critical in facilitating adequate comprehension, coordination and continuity of care.

We conducted a prospective cohort study with the primary objective of investigating verbal and documented discharge communication for chronic NCD patients in three hospitals in Himachal Pradesh and Kerala states, India. In addition, given the increasing evidence on the significance of information exchange for patient outcomes, a secondary objective was to explore the relationship between quality of discharge communication and adverse health outcomes.

Methods

Study setting

Overview. The study was conducted from December 2014 to November 2015 in Himachal Pradesh and Kerala states. Patients were recruited and initial data was collected from three hospitals: one rural secondary-care hospital (150 beds) in the district of Solan, Himachal Pradesh, and one peri-urban secondary-care hospital (150 beds) and one urban tertiary-care hospital (783 beds) in the district of Ernakulam, Kerala. These settings were selected to capture a range of contrasting hospital types and environments. We selected public rather than private healthcare facilities for this study as this is where targeted improvements to health systems could be implemented more systematically (i.e. via state health departments). In addition, public facilities are where a large proportion of socio-economically vulnerable populations access healthcare in India.

Public healthcare in India. At the national level, public healthcare in India is directed by the Ministry of Health and Family Welfare. At the state level, public healthcare is managed by the State Department of Health and Family Welfare, which has considerable autonomy in deciding upon, designing and delivering health programs. Fig 1 contains a summary of the structure of public healthcare in India, based on Indian Public Health Standard Norms.[39]

Population and public healthcare in Solan, Himachal Pradesh and Ernakulam, Kerala. Himachal Pradesh is a predominantly rural and mountainous state in northern India with a population of 6.86 million people.[40] Solan district has a population of approximately 580,000 people, with 82.4% living in rural areas. There average literacy rate across the district is 83.7%, which is higher than the national average (74%) but rates remain lower for women compared to men (77.0% vs. 89.6%, respectively).[41] A recent study regarding the availability of health services across Himachal Pradesh found that there are 5 hospitals, 6 Community Health Centres (CHCs), 33 Primary Health Centres (PHCs) and 179 Sub Health Centres (SHCs) in Solan District. With regard to primary care infrastructure, it was calculated that there are approximately 0.83 CHCs per 80,000 persons, 1.14 PHCs per 20,000 persons and 0.93 SHCs per 300 persons.[42]

Kerala is a state in the south-west of India with a population of 34.8 million people and a greater than national average urban-based population of 47.7%.[43] Ernakulam district has a population of approximately 3.2 million people, with 68.1% living in urban areas. The average literacy rate across the district is 95.89%, which is notably higher than the national average with similar rates between women and men (94.5% vs. 97.4% respectively).[44] Regarding the availability of health services, the Kerala Department of Health Services (DHS) reports there are 15 hospitals, 23 CHCs, 75 PHCs and 410 SHCs in Ernakulam district.[45] Based on census and DHS data, it can be calculated that there are approximately 0.58 CHCs per 80,000 persons, 0.47 PHCs per 20,000 persons and 0.04 SHCs per 300 persons in Ernakulam.

Ethics approval

This study was reviewed and approved by the Centre for Chronic Disease Control Independent Ethics Committee, India, and the Amrita Institute of Medical Sciences Institutional Ethics Committee, India. Data archives are stored at the University of Birmingham, in accordance with the University's code of practice.

Patient recruitment

Patients were recruited consecutively by trained social work graduate researchers (n = 6) six days per week (spread across all days of the week over the study period) between the hours of 8 am and 6 pm, as this is the window within which patients were typically discharged from study

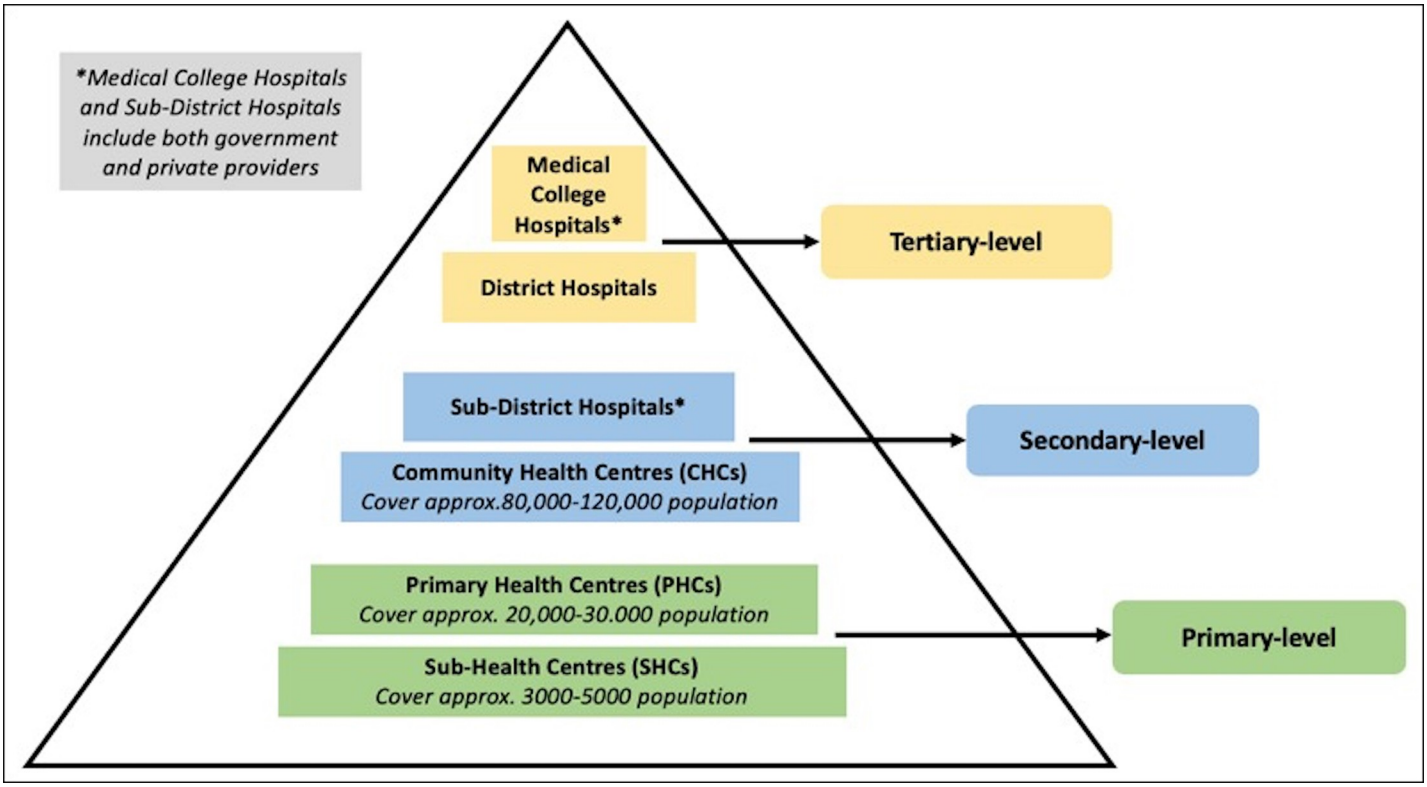

Fig 1. Structure of the Indian public healthcare system according to Indian Public Health Standard Norms.

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hospitals. Patients were included within the first 24 hours of their admission if they met the following inclusion criteria: adults (18yrs+) with one of the following tracer chronic NCDs; cardiovascular disease, chronic respiratory disease, diabetes mellitus or hypertension. Researchers approached ward nurses to identify eligible chronic NCD patients; patients were excluded they lived outside the study areas (where planned follow-up visits would be difficult to achieve), or if ward nurses judged them to be too unwell to participate due to physical and/or cognitive impairment. Researchers then approached eligible patients (and their carers), provided them with study information sheets and verbally informed about the purpose of the research. Written consent was obtained from literate patients. For illiterate patients, oral consent was obtained along with a thumbprint and signature from a literate witness (i.e. carer) in line with World Health Organisation ethical guidelines.[46]

Due to the lack of prior work completed in the field of study, the sample size for this study was calculated using a formula to determine the minimum sample size needed to estimate a population mean with confidence limits of 5% for a variable (such as the proportion of patients receiving complete healthcare information) with a prevalence of 50%. The formula used was: Necessary Sample Size = $(\text{Z-score})^2 * \text{StdDev}*(1\text{-StdDev}) / (\text{margin of error})^2$.[47] Based on our parameters this worked out as 384.16. Therefore, we aimed to collect survey data from a minimum of 385 patients.

Data collection

Questionnaire. The questionnaire used in this study was developed from one used in previous handover research conducted in Nigeria for a masters in public health thesis (see

"S1 Appendix" for a copy of the questionnaire). It was adapted using relevant handover communication literature and input from expert researchers in the UK and India. Prior to the commencement of data collection, a small pilot study was conducted in Kerala to test the questionnaire. This was conducted iteratively over three rounds, with field researchers visiting the study hospitals and interviewing two patients/carers at each location. In addition to asking questions, researchers also asked for feedback on the clarity and contextual appropriateness of the materials. Once this was completed, all researchers met with a supervisor to discuss the aim of each question, patient/carer responses and subsequently make minor amendments to the wording and structure of the questionnaire to improve clarity. After three rounds of piloting, based on both patient/carer and researcher feedback, the questionnaire was considered to be suitable for use; piloted cases were not included in the main study.

Questionnaires were completed at four time points: 1. during hospital admission; 2. immediately after hospital discharge; 3. five weeks after discharge and 4. eighteen weeks after discharge. All questionnaires were administered in person by trained social work graduate researchers (n = 6) in the form of an interview; each question was read aloud and researchers ticked the appropriate box/es for responses that corresponded to pre-defined answers and/or wrote free-text notes for responses that did not correspond to pre-defined answers. Whilst patients predominantly provided responses to questions, their accompanying carer/s (e.g. friends, family members etc.) were able to provide support for clarifying answers when required. The admission and discharge interviews were completed in the hospital, whereas the five-week and eighteen-week follow-up interviews were completed in the community.

During admission, data was collected on patient demographics, health status, previous HCP visits, referral/s (if any) and experiences of healthcare information transfer. Following hospital discharge consultations, information was collected about verbal recall of healthcare information given to patients, attitudes towards such information and subsequent plans for HCP follow-up. Researchers also assessed patient/carer understanding of their health condition and post-discharge care requirements by asking them to explain this information and then checking it against their discharge notes, or if these did not contain enough information/were not immediately available, a ward nurse who was aware of their condition and care requirements. Researchers also evaluated the contents of all notes, prescriptions and/or other pieces of paper that the patient had brought with them to hospital and that had been given to them by a hospital HCP during admission and/or their discharge consultation. These content evaluations were completed using structured checklists within the questionnaires; space was provided for free-text entry to cover any information not included in the checklists. At five and eighteen-week follow-up visits data was collected about post-discharge adverse health outcomes, health status and health-seeking behaviour.

Analysis

Descriptive statistics were used to outline patient demographics, attitudes and experiences of discharge communication and post-discharge health outcomes. Descriptive statistics were also used to calculate the number of patients who received all items of "key" documented and verbal information during discharge communication. For documented information, key items included: Diagnosis, medication information, lifestyle advice and follow-up instructions. For verbal information, key items included: Ongoing treatment/management information, medication information, lifestyle advice and follow-up instructions. These items were selected based on common themes across the literature regarding critical information needed to improve discharge communication and care transitions for patients with chronic conditions. [48–51]

Due to a relatively small number of outcome events in the study sample, the Firth method of multiple logistic regression was used to explore the relationship between quality of discharge communication and health outcomes at five and eighteen-weeks follow-up.[52, 53] The principle outcome variables were death (all-cause mortality), hospital readmission and self-reported deterioration of NCD/s (that the patient was hospitalised for). For explanatory variables, the completeness of key documented and verbal information was utilised to measure the quality of discharge communication. The explanatory variables of interest in this study were receiving low-quality documented discharge communication (i.e. notes containing 0–2 items of key documented information—compared to notes containing 3–4 items) and receiving low-quality verbal discharge communication (i.e. recall of receiving 0–2 items of key verbal information—compared to recall of receiving 3–4 items) during discharge consultations.

Multiple logistic regression models were employed in order to adjust for the following potential confounders: sex, age, education level, employment status, time taken to reach the hospital, number of chronic NCDs and hospital site. A count of chronic NCDs was used due to a lack of available data regarding primary diagnosis or severity of comorbidities, which would have enabled the creation of a comorbidity index. Such an approach has been validated and shown to add predictive value for survival analyses (vs. age alone).[54]

Results

Demographics and medical conditions

A total of 546 inpatients completed questionnaires; 305 men and 241 women. The majority of participants were aged 60 years or older (59%) and were literate with a complete primary school-level education or more (67%). Of the four chronic NCDs captured by this study, the most frequently reported was chronic respiratory disease (45%) (Table 1). See "S2 Appendix" for participant demographic information and health outcomes by study site.

Hospital discharge

Patient recall of verbal discharge communication. Most patients (89%) reported having their health condition explained to them during admission. Post-discharge care advice appeared to vary notably, as just over half (50%) of all patients recalled being given information regarding ongoing treatment/management and 23% of patients recalled receiving lifestyle advice. With regard to follow-up instructions, the majority of patients (85%) recalled being told to return for an outpatient check-up. Overall, just 15 (3%) patients recalled receiving all key verbal discharge information (i.e. ongoing treatment/management information, medication information, lifestyle advice and follow-up instructions). With regard to patient understanding of post-discharge care information, a quarter of patients/carers (25%) were judged by researchers to have a good understanding of almost all important details (Table 2).

Patient follow-up plans. When asked about follow-up plans, the majority of patients (82%) stated that they planned to return to the outpatient clinic of the same hospital they were being discharged from. A notable proportion of patients also (13%) stated that they would only return to a HCP when they become unwell again (Table 2). When patients were asked about how they would explain to the next HCP what was done for them during admission, the most common response (45%) was that they had asked the doctor to explain key information to their carer/family member (Table 2).

Documented discharge communication. All patients were provided with a document containing handwritten notes during their discharge consultation. Overall, most patients (94%) felt it was important to receive discharge notes, the most common reason given for this was because it helps patients to understand and explain their condition (64%). The type of

Table 1. Participant demographic and adverse health outcomes information.

Characteristic	Total (n = 546)
	Frequency (%)
Sex	
Male	305 (55.9)
Female	241 (44.1)
Age group (Years)	
18–49	98 (17.9)
50–69	296 (54.2)
≥70	152 (27.8)
Level of education	
Illiterate	91 (16.7)
Literate with partial or completed primary school education	258 (47.3)
Complete secondary school education	132 (24.2)
Complete higher school/vocational studies	52 (9.5)
University graduate or above	13 (2.4)
Employment status	
Employed	164 (30.0)
Unemployed	369 (67.6)
Retired	11 (2.0)
No data*	2 (0.4)
Time taken to reach hospital	
<1 hour	311 (57.0)
1–4 hours	230 (42.1)
>4 hours	4 (0.7)
No data*	1 (0.2)
Chronic NCDs†	
Diabetes	157 (28.8)
Cardiovascular Disease	218 (39.9)
Chronic Respiratory Disease	247 (45.2)
Hypertension	171 (31.1)
Number of chronic NCDs (per patient)	
1	365 (66.9)
2	128 (23.4)
3	40 (7.3)
4	13 (2.4)
Adverse health outcomes at 5-week follow-up	
Death (all-cause mortality)	19 (3.5)
Hospital Readmission	33 (6.0)
Self-reported deterioration of NCD/s	39 (7.1)
No data* (loss to follow-up)§	13 (2.4)
Adverse health outcomes at 18-week follow-up	
Death (i.e. all-cause mortality)	25 (4.6)
Hospital Readmission	69 (12.6)
Self-reported deterioration of NCD/s	62 (11.4)
No data* (loss to follow-up)§	14 (2.6)

* No data = missing responses

†Please note that participants could select more than one answer for this question

§Patients lost to follow-up were those who could not be contacted or found during community visits in the follow-up period

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Table 2. Patient recall of verbal discharge communication and follow-up plans.

Hospital discharge	No. (n = 546)	%
Health condition explained to patient during admission		
Yes	485	88.8
No	38	7.0
Patient unsure	16	2.9
No data*	7	1.3
Post-discharge care information provided by hospital doctors†		
Instructions to go for further test/s	19	3.5
Details regarding ongoing management	274	50.2
Details of prescribed course of medication to be taken (and reviewed when completed)	297	54.4
Lifestyle advice (i.e. regarding exercise, diet, tobacco and/or alcohol)	123	22.5
Instructions to take rest	1	0.2
Instructions to visit a physiotherapist	14	2.6
Referral to another HCP	3	0.5
Patient unsure of what advice was given (if any)	12	2.2
No advice given	1	0.2
No data*	10	1.8
Follow-up instructions provided by hospital doctors†		
Visit/s to the outpatient department of this (same) hospital	430	78.8
Visit/s to the outpatient department of another hospital/specific doctor	33	6.0
Patient unsure of what advice was given (if any)	75	13.7
No data*	16	2.9
Patient recalled receiving all key verbal discharge information§	**15**	**2.7**
Patient/carer understanding of health condition and post-discharge care requirements		
Patient/carer had a good understanding of almost all important information	135	24.7
Patient/carer had a broadly correct understanding of important information	186	34.1
Patient/carer had only a basic understanding of some important information (e.g. diagnosis/ medicine)	85	15.6
Patient/carer had very little/no understanding of any important information	20	3.7
No data**	120	22.0
Patient plans for follow-up HCP visit/s†		
Return to same hospital outpatient clinic	448	82.1
Another government hospital	12	2.2
Government primary care centre	20	3.7
Private hospital/nursing home	6	1.1
Local private doctor/nurse	6	1.1
Physiotherapist	1	0.2
Traditional healer	1	0.2
Patient plans to only return to a HCP when they are sick again	68	12.5
No data*	8	1.5
How patients plan to explain to next HCP what was done for them during admission†		
Patient asked the doctor to explain to their carer/family member	247	45.2
Patient asked the doctor to explain to them so they can tell the HCP when they see them	82	15.0
Doctor gave the patient/carer a note or discharge summary to take back to their local HCP	116	21.3
Patient plans to return to this (same) hospital where their medical records are stored	100	18.3
Patient is unsure what they will do because they cannot remember what the doctor said	2	0.4

(*Continued*)

Table 2. (Continued)

Hospital discharge	No. (n = 546)	%
No data*	23	4.2

* No data = missing responses

† Participants could select more than one answer for this question

§ Ongoing management information, medication information, lifestyle advice and follow-up information

**No data = missing responses; please note the larger number of missing responses to this question was due to a lack of available documented discharge information and/or ward nurses, which were required at the time of questioning for the researcher to verify patient/carer understanding of their condition and post-discharge care requirements

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discharge documents provided to patients varied; the majority received either a sheet of paper with basic pre-printed headings (71%—see "S3 Appendix" for a photographed example) or an unstructured (i.e. otherwise blank) sheet of paper (19%). The contents of discharge notes received by patients varied greatly between individuals, with only 31% containing all four items of key healthcare information required for effectively facilitating transitions of care (i.e. diagnosis, medication information, lifestyle advice, and follow-up instructions) (Table 3).

Five-week follow-up

Five weeks post-discharge 13 (2%) patients had been lost to follow-up, 19 (4%) patients had died, 33 (6%) patients reported they had been re-admitted to hospital and 39 (7%) patients reported a deterioration in their health (related to the NCD/s they were hospitalised for) (Table 1). See "S4 Appendix" for flowchart summarizing participant inclusion and exclusion throughout the study.

Results of the adjusted analyses of the association between low-quality discharge communication and death, hospital readmission and self-reported deterioration of NCD/s within 5 weeks of discharge are presented in Table 4 (see "S5 Appendix" for unadjusted results). They showed significant ($p<0.05$) increased odds of death within five weeks of discharge for patients who received low-quality discharge notes (AOR = 4.43; 95% CI 1.46, 13.46). No other significant associations were found. Goodness-of-fit tests using the method of Heinze and Schemper were performed for each adjusted multivariate analysis and are reported in "S6 Appendix". In this approach, coefficients are constrained to zero and left in the model in order to allow their contribution to the penalization.[55]

Eighteen-week follow-up

Eighteen weeks post-discharge 14 (2%) patients had been lost to follow-up, 25 (5%) patient had died, 69 (13%) patients reported that they had been readmitted to hospital and 62 (11%) patients reported a deterioration in their health (related to the NCD/s they were hospitalised for) (Table 1).

Results of the adjusted analyses of the association between low-quality discharge communication and death, hospital readmission and self-reported deterioration of NCD/s within eighteen weeks of discharge are presented in Table 4 (see "S6 Appendix" for unadjusted results). They showed significant ($p<0.05$) increased odds of death for patients who received low-quality discharge notes (AOR = 3.00; 95% CI 1.27, 7.09). With regard to verbal information, the results showed a significant ($p<0.05$) decreased odds of self-reported deterioration of NCD/s within eighteen weeks of discharge for patients who recalled receiving low-quality verbal discharge communication (AOR = 0.48; 95%CI 0.27–0.87). No other significant associations were found (see "S6 Appendix" for goodness-of-fit statistics for all adjusted analyses).

Table 3. Documented discharge communication.

Hospital discharge	No. (n = 546)	%
Documented information given to patients at discharge		
Patient received discharge document/s (seen by a researcher)	546	100
Patient attitudes regarding importance of receiving discharge document/s		
It is important to receive discharge document/s	513	94.0
It is not important to receive discharge document/s	24	4.4
Unsure whether it is important or not to receive discharge document/s	6	1.1
No data*	3	0.5
Reasons given for why patients feel it is important†	**No. (n = 513)**	**%**
It helps to understand and explain my condition/s	330	64.3
It helps me to get attended to faster at my next HCP visit	85	16.6
I feel it's more professional	19	3.7
I have to submit this for claiming insurance	89	17.3
It will help in an emergency	2	0.4
It is a helpful medical identification certificate	1	0.2
Reasons given for why patients feel it is not important†	**No. (n = 24)**	**%**
The notes get lost	5	20.8
Everyone receives the same standard of care regardless	19	79.2
Types of documents given to patients at discharge		
Discharge booklet	42	7.7
Structured discharge document (i.e. form/card with basic pre-printed headings)	386	70.7
Unstructured discharge document (i.e. note/letter on otherwise blank sheet of paper)	104	19.0
Prescription card (containing medication information only)	5	0.9
Referral letter	1	0.2
No data*	8	1.5
Contents of discharge documents	**No. (n = 545)§**	**%**
Illegible notes	29	5.3
Name of doctor/contact at the hospital	379	69.5
Date	517	94.9
Name, age and sex of patient	523	96.0
Diagnosis	536	98.4
Medication information	477	87.5
Follow-up instructions	299	54.9
Lifestyle advice (e.g. exercise, diet, tobacco, alcohol etc.)	268	49.2
Past medical history for current condition	331	60.7
Past medical history for other conditions	99	18.2
Patient's signs, symptoms and problems when admitted	506	92.8
Tests performed during admission (without results)	98	18.0
Tests performed during admission (with results)	429	78.7
Discharge document contained all key items of information**	**168**	**30.8**

* No data = missing responses

† Participants could select more than one answer for this question

§ One patient did not give permission for the contents of their discharge document/s to be analysed

** Diagnosis, medication information, lifestyle advice and follow-up instructions

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Table 4. Adjusted associations between receiving low-quality discharge communication and the likelihood of experiencing adverse health outcomes within five and eighteen weeks of discharge.

Death within 5 weeks of discharge	Adjusted odds ratios*			Death within 18 weeks of discharge	Adjusted odds ratios*		
	OR	95% CI	p-value		OR	95% CI	p-value
No. of items of key documented discharge information†				*No. of items of key documented discharge information*†			
0 to 2 items	4.37	1.46–13.11	0.009§	0 to 2 items	3.00	1.27–7.06	0.012§
*No. of items of key verbal discharge information***				*No. of items of key verbal discharge information***			
0 to 2 items	3.18	0.15–67.18	0.458	0 to 2 items	1.60	0.37–6.89	0.525
Hospital readmission within 5 weeks of discharge				**Hospital readmission within 18 weeks of discharge**			
No. of items of key documented discharge information†				*No. of items of key documented discharge information*†			
0 to 2 items	0.60	0.25–1.43	0.252	0 to 2 items	0.75	0.42–1.34	0.324
*No. of items of key verbal discharge information***				*No. of items of key verbal discharge information***			
0 to 2 items	0.73	0.30–1.75	0.479	0 to 2 items	0.82	0.45–1.50	0.510
Self-reported deterioration of NCD/s within 5 weeks of discharge				**Self-reported deterioration of NCD/s within 18 weeks of discharge**			
No. of items of key documented discharge information†				*No. of items of key documented discharge information*†			
0 to 2 items	1.41	0.70–2.86	0.338	0 to 2 items	1.59	0.89–2.85	0.115
*No. of items of key verbal discharge information***				*No. of items of key verbal discharge information***			
0 to 2 items	0.65	0.32–1.34	0.241	0 to 2 items	0.46	0.25–0.83	0.010§

*Adjusted for the following independent variables: sex, age group (18-49/50-69/70yrs+), education level (up to primary school-level/secondary school-level/higher school-level or more), employment status (unemployed/employed/retired), usual time taken to reach hospital (<1 hour/1-4 hours/>4 hours), number of chronic NCDs (1/2/3/4) and hospital site (1/2/3).

† Odds ratios represent association with receipt of 0 to 2 items of key documented information on discharge notes

§ Statistically significant at $p<0.05$

** Odds ratios represent association with receipt of 0 to 2 items of key verbal information during discharge consultation

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Discussion

Main findings

This study has described discharge communication for chronic NCD patients in three public hospitals in India. One of our main findings was that both verbal and documented communication between HCPs and patients was often limited. Regarding documented information, discharge notes were predominantly provided on forms within minimal structure and in some cases were hastily written on blank sheets of paper or prescription forms. Patient attitudes towards discharge documents were generally positive, with the majority feeling it was important to receive them to help with understanding/explaining their condition, claiming insurance and getting attended to faster when they see the next HCP. However, the contents of discharge notes varied notably, with only just under a third of patients received notes containing all items of key information (i.e. diagnosis, medication information, lifestyle advice and follow-up instructions).

In addition, whilst the majority of patients reported being told where to go for a follow-up HCP visit during discharge consultations, other verbal information appeared to vary notably between patients. In particular, only just over half of all patients recalled receiving information

about necessary ongoing treatment/management for their NCD/s and under a quarter recalled receiving lifestyle advice. A markedly small minority of patients (3%) recalled receiving all four items of key verbal information during discharge consultations (i.e. ongoing treatment/management information, medication information, lifestyle advice and follow-up instructions). In addition, just under a fifth of patients were assessed by researchers as having either a basic or little/no understanding of important discharge information and 13% of patients only planned to return to a HCP when they were unwell again. These findings indicate that a significant proportion of patients left the hospital with sub-optimal levels of discharge information and/or comprehension regarding their ongoing healthcare needs, which may have compromised their ability to adequately manage their chronic NCD/s. Given the role that patient-held documents play in facilitating handover communication between HCPs in the study areas of India, the deficiencies in documented information provision may have also affected continuity of patient care.

Overall, the results reflect the limited similar research from India that has evidenced unstructured and deficient HCP-patient communication at the point of discharge.[32, 35] They are also consistent with other LMIC-based studies that, via patient reports and record evaluations, have evidenced a lack of in-depth information provision during discharge and/or poor levels of patient understanding regarding post-discharge care requirements.[27–30] The provision of deficient documented discharge information may be of particular concern for patient self-management, as global literature (predominantly from high-income countries) has indicated that individuals can struggle to absorb the verbal information provided by HCPs during healthcare consultations.[56] Further, whilst there is a dearth of empirical research on HCP attitudes towards discharge in India, our research on outpatients and qualitative data regarding inpatients from the same study areas in India indicates that a paucity of time, available HCPs, training and guidelines are likely to be notable contributors to the suboptimal communication evidenced in this study.[37] The results may also be somewhat explained by a historical lack of communication training in medical education and a tendency for paternalistic physician behaviour in India.[57, 58] A dominant HCP communication style is likely to result in unmet information needs from patients, due to them feeling intimidated and unable to ask questions. Similar communicative issues have been identified across healthcare settings in other parts of Asia, despite an increasing desire from patients for more involvement.[59] A global review of discharge communication literature suggests that both patients and HCPs prefer practices that are relevant, concise and personalised.[60] However, in practice HCPs across numerous healthcare settings report not having enough time to perform comprehensive discharge consultations and instead prioritising inpatient medical care.[24, 61] Overall, the international evidence would suggest that the issues found in this study pose a serious challenge for the Indian public health system, given the importance of information exchange in ensuring the continuity and safety of healthcare.[62]

Furthermore, to the best of the authors' knowledge, this study is the first of its kind to investigate the association between quality of discharge communication and adverse health outcomes in India. In the adjusted analyses we found that chronic NCD patients who received low-quality discharge notes (i.e. containing 0–2 items of key information) were more likely to have died within five and eighteen weeks of follow-up compared to those who received higher-quality notes. Such findings reflect HIC research, which has repeatedly demonstrated a link between deficient discharge information transfer and an increased risk of adverse events.[4–7] We also found that patients who received low-quality verbal discharge communication were less likely to report an NCD-related deterioration in their health within eighteen weeks of follow-up compared to those who received higher-quality communication. This was an unexpected finding, which could be explained by the possibility that those provided with less

information at discharge were patients with less severe health issues (due to HCP time pressures/case prioritisation etc.) and were subsequently less likely to report a deterioration later on. Overall, it is not possible to say whether low-quality discharge communication caused some, or all, of the health outcomes observed in this study. The small scale of the research alongside the complex nature of factors affecting health outcomes means that the results should be interpreted cautiously and will require further validation. Nonetheless, given the importance of handover communication for continuity of safety of care, the imperative to improve the recording and transfer of key healthcare information remains.

Strengths and limitations

A key strength of this study is the collection of data from a range of patients across multiple healthcare facilities in varying geographical settings, which has provided a representative sample of chronic NCD patients accessing public hospitals in two diverse states of India. This study has also provided key insight into the transfer of critical NCD patient information during public hospital discharge in India. Follow-up data can be challenging and resource-intensive to collect in LMIC settings for a number of reasons, including a lack of comprehensive/up-to-date directories to assist with locating addresses, difficulties in contacting individuals to confirm visit attendance (due to a lack of phone ownership/poor network coverage) and limited access to certain areas (due to challenging terrains and/or limited transportation infrastructure). Therefore, this study has also provided an invaluable opportunity to explore the experiences of NCD patients following hospital discharge in the community.

However, given the vastness of India and the complexity of healthcare systems across LMICs, generalisability to other settings may be done with caution. A limitation of this study is that the quality of discharge communication was predominantly assessed via patient recall, rather than direct observation. A lack of adequately recorded inclusion/exclusion rates for participation is also a limitation as this could not be reported. The involvement of six different researchers may have increased the likelihood of researcher bias and, as the same researchers completed all data collection, they were not blinded to the quality of discharge communication. However, each section of the questionnaire was immediately filed away after completion and not referred to again which, alongside the fact that each researcher collected large volumes of questionnaire data, reduced potential for further bias. Regarding limitations of the regression analyses, data regarding diagnostic accuracy was unavailable and, theoretically, associations may have arisen as a result of imprecision (alpha error), indirect causal links (e.g. the provision of information was a marker for other aspects of care) or a combination of these factors. The limited number of deaths means it is also unclear how well our models adjusted for confounding factors, so the findings must be interpreted with caution. In addition, our follow-up questionnaire did not capture further information on patients who had died, so it was not possible to know whether these patients had been readmitted. Therefore, we ran further sensitivity analyses based on the assumption that all patients who died had also been readmitted; whilst no significant associations were found, adjusted point estimates regarding associations with low-quality discharge notes all leaned in the direction of an increased likelihood of hospital readmission within five and eighteen weeks follow-up (see "S7 Appendix" for results and goodness-of-fit statistics).

Next steps

To effectively address the issues surrounding ineffective communication between HCPs and patients during discharge consultations, there is a pressing need for structured HCP training and handover communication guidelines to be implemented across public healthcare

facilities–our outpatient handover research from the same study hospitals has indicated that these are currently missing.[63]

Extensive HIC-based research has shown that education, simulation-training, and communication tools are effective strategies for improving the quality of healthcare information transfer during transitions of care.[12] Communication tools can also be adapted to ensure they facilitate patient-centred care at the point of discharge, which takes into account patients' needs, desires and values and involves patients and carers in care/decision-making processes [12, 24] In addition, several LMIC studies have evidenced that introducing patient discharge educational materials and structured disease-specific discharge planning can improve HCP to patient communication, as well as patient satisfaction, patient/carer healthcare management knowledge and post-discharge health outcomes.[64–68] Given the predominantly paper-based systems in use across the study settings, well-structured and standardised HCP checklists, documents and patient-held record booklets are also likely to advance the quantity and quality of essential information transferred between HCPs and between HCPs and patients and have proven successful in HIC and LMIC settings.[35, 69–71] Co-creation of such materials with HCPs, patients, carers and other key stakeholders should be considered in order to enhance acceptability, function and utilisation.

Looking to the future, the introduction of electronic health information systems holds great promise for improving information exchange and overall quality of healthcare.[72] A review of computer-enabled discharge communication interventions has evidenced their impact in improving timeliness and accuracy of information as well as patient and HCP satisfaction across Europe and North America.[60] In India, the government has recently announced long-term plans to digitize health records and this is currently being set up in seven states, including Himachal Pradesh and Kerala.[73] In addition, Kerala is the first Indian state to undergo comprehensive e-health systems reforms across all public healthcare facilities.[74] However, these developments are presently in their early stages and will take some time to become integrated enough to effectively facilitate handover communication; patient-held medical documents remain in use as the predominant vehicle for information transfer throughout public healthcare. In addition, e-health developments will not address integrative challenges between public and private HCPs using different information systems. This may continue to compromise continuity of care for many patients visiting multiple HCPs. Further, technological advances will not necessarily address improvements regarding the quality of information exchanged between HCPs and patients.

Conclusion

In conclusion, this study has found that the quality of discharge communication for chronic NCD patients visiting public healthcare facilities in Himachal Pradesh and Kerala states in India is currently suboptimal. As a consequence of this, many patients with ongoing health needs are leaving hospitals with insufficient levels of information and/or understanding to be able to facilitate continuity of care and adequately manage their NCD/s. The findings have also evidenced significant associations between low-quality discharge communication and health outcomes at five and eighteen weeks follow-up. Whilst these associations must be interpreted with caution, overall this study has highlighted a pressing need for the wide-scale implementation of structured protocols, documents and training to improve the exchange of key discharge information between HCPs and between HCPs and patients. With the rising burden of NCDs across India and other LMICs, the findings from this study are timely and crucial for effective health systems development. Regarding future research, additional in-depth investigation is required to elucidate the validity of relationships between discharge communication and

health outcomes. It is also important that further robust LMIC studies are conducted to continue exploring the critical factors affecting the continuity and safety of NCD patient care and develop sustainable, cost-effective interventions.

Supporting information

S1 Appendix. Copy of previous handover research study questionnaire used as basis for current study questionnaire.
(PDF)

S2 Appendix. Baseline characteristics and adverse health outcomes by study site.
(PDF)

S3 Appendix. Exemplar picture of a structured discharge slip.
(PDF)

S4 Appendix. Summary flowchart of participant inclusion and exclusion throughout the study.
(PDF)

S5 Appendix. Results of all unadjusted regression analyses.
(PDF)

S6 Appendix. Summary of goodness-of-fit test results for all adjusted multivariate analyses.
(PDF)

S7 Appendix. Summary of results and goodness-of-fit test results for all sensitivity analyses.
(PDF)

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7. HEALTHCARE PROVIDER TRAINING, PROCEDURES AND PROTOCOLS FOR HANDOVER COMMUNICATION IN HIMACHAL PRADESH AND KERALA STATES, INDIA

Internationally there has been growing recognition of the disconnect between the recognised significance of handover for continuity and safety of care, subsequent expectations for practice and the emphasis actually received during medical education and training.[1 2] Across India, literature focussing on medical curricula has also reported deficiencies in the availability and structure of HCP communication skills training.[3-6] However, to the best of the author's knowledge, there has yet to be specific investigation of training, procedures and protocols in place for handover communication in India.

The cross-sectional study reported in this chapter investigates private and public HCP training, procedures and protocols for handover communication in Himachal Pradesh and Kerala states, India. It also explores HCP attitudes regarding barriers to handover communication between levels of care.

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Healthcare provider training, procedures and protocols for handover communication in Himachal Pradesh and Kerala states, India: a cross-sectional study

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7.1 Abstract

OBJECTIVES: Primary: To investigate healthcare provider (HCP) training, procedures and protocols in place for handover communication in Himachal Pradesh and Kerala states, India. **Secondary:** To explore HCP perceptions of barriers to improving handover communication.

METHODS: Design: Descriptive, cross-sectional study. **Setting:** Three private hospitals, seven public hospitals, three community health centres and three primary health centres across Himachal Pradesh and Kerala. **Participants:** 132 HCPs (nurses and doctors) with a minimum of 12 months of professional experience. Piloted questionnaires were completed covering handover training, local procedures, state-wide protocols and barriers to handover communication. Relevant policy, guideline and training documents were also sought through expert consultations and online searches of relevant public and private healthcare resources.

RESULTS: The minority of HCPs reported receiving structured training for transferring information during shift-change handover (37%), primary to secondary care referral (24%) and hospital discharge (11%). The commonest reported local procedure for referral and discharge communication was giving letters/forms to patients (75.0%). HCPs most frequently considered the following barriers as “highly applicable” to improving referral and discharge communication: excessive workload (46% & 50%), poor health systems integration (50% & 48%) and poor health systems in general (47% & 45%). One tertiary private hospital in Kerala was found to have policies for handover. Documents regarding national voluntary accreditation schemes for assessing the quality of public and private healthcare were also found, which mandated the use of structured information exchange protocols. No further policies, guidelines or training documents regarding handover communication were identified for public or private facilities.

CONCLUSIONS: A paucity of structured and standardised HCP training and protocols in place for handover communication may be compromising continuity of patient care and overall health systems integration in Kerala and Himachal Pradesh states, India. Wide-scale implementation of relevant policies, protocols and quality control measures are required to improve HCP awareness and practice regarding the transfer of critical healthcare information.

7.2 Introduction

Handover communication takes place during transitions of patient care (i.e. handovers/handoffs) and is therefore essential for safe and continuous care; it is defined as “the passing of patient-specific information from one caregiver/team of caregivers to the next and from caregivers to the patient and family in order to ensure care continuity and safety”.[1] Such communication is also a critical element of facilitating health systems integration, given its frequent occurrence both within hospitals (i.e. during shift-change, patient discharge consultations and intra-hospital referrals and transfers) and between healthcare facilities (i.e. during inter-facility referrals and transfers and forwarding of patient discharge information from hospital to primary/community care HCPs). Effective integration and coordination between HCPs are particularly vital for patients whose needs extend beyond a single episode of care.

One group of patients requiring effective ongoing care that is growing within India and numerous low and middle-income countries (LMICs) is those with chronic non-communicable diseases (NCDs). Currently, chronic NCDs are attributed to over half of all deaths in Asia and the World Health Organization (WHO) has estimated that chronic NCDs will cause 7 out of 10 LMIC deaths by 2020.[2 3] Given this growing disease burden, the need for effective methods of transferring healthcare information has become increasingly significant. Over the past decade the WHO Collaborating Centre for Patient Safety Solutions and multiple high-income nations have published reports suggesting actions for improving handover communication practices.[1 4 5] However, these have predominantly concluded that comprehensive evidence and policies remain lacking and a recent review of the LMIC literature has also evidenced a dearth of high-quality interventional research.[1 4-6]

More recently, the WHO has established “World Patient Safety Day” – the first took place on the 17th of September 2019 – to raise global awareness surrounding issues

affecting patient safety, one of which is communication between healthcare providers (HCPs).[7] This is critical given that miscommunication and poor handovers in healthcare remain major causes of serious adverse events for patients, including unplanned readmissions following hospital discharge and premature or preventable death.[8-10] The global scale of this awareness-raising is significant as patient safety initiatives have historically received less priority across LMICs. In addition, integrative challenges have been intensified in many LMIC settings where healthcare is fragmentally spread across numerous HCPs.[11] This is particularly true of India, where the healthcare environment has become increasingly complex due to a growing presence and popularity of unregulated private HCPs.[12]

Whilst limited to predominantly single-site and hospital-based studies, the small amount of handover communication studies conducted in India has evidenced issues of deficient practices and protocols for shift-change, referral and discharge communication.[13-18] In addition, research focussing on patient safety in India has evidenced negative HCP perceptions regarding hospital handover practices, health systems functioning, medical culture and available safety training/education.[19 20] Additional challenges reported as hindering patient safety efforts across India include: fragmented patient safety research activities and dissemination, a lack of standardised guidelines for patient safety in public healthcare facilities and a deficiency of private hospitals implementing patient safety procedures.[21]

As a result of these challenges and the relative lack of comprehensive handover communication research in India and many other LMICs, this study forms part of a series completed for a project investigating handover and continuity of care for chronic NCD patients in Kerala and Himachal Pradesh states, India. Two studies that have already been disseminated as part of the project have focussed on HCP and patient reports of handover and healthcare communication during chronic NCD outpatient and

inpatient care.[22 23] Findings from both have indicated similar issues regarding suboptimal recording and exchange of patient information, a lack of formal handover communication systems within and between levels of care and deficient HCP education and training regarding handover.[22 23] Given the emerging issues surrounding the deficiencies of relevant systems and training, the primary objective of this study was to investigate HCP training, procedures and protocols currently in place for handover communication within and between levels of healthcare in Kerala and Himachal Pradesh states, India. A secondary objective was to explore HCP perceptions of barriers to improving handover communication.

7.3 Methods

7.3.1 Overview

The study was conducted in Himachal Pradesh and Kerala states in India between December 2014 and November 2015. HCPs with a range of professional experience and from a mixture of public and private healthcare facilities were interviewed to capture a broad range of information regarding training, procedures and protocols in place for handover communication, as well as perceived barriers to improving handover communication. In addition, public and private HCPs were consulted and online searches were conducted to find policy, guideline and training documents relevant to handover communication in both states to review.

7.3.2 Ethical considerations

This study was reviewed and approved by the Amrita Institute of Medical Sciences Institutional Ethics Committee, India and the Centre for Chronic Disease Control Independent Ethics Committee, India.

7.3.3 Study Setting

This study was conducted from December 2014 to November 2015 and utilised convenience sampling to include as many healthcare facilities and staff as possible within the study settings. Initially, HCPs in one secondary public hospital and one Primary Health Centre (PHC) in Himachal Pradesh and one secondary public hospital, one tertiary public hospital and one PHC in Kerala were recruited, as these facilities were situated within large cities/districts and a range of geographical environments (i.e. urban, peri-urban and rural). Following this, researchers approached other public and private healthcare facilities to identify and recruit further HCPs. Overall, HCPs were recruited from sixteen healthcare facilities: one private hospital, four public hospitals, one Community Health Centre (CHC) and two PHCs in Himachal Pradesh and two private hospitals, three public hospitals, two CHCs and one PHC in Kerala. See supplementary file S1 for additional information regarding the Indian healthcare system and study settings.

7.3.4 Recruitment

Inclusion criteria for questionnaire participants were HCPs with twelve months or more of professional experience working in the studied healthcare facilities, to ensure that they would be familiar with facility-specific, as well as local and statewide practices, policies and protocols. Due to the busy nature of the study settings, opportunistic

sampling was used to recruit as many HCPs as possible with a range of roles and experience. Researchers attended healthcare facilities during all ranges of operational hours over the study period. Prior to data collection, HCPs were provided with a study information sheet, verbally informed about the purpose of the research and written consent was obtained.

Due to the lack of prior work completed in the field of study, the sample size for this study was calculated using a formula to determine the minimum sample size needed to estimate a population mean with confidence limits of 5% for a variable with a prevalence of 50% (such as the proportion of HCPs receiving structured handover training). The formula used was: Necessary Sample Size = (Z-score)^2 * StdDev*(1-StdDev) / (margin of error)^2.[24] Based on our parameters this worked out as 384.16. Therefore, we aimed to collect survey data from a minimum of 385 HCPs.

7.3.5 Data collection

7.3.5.1 *Questionnaire*

The questionnaire used in this study was developed using components of the Agency for Healthcare Research and Quality's Hospital Survey on Patient Safety Culture.[25] It was further supplemented with questions based on relevant handover communication literature and input from expert researchers in the UK and India. The questionnaire was then piloted across two study hospitals (involved in the main data collection) in Kerala over three rounds prior to the commencement of the study. This process helped to ensure that the questionnaire was comprehensible and contextually appropriate.

Six researchers completed data collection. To facilitate consistency in the data collection process, all researchers received training on research ethics, administering questionnaires and standardised data collection methods before commencing the

study. HCPs were interviewed by researchers using the questionnaire in their office; questionnaires were printed English and interviews were conducted in the preferred language of the interviewee. The first part of the questionnaire collected information regarding participant demographics and professional healthcare experience. The remainder covered training, procedures, protocols and perceived barriers to handover communication. The majority of the questionnaire was structured, with some spaces for open-ended elaboration regarding professional designation, specialty and when the answer “other” was available.

7.3.5.2 *Policy, guidelines and training related to handover communication*

Following the completion of questionnaires, HCPs were asked by researchers if they were aware of information and/or documents relating to legislation, policy, guidelines and training regarding handover communication. If they were, they were then asked to explain if/where the information and/or documents could be found.

In addition to asking HCPs, the lead Indian and UK researchers (SJ & CH) searched online for publicly available documents regarding legislation, policy, guidelines and training for handover communication in healthcare facilities in Himachal Pradesh and Kerala states, India. For public facilities, the national and state-level Indian government and Ministry of Health and Family Welfare websites were searched for relevant documents and information using key phrases such as “handover”, “handoff”, “shift-change“, “discharge”, “referral” and “transfer”. For private facilities, individual organisation websites were searched using the same phrases.

Further, on the 11th of October 2015, a handover expert meeting took place in New Delhi, India, to present preliminary findings from the handover development project and discuss possible interventions. Given the broad range of representatives (n=27) from

international, Indian national and state-level healthcare organisations, meeting participants were also consulted to help identify relevant information and/or documents relating to handover communication in the study areas. Meeting participants included representatives from the following organisations: The World Health Organization (country and regional offices); The World Bank; ACCESS Health International; The Ministry of Health and Family Welfare; The Public Health Foundation of India; The National Centre for Disease Control; The Centre for Chronic Disease Control; The National Health System Resource Centre; The All India Institute of Medical Sciences; Aga Khan Health Services; AMRITA Institute of Medical Sciences and Fortis Hospitals.

7.3.6 Analysis

7.3.6.1 *Questionnaires*

Questionnaire data was input into Microsoft Excel and initially cleaned by the lead researcher in India (SJ). Once data collection and inputting was complete, the dataset was sent to the lead UK research (CH) to be further cleaned and analysed. Minor issues regarding missing information and inconsistencies were resolved via consultation with SJ prior to completing analysis. Data was analysed using STATA 13 and descriptive statistics (i.e. numbers and/or percentages) were used to outline all results.

7.3.6.2 *Policy, guidelines and training documents*

Due to the descriptive nature of the study, a narrative approach was utilised to summarise the contents of relevant healthcare documents relating to handover communication training, policies and/or guidelines. The lead UK researcher (CH) read

all documents several times to obtain a full understanding of the contents and subsequently provide an accurate summary.

7.4 Results

7.4.1 Questionnaire participant demographics

A total of 132 HCPs completed questionnaires, the majority of whom were female (n=61) and aged between 18-39 years (n=98, 74.3%). The highest medical qualification most frequently reported amongst HCPs was a postgraduate specialty degree (40.1%) and the majority HCPs worked in private hospitals (60.6%), followed by public hospitals (24.2%) and community health centres (9.1%). HCPs had a range of professional designations – the majority were hospital resident doctors (37.9%), followed by nurses (14.4%), medical officers (13.6%) and consultants (13.6%). Two hospital superintendents also participated (Table 7.1). HCPs also had a range of specialities; see supplementary file S3 for a summary of reported HCP specialties and HCP demographics by study area.

Table 7.1 Questionnaire participant demographic information

Characteristic	Males (n=61) No. (%)	Females (n=71) No. (%)	Total (n=132) No. (%)
Age group (Years)			
18–39	42 (68.9)	56 (78.9)	98 (74.3)
40–59	17 (27.9)	13 (18.3)	30 (22.7)
≥60	2 (3.3)	2 (2.8)	4 (3.0)
Highest medical qualification			
MBBS / BAMS*	19 (31.1)	25 (35.2)	44 (33.3)
Postgraduate specialty degree	31 (50.8)	22 (31.0)	53 (40.1)
Super specialty degree / PhD	9 (14.8)	1 (1.4)	10 (7.6)
Other	2 (3.3)	22 (31.0)	24 (18.2)
***No data*†**	0 (0)	1 (1.4)	1 (0.8)
Current place of work			
Private hospital	35 (57.4)	45 (63.4)	80 (60.6)
Public hospital	19 (31.1)	20 (28.2)	39 (29.5)
Community health centre	5 (8.2)	5 (7.0)	10 (7.6)
Primary health centre	2 (3.3)	1 (1.4)	3 (2.3)
Current designation			
Nurse	1 (1.6)	18 (25.4)	19 (14.4)
General practitioner	2 (3.3)	0 (0)	2 (1.5)
Medical officer	33 (54.1)	35 (49.3)	68 (51.5)
Anesthetist	1 (1.6)	0 (0)	1 (0.8)
Surgeon	4 (6.6)	0 (0)	4 (3.0)
Consultant	13 (21.3)	5 (7.0)	18 (13.6)
Professor	4 (6.6)	6 (8.5)	10 (7.6)

Table 7.1 (Continued) Questionnaire participant demographic information

Characteristic	Males (n=61) No. (%)	Females (n=71) No. (%)	Total (n=132) No. (%)
Current designation			
Superintendent	0 (0)	2 (2.8)	2 (1.5)
***No data*†**	3 (4.9)	5 (7.0)	8 (6.1)
Previous places of work§			
Public teaching hospital	30 (49.2)	22 (31.0)	52 (39.4)
Public district hospital	23 (37.7)	32 (45.1)	55 (41.7)
Private hospital	37 (60.7)	34 (47.9)	71 (53.8)
Primary health centre	31 (50.8)	19 (26.8)	50 (37.9)

* MBBS = Bachelor of Medicine and Bachelor of Surgery / BAMS = Bachelor of Ayurvedic Medicine and Surgery
† No data = missing responses
§ Participants could select more than one answer

7.4.2 Handover communication training

7.4.2.1 *Hospital shift-change*

A total of 49 (37%) HCPs reported that they had received structured training for transferring information during hospital shift-change and 17 (35%) of those reported that the training is promoted/regulated nationally. Concerning availability, the majority of HCPs who had received training (65%) reported that it was only available for hospital doctors. The commonest type of shift-change handover training reported to have been received was university undergraduate clinical training (41%), followed by in-service training in public hospitals (29%) (Table 7.2).

7.4.2.2 *Primary care referral notes and hospital discharge notes*

A total of 31 (24%) HCPs reported that they had received structured training for writing referral notes from primary care to hospitals and 11 (35.5%) of those reported that the training is promoted/regulated nationally. A total of 14 (11%) HCPs reported that they had received structured training for writing hospital discharge notes and of those 2 reported that the training is promoted/regulated nationally. Half (50%) of all HCPs reported that they had not received structured training for either primary care referral notes or hospital discharge notes (Table 7.2).

Table 7.2 HCP reports regarding handover communication training

Training	No.	%
HCP has received structured training for primary care referral notes or hospital discharge notes		
Yes – for primary care referral notes	31	23.5
Yes – for hospital discharge notes	14	10.6
No (neither)	66	50.0
Unsure	8	6.1
No data*	13	9.8
Primary care referral notes - training is promoted or regulated nationally	**(n=31)**	
Yes	11	35.5
No	10	32.3
Unsure	7	22.6
No data*	3	9.7
Hospital discharge notes - training is promoted / regulated nationally	**(n=14)**	
Yes	2	14.3
No	3	21.4
Unsure	5	35.7
No data*	4	28.6

Table 7.2 (Continued) HCP reports regarding handover communication training

HCP has received structured training for transferring information during hospital shift-change	(n=132)	
Yes	49	37.1
No	77	58.3
Unsure	6	4.5
Training is promoted / regulated nationally		
Yes	17	34.7
No	16	32.7
Unsure	15	30.6
No data*	1	2.0
Availability of training	**(n=49)**	
Only for hospitals doctors	32	65.3
Includes other healthcare staff	7	14.3
Unsure	7	14.3
No data	3	6.1
Type of training received†		
Undergraduate clinical training in University	20	40.8
In-service training in most public hospitals	14	28.6
Training in only a few teaching hospitals	11	22.4
Training in most private hospitals	7	14.3
Training in only a few private hospitals	6	12.2
Unsure	4	8.2
No data*	4	8.2

* No data = missing responses
† Participants could select more than one answer

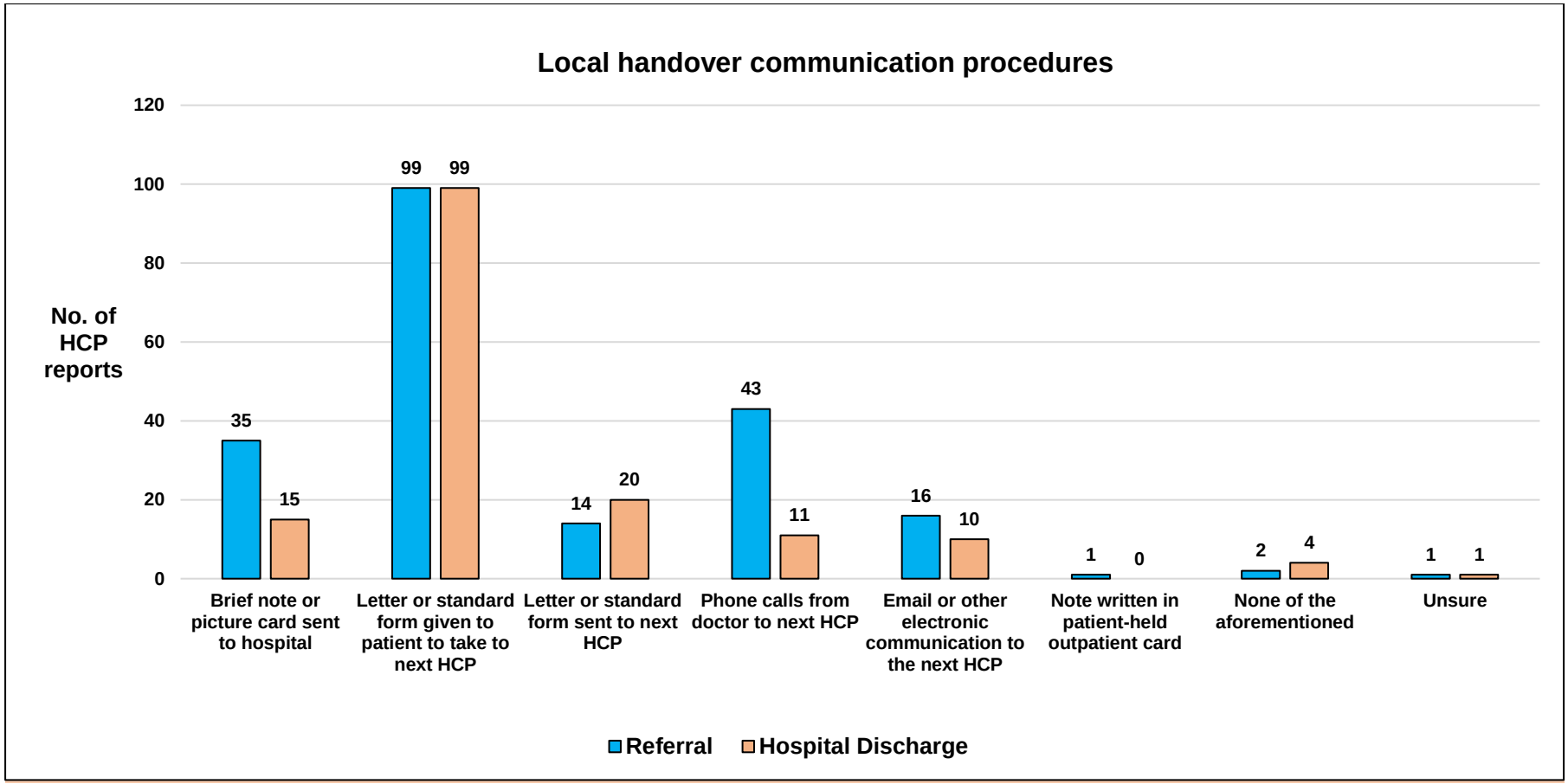
7.4.3 Local handover communication procedures

7.4.3.1 *Referral to hospital*

The majority of HCPs (n=99, 75%) reported that a letter/standard referral form is given to patients to take with them during referrals to the hospital. The next most frequently reported procedures were phone calls being made from the doctor to the hospital (n=43, 32%) and brief notes/picture cards being sent to the hospital (n=35, 27% - Figure 7.1).

7.4.3.2 *Hospital* discharge

The majority of HCPs reported that patients are given standard discharge forms to take with them to primary care (n=99, 75%). The next most common procedures reported were letters/standard discharge forms (n=20, 15%) and brief notes/pictures cards (n=15, 11%) being sent to primary care (Figure 7.1).



*****There were five missing responses regarding procedures for referral and five missing responses regarding procedures for hospital discharge

Figure 7.1 Bar chart displaying results of HCP reports of local handover communication procedures

7.4.4 Healthcare facility protocols for monitoring quality of patient records

The commonest response regarding whether a protocol for supervisory checks of patient records was in use in their healthcare facility from HCPs was that it is always used (n=46, 35%), closely followed by it is occasionally used (n=44, 33%). With regard to a protocol of clinical audits of patient records, the commonest response was that it is occasionally used (n=49, 37%). A notable proportion of other HCPs reported that this protocol does not exist in their facility (n=21, 16%) (Table 7.3).

Table 7.3 HCP reports of the use of protocols for monitoring quality of patient records in their healthcare facility

Supervisory checks of patient records – Frequency of use	Private Hospitals (n=80) No. (%)	Public Hospitals (n=39) No. (%)	Public CHCs (n=13) No. (%)	Public PHCs (n=3) No. (%)	Total (n=132) No. (%)
Always used	**37 (46.3)**	9 (23.1)	0 (0)	0 (0)	**46 (34.8)**
Occasionally used	18 (22.5)	**20 (51.3)**	**4 (30.8)**	**2 (66.7)**	44 (33.3)
Hardly ever used	6 (7.5)	1 (2.6)	2 (15.4)	0 (0)	9 (6.8)
Does not exist	0 (0)	4 (10.3)	**4 (30.8)**	1 (33.3)	9 (6.8)
Unsure	13 (16.3)	1 (2.6)	0 (0)	0 (0)	14 (10.6)
*No data**	*6 (7.5)*	*4 (10.3)*	*0 (0)*	*0 (0)*	*10 (7.6)*
Doctors doing a clinical audit of a selection of patient records for completeness and quality – Frequency of use					
Always used	**24 (30.0)**	6 (15.4)	0 (0)	0 (0)	30 (22.7)
Occasionally used	**24 (30.0)**	**20 (51.3)**	4 (30.8)	1 (33.3)	**49 (37.1)**
Hardly ever used	7 (8.8)	1 (2.6)	1 (7.7)	0 (0)	9 (6.8)
Does not exist	8 (10.0)	6 (15.4)	**5 (38.5)**	**2 (66.7)**	21 (15.9)
Unsure	12 (15.0)	1 (2.6)	0 (0)	0 (0)	13 (9.8)
*No data**	*5 (6.3)*	*5 (12.8)*	*0 (0)*	*0 (0)*	*10 (7.6)*

*No data = missing responses

7.4.5 Statewide written handover communication protocols in public healthcare facilities

The majority of HCPs reported that all but two of the listed statewide protocols are always used in public healthcare facilities. However, there was variation in reports of the use of each protocol; for example, whilst the use of discharge summaries was predominantly reported to always be used (n=71, 54%), a notable proportion of others reported that it is hardly ever used (n=15, 11%). Protocols regarding computer-based patient records and computer-based test results being saved for reference were reported by the majority of HCPs to not exist (n=42, 32% for both) (Table 7.4).

Table 7.4 HCP reports of the use of statewide written handover communication protocols in public healthcare facilities

Frequency of use	Referral notes to be sent from primary care to hospitals during patient referrals	Daily doctors' notes in paper-based patient records or regularly writing in patient case notes	Daily nurses' notes in patient case notes	Computer-based patient records	Summary of patient records for hospital discharge in a paper-based or computer-based format	Hardcopy test results filed in patient records	Computer-based test results saved for reference
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Always used	**67 (50.8)**	**88 (66.7)**	**78 (59.1)**	29 (22.0)	**68 (51.5)**	**71 (53.8)**	39 (29.5)
Occasionally used	29 (22.0)	22 (16.7)	20 (15.2)	21 (15.9)	19 (14.4)	22 (16.7)	13 (9.8)
Hardly ever used	13 (9.8)	3 (2.3)	5 (3.8)	7 (5.3)	15 (11.4)	11 (8.3)	5 (3.8)
Does not exist	5 (3.8)	0 (0)	6 (4.5)	**42 (31.8)**	8 (6.1)	8 (6.1)	**42 (31.8)**
Unsure	10 (7.6)	9 (6.8)	9 (6.8)	21 (15.9)	12 (9.1)	6 (4.5)	18 (13.6)
*No data**	*8 (6.1)*	*10 (7.6)*	*14 (10.6)*	*12 (9.1)*	*10 (7.6)*	*14 (10.6)*	*15 (11.4)*

*No data = missing responses

7.4.6 Perceptions of barriers to improving referral and discharge handover communication

7.4.6.1 *Referral*

HCPs felt that the majority of the stated barriers to improving referral information were very applicable. In particular, excessive workload/time pressure (n=61, 46%), poor health systems integration/guidelines (n=66, 50%) and poor health systems in general (n=62, 47%) received the most reports of being very applicable. A lack of resources was predominantly deemed to be moderately applicable (n=40, 30%) (Table 7.5).

7.4.6.2 *Hospital discharge*

Similar to referral communication, overall HCPs felt that the majority of stated barriers to improving discharge communication were very applicable. Again, the 3 most commonly reported barriers considered to be very applicable were excessive workload/time pressure (n=66, 50%), poor health systems integration/guidelines (n=63, 48%) and poor health systems in general (n=60, 45%). Lack of involvement/interest/care from family/carer/patient about discharge notes was predominantly deemed to be moderately applicable (n=40, 30%) (Table7.5).

Table 7.5 HCP perceptions regarding the applicability of barriers to improving handover communication during referral and hospital discharge

Barriers to improving referral notes/patient information that primary care staff pass on to hospital doctors	**Unsure**	**Not Applicable**	**Not Very Applicable**	**Moderately Applicable**	**Very Applicable**	*No data**
	No. (%)	**No. (%)**	**No. (%)**	**No. (%)**	**No. (%)**	*No. (%)*
Lack of timely communication	0 (0)	16 (12.1)	14 (10.6)	34 (25.8)	**60 (45.4)**	*8 (6.1)*
Excessive workload/time pressure of healthcare staff	2 (1.5)	9 (6.8)	11 (8.3)	41 (31.1)	**61 (46.2)**	*8 (6.1)*
Lack of resources	2 (1.5)	13 (9.8)	31 (23.5)	**40 (30.0)**	37 (28.0)	*9 (6.8)*
Lack of involvement/interest/care from family/carer/patients about referral notes	1 (0.8)	15 (11.4)	32 (24.2)	37 (28.0)	**40 (30.0)**	*7 (5.3)*
Poor health system integration/ guidelines between institutions	2 (1.5)	15 (11.4)	13 (9.8)	30 (22.7)	**66 (50.0)**	*6 (4.5)*
Poor health systems in general	2 (1.5)	15 (11.4)	17 (12.9)	30 (22.7)	**62 (47.0)**	*6 (4.5)*
Barriers to improving discharge information that hospital doctors pass on to primary care doctors						
Poor patient record keeping in hospitals	3 (2.3)	16 (12.1)	13 (9.8)	33 (25.0)	**58 (43.9)**	*9 (6.8)*
Lack of timely communication	1 (0.8)	14 (10.6)	17 (12.9)	34 (25.8)	**56 (42.4)**	*10 (7.6)*
Excessive workload/time pressure of healthcare staff	2 (1.5)	9 (6.8)	7 (5.3)	34 (25.8)	**66 (50.0)**	*14 (10.6)*
Lack of resources	3 (2.3)	17 (12.9)	21 (15.9)	37 (28.0)	**44 (33.3)**	*10 (7.6)*
Lack of involvement / interest / care from family / carer / patients about discharge notes	2 (1.5)	16 (12.1)	23 (17.4)	**40 (30.0)**	34 (25.8)	*17 (12.9)*
Poor health system integration / guidelines between institutions	2 (1.5)	8 (6.1)	14 (10.6)	29 (22.0)	**63 (47.7)**	*16 (12.1)*
Poor health systems in general	2 (1.5)	8 (6.1)	17 (12.9)	30 (22.7)	**60 (45.4)**	*15 (11.4)*

*No data = missing responses

7.4.7 Policy, guidelines and training documents related to handover communication

A total of 132 HCPs who completed questionnaires and 27 representatives of international, Indian national and state-level public and private healthcare organisations were consulted regarding the existence of relevant policy, guideline and/or training documents. Following these consultations and the completion of searches for publicly available materials by researchers, 12 documents were identified and reviewed (Table 7.6). All were written in English and consisted of policies (n=3) at one private tertiary hospital and accreditation/certification standards for the quality of private/public healthcare (n=9).

None of the public healthcare facilities involved in this study were accredited/certified at the time of data collection. In addition, no mandatory handover communication policy, guideline or training documents were found to be in place for public healthcare facilities at national or state level within Himachal Pradesh or Kerala.

Table 7.6 Summary of reviewed policy and guideline documents

Private hospital policy documents		
Title of document	**Year of publication**	**Authoring organisation**
Discharge summary policy	2013	Private tertiary referral hospital, Kerala
Initial assessment policy	2013	Private tertiary referral hospital, Kerala
Policy for transfer of patients from other hospitals	2013	Private tertiary referral hospital, Kerala
Accreditation/certification standards documents		
Title of document	**Year of publication**	**Authoring organisation**
Kerala accreditation standards for hospitals - 2nd edition	2013	National Rural Health Mission Kerala, Ministry of Health and Family Welfare, Government of India
Operational guidelines for quality assurance in public health facilities	2013	National Health Mission, Ministry of Health and Family Welfare, Government of India
Assessor's guidebook for quality assurance in community health centres (first referral unit)	2014	National Health Mission, Ministry of Health and Family Welfare, Government of India
Assessor's guidebook for quality assurance in district hospitals – volume 2	2014	National Health Mission, Ministry of Health and Family Welfare, Government of India
Assessor's guidebook for quality assurance in primary health centres (24X7)	2014	National Health Mission, Ministry of Health and Family Welfare, Government of India
Guide book to accreditation standards for small healthcare organisations	2014	National Accreditation Board for Hospitals and Healthcare Providers
Guide book to accreditation standards for hospitals - 4th edition	2015	National Accreditation Board for Hospitals and Healthcare Providers
Quality standards for urban primary health centres	2015	National Health Mission, Ministry of Health and Family Welfare, Government of India
Annexures - 2nd edition	2016	National Accreditation Board for Hospitals and Healthcare Providers

7.4.8 Private hospital policy documents

During expert consultations, a manager at a private tertiary referral hospital in Kerala shared three hospital policy documents containing handover-related information. One of the documents was an “initial patient assessment policy”, which contained a section titled “responsibilities of involved disciplines”. This included details regarding necessary information exchange during shift-change and patient transfers between units. Other policy documents included the “policy for transfer of patients from other hospitals” and the “discharge summary policy”, containing details of necessary information exchange during these transitions. The manager reported that whilst such policies and supporting structured medical documentation existed, implementation was not 100% due to many physicians choosing to follow their own “working style”. It was also reported that the hospital had received accreditation from the National Accreditation Board for Hospitals & Healthcare Providers (NABH) in 2010; this is considered the apex of national accreditation regarding the quality of healthcare in India and caters to both public and private facilities.[26]

7.4.9 Accreditation/certification standards documents

Consultations with clinicians and public health staff revealed that there are national and state-level accreditation/certification programmes for healthcare facilities that have been set up to improve the safety and quality of care provided. These programmes are voluntary to undertake and include standards relating to medical record keeping and patient information exchange during handovers.

7.4.9.1 *National level*

Two publicly available NABH accreditation standards documents (published in 2014 and 2015) for small healthcare organisations and hospitals were found. Within these documents, the presence of good-quality record keeping and formal information exchange procedures for referrals, transfers, shift-change handovers and discharge is part of the requirements. During the data analysis and document review period for this study, another NABH annexure document (April 2016) was also released that includes generalised advice to healthcare facilities regarding the importance of communication during healthcare delivery and provides basic information regarding examples of protocols that could be used for handovers within and between levels of care.

In addition, five publicly available National Quality Assurance Standards (NQAS) certification programme documents were found; this programme was established in 2013 specifically for public healthcare facilities.[27] Within the documents (published from 2013 to 2015) it was found that operational guidelines and assessor's guidebooks have been released for district hospitals, community health centres and primary health centres; similar to NABH standards, the presence of good-quality record keeping and formal information exchange procedures for referrals, transfers, shift-change handovers and discharge form part of the clinical care requirements.

7.4.9.2 *State level - Kerala*

At the state level, public health systems experts and clinicians working in Kerala reported that the state department for Health and Family Welfare had held an executive committee in 2010 to develop standards for state-level NABH accreditation. Within a publicly available accreditation standards for hospitals document published in 2013, it was found that Kerala's NABH standards also require the presence of good-quality

record keeping and formal information exchange procedures for referrals, patient transfers and discharge. However, no requirements for shift-change handover procedures were found.

7.5 Discussion

7.5.1 Main findings

This study presents findings on HCP training, procedures and protocols for handover communication and perceptions of barriers to improving handover communication in Himachal Pradesh and Kerala states, India. The main findings are that there appears to be a notable lack of HCP handover communication training, inconsistent use of patient information exchange procedures and a paucity of policies, guidelines and protocols in place for handover communication across public healthcare facilities. Referral and discharge communication were also reported to be predominantly facilitated via medical information carried by patients (i.e. patient-held documents), indicating limited formal integration between healthcare facilities. In addition, several system-based barriers to improving referral and discharge communication, such as excessive workloads/time pressures, poor integration between healthcare facilities and poor health systems in general, were considered to be highly applicable by HCPs. This suggests that there is a lack of sufficient human resources and infrastructure in place within the study areas of India to support HCPs in ensuring high-quality handover communication. Overall, the findings demonstrate that the significance of handover communication for continuity and safety of care has been largely overlooked, particularly across public healthcare facilities. They also highlight a pressing need for the systematic application of handover policies, guidelines and monitoring. As far as

the authors' are aware, this is the first study to specifically investigate HCP training, procedures and protocols for handover communication in Himachal Pradesh and Kerala states, India. The findings are significant given the key role that effective handover can play in strengthening pressurised health systems across India.

The results from this study evidencing a deficiency in training opportunities for HCPs regarding information exchange during referrals, hospital discharge and shift-change reflect findings from the previously disseminated studies carried out as part of the India handover project.[22 23] During interviews, multiple outpatient and inpatient HCPs reported that they had not received any handover training at medical school or whist working.[22 23] Reports from HCPs in the current study also indicated a possible disparity of shift-change handover training being provided to hospital doctors more regularly than to nurses and other HCPs. In general, such issues are reflective of the literature focussing on Indian medical curricula, which has continually reported deficiencies in the availability and structure of communication skills and patient safety training.[21 28-31] This appears to an international issue, with a lack of education surrounding communication and handover also being noted as an issue in medical schools and healthcare facilities across a number of HICs.[32-35] More recent studies from medical colleges in India have shown that teaching and assessing basic communication skills at an undergraduate level can improve clinical competency and doctor-patient relationships.[36 37]

With regard to local procedures for referral and discharge communication, this study has shown that despite some good practice there is inconsistency in methods used and minimal direct contact between HCPs, which is increasing the possibility of fragmented information transfer and subsequently poor continuity of patient care. The finding that the majority of HCPs reported giving letters/forms to patients to take to the next HCP reflects findings from the outpatient study in the same study areas of India, which evidenced the provision of largely unstructured patient-held documents to chronic NCD

outpatients during referrals.[23] Whilst such documents are a pragmatic method in health systems that lack formal communicative channels, findings from the same study areas in India indicate that they can contribute to fragmented information exchange because a) documents often do not contain all the information necessary to facilitate effective continuity of care and b) patients do not always transport their documents;[23] similar issues regarding patient-held documents have also been identified in Mongolia.[38] In addition, the most commonly reported method of direct HCP to HCP communication between levels of care in this study was phone calls during referrals. Whilst this seems like a practical and potentially efficient method of communication, the inpatient study in the same areas of India indicated that HCPs may only make referral calls if they are familiar with the patient and/or referring HCP.[22] These findings suggest that current handover communication practices between primary and secondary care lack structure and equity, which is likely to be hindering critical information transfer for many patients.

Furthermore, HCP reports and an absence of relevant protocol, guideline and training documents found across Himachal Pradesh and Kerala suggest that there is deficient use of quality assurance methods (i.e. supervisory checks and clinical audits) for in-house medical record keeping, particularly across public healthcare facilities. It is also of note that more than 40% of HCPs considered poor hospital record keeping to be a highly applicable barrier to improving discharge communication between hospital and primary care HCPs. These findings are in line with previous research from India that has reported a lack of standardised and often poor-quality medical record keeping in hospitals.[39] One possible explanation that has been given for this is a lack of legal requirements for clinical audits to be conducted to improve the quality of in-patient care.[39 40] In addition, high patient volumes in public healthcare facilities have been shown to contribute to the low prioritisation of record keeping, with HCPs choosing to focus on patient care rather than writing notes.[40] In the private sector, the absence of

government regulations by way of incentive has also been posited as a reason for low-quality record keeping.[39] Overall, deficiencies in medical record keeping is a critical issue for patient safety, as high-quality and accessible clinical information is required to provide effective ongoing care. A lack of quality assurance methods also poses a threat to overall quality of care, as audits play a key role in monitoring practice and facilitating quality improvement strategies.

As well as medical record-keeping, conflicting HCP reports indicated a lack of awareness regarding the existence of formal protocols in place for written handover communication regarding patient records, documenting test results and writing referral and discharge notes across public healthcare facilities in Himachal Pradesh and Kerala. Subsequent searches for relevant national and statewide documents revealed an absence of formal policies and guidelines for public healthcare facilities in both states. One private hospital was found to have specific policies and structured documents for handover practices, although a senior manager indicated that actual implementation lacks consistency as physicians can choose their own “working style”.

The only other formal requirements found for healthcare facilities to have structured protocols for healthcare information exchange came from national accreditation/certification schemes, which are voluntary to undertake. One autonomous national accreditation system – ran by NABH – was established in 2006 by the Quality of Council of India, which is the quality standards accreditation body for the government of India. NABH accreditation operates on par with global benchmarks and caters to both public and private healthcare organisations.[26] In 2010 the government in Kerala (a wealthy state with high levels of education and health awareness) also began developing state-specific NABH accreditation, but the same could not be found in Himachal Pradesh.[26 27] The publicly available accreditation standards for Kerala are recognised as a “halfway camp” to full NABH accreditation. More recently, in 2013

another accreditation system - NQAS - was established specifically for public healthcare facilities by the National Health Systems Resource Centre, which is the technical support institute for the National Health Mission of the government of India.[27] NQAS certified facilities are provided with financial incentives in recognition of their achievements. Whilst these accreditation schemes are positive developments for raising awareness of optimal practice and providing guidelines to improve quality of healthcare, reports indicate that their implementation remains sporadic throughout India.[21] In addition, whilst both NABH and NQAS standards require the presence of information exchange protocols during patient handovers, neither stipulates nor provides detailed recommendations of specific methods, materials or training that should be employed for specific areas of handover.

Regarding HCPs perceptions of highly applicable barriers to referral and discharge communication, the identification of predominantly system-based issues such as excessive workloads/time pressures, poor health systems integration (i.e. deficient information transfer between healthcare facilities) and poor health systems in general reflects HCP and chronic NCD patient reports from both the inpatient and outpatient studies in the same areas of India.[22 23] The findings regarding workloads/time pressures hampering discharge communication practices also resonate with reports from other Indian and HIC studies.[14 41] Overall, the fact that the majority of HCPs in the current study considered each barrier to improving referral and discharge communication as either moderately or highly applicable highlights the need for the implementation of comprehensive and systematic improvement strategies. Such findings have also helped to identify both systems and patient-related factors that can be targeted in such strategies.

7.5.2 Strengths and limitations

A strength of this study is the collection of data from a range of public and private HCPs working at various levels of healthcare across two diverse states of India, which has enhanced the breadth and generalisability of findings. In addition, expert consultations and document reviews have enabled clearer conclusions to be drawn regarding the availability and use of policies, guidelines and training for handover communication. Due to the centralised national governance of public healthcare, findings regarding public facilities may be representative of other areas of India. However, given the vastness of the country and the fact that each state department of Health and Family Welfare has considerable autonomy in delivering public healthcare services, generalisability to other settings may be done with caution. Additionally, findings regarding private healthcare may lack generalisability given the independence of each facility's policies and operational systems. A lack of complete/accessible information regarding healthcare facilities and associated healthcare staff within the study areas resulted in recruitment challenges. However, given the subsequent use of convenience sampling, the resulting amount of survey data was considered relatively large. Regarding perceived barriers to handover communication, the use of structured questions may have restricted HCPs from providing original/alternative responses. A lack of adequately recorded inclusion/exclusion rates for participation is also a limitation, as this could not be reported.

7.5.3 Next steps

Given the rising burden of NCDs across India and the subsequent requirement for effective coordination and continuity of care across a range of HCPs, there is a pressing need to address the plethora of deficiencies found in this study. Figure 7.2 contains a summary of key system, organisational cultural, HCP and patient-related

considerations that should be taken into account when implementing quality improvement strategies for handover communication in the study areas of India (based on findings from this study, other studies from the India handover project and systematic reviews on handover from both LMICs and HICs).[4 6 22 23]

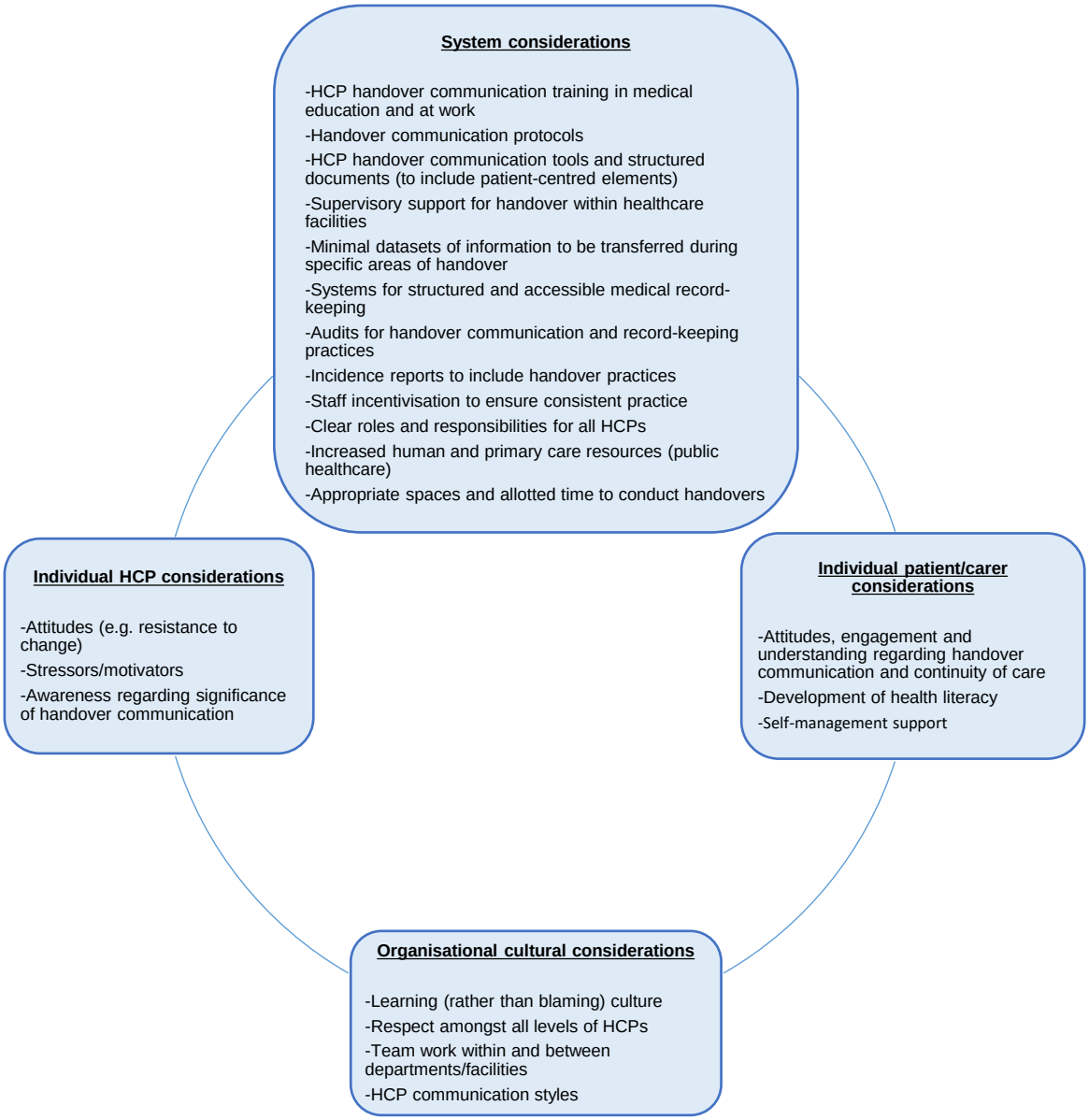


Figure 7.2 Key considerations to be taken into account when implementing handover communication quality improvement strategies in the study areas of India

In particular, specialised handover communication training should be made available to all HCPs involved in transitions of care. This is important as it is likely to assist in developing the necessary awareness and skills required to facilitate consistently high-quality information transfer within and between levels of care. There is a sizeable body

of international literature regarding effective teaching methods for managing patient handovers that can be drawn upon for implementation during medical education and/or whilst working and much of it has recommended early implementation in the medical education process to maximise impact.[42-46] Methods commonly involve a combination of strategies including didactic sessions, giving feedback on others' practices and patient/HCP simulation training and have been shown to improve HCP skills and confidence.[42 44-46]

There is also a notable need for implementation of high-quality medical record-keeping and handover communication policies and protocols that are regularly audited across healthcare facilities at all levels of care. This is particularly the case in public healthcare facilities, where handover frequently occurs within and between levels of care. Such issues relating to the quality and safety of public healthcare appear to have become increasingly recognised by the government of India in recent years, who in 2018 published a "National Patient Safety Implementation Framework 2018-2025".[47] This framework listed one of the key priorities as "establishing a culture of safety and improving communication, patient identification, handing over transfer protocols in healthcare facilities". However, as far as the authors are aware, mandatory policies/protocols are yet to have been developed and implemented and accreditation schemes such as the NABH and NQAS remain voluntary to undertake.

Given the key role that handover communication plays in continuity and safety of care, clear protocols based on evidence-based strategies require urgent and widespread implementation. For example, the ISBAR (Identify, Situation, Background, Assessment and Recommendation) protocol has been used across both LMIC and HIC settings to standardise and subsequently improve the quality of shift-change and transfer communication between HCPs.[48 49 50] Protocols also need to be assisted by the use of specific and structured handover documentation, which has improved the quality of

patient information transfer in both LMIC and HIC settings.[15 48 51 52] Further, findings from the current study have indicated that HCPs perceive patient/carer interest/engagement as being a barrier to handover communication between levels of healthcare. Therefore, there is a need to ensure that protocols are employed that also target the enhancement of communication between HCPs and patients. For example, at the point of hospital discharge, protocols involving the use of patient/carer education sessions and/or related take-home documents have proven effective for improving health literacy (i.e. the ability to comprehend and effectively act on medical instructions),[53] as well as self-management, patient satisfaction and post-discharge outcomes across several LMICs.[54-56] In addition to raising awareness regarding the significance of handover communication, such protocols are also likely to improve patient-centred care (i.e. care that takes into account patients' needs, value and concerns),[63] which has further been shown to improve patient satisfaction and outcomes.[57]

In the years to come, it is of note that the Indian government has pledged to digitize all public healthcare information systems across the country via an "Integrated Health Information Platform".[58] Whilst this holds great potential for streamlining and standardising healthcare records and communication, the findings from this study and others in the India handover project may serve to emphasize the importance of implementing relevant training, policies, protocols and audits to advance the quality, as well as efficiency, of handover communication within and between levels of care. Such systems must be viewed as tools for improving continuity of care, as well as accessibility of information. It is also crucial that other aforementioned aspects of handover communication, such as HCP-patient communication, continue to be developed alongside technological endeavours.

7.6 Conclusion

This study has revealed that there is a dearth of structured and standardised training and protocols in place for handover communication across Himachal Pradesh and Kerala states, India. This is resulting in inadequate numbers of HCPs being equipped with the necessary skills and tools to ensure high-quality information transfer, which may be compromising continuity and safety of patient care. These findings are critical given the rapidly rising burden of chronic NCDs across India, which require high-quality care coordination for effective management. The systemic issues identified, if remedied, could improve integration, efficiency and overall quality of care provided across health systems on a noteworthy scale. Further research across India is required to continue to explore system, organisational, HCP and patient-related challenges to handover communication and evaluate interventions targeting the improvement of handover communication both within and between levels of care.

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8. DISCUSSION

This final discussion chapter summarises the principal findings of the thesis research, the interpretation and implications of the findings, the strengths and limitations of the research and future research recommendations. The systematic review presented within this thesis addressed the aim of (i) exploring the quality of handover communication and interventions for handover communication in LMICs (Chapter 3). The studies presented within this thesis (Chapters 4-7) addressed the aims of (ii) investigating handover and healthcare communication practices, protocols and training within and between levels of healthcare in Himachal Pradesh and Kerala states, India, and (iii) identifying possible strategies to improve the storage and exchange of chronic NCD patient information in Himachal Pradesh and Kerala states, India.

8.1 Summary of principal findings

8.1.1 Quality of handover communication and interventions for handover communication in LMICs

The systematic review (Chapter 3) was conducted to provide a comprehensive and up-to-date summary of the quality of handover communication and interventions for handover communication during transitions of care across LMICs. This was done as LMIC research has rarely featured in previous reviews on clinical handover. The first key finding was the relative dearth of LMIC-based literature and particularly interventional research, with 94 studies found from just 25 of 138 LMICs, which were predominantly upper-middle income countries.

Observational studies utilised a range of methods to evaluate observed and/or perceived quality of handover communication, including questionnaires, observations and HCP/patient interviews. Findings predominantly demonstrated suboptimal information transfer between HCPs and/or between HCPs and patients during hospital shift-change, discharge and intra and inter-facility referrals and transfers. A number of system, organisational cultural and individual HCP factors affecting the quality of communication during each area of handover were also identified; system factors, such as lack of standardised practices, time constraints and unsuitable areas for handover were most commonly reported. Observational studies were predominantly cross-sectional and of medium or high quality. The majority of observational studies focussed on hospital discharge.

Regarding interventions, several relatively simple strategies for shift-change, discharge and intra and inter-facility referrals and transfers such as structured guidelines, protocols, documents and HCP/patient education, were shown to improve communication, knowledge, satisfaction and some health-related outcomes. Intra-hospital quality improvement projects conducted by researchers and in-house HCPs for shift-change and discharge were also reported as effectively addressing context-specific challenges and increasing communication protocol adherence. One study utilised mobile technology to implement a digital referral mechanism (i.e. SMS messages and phone calls between community health workers and hospitals) to improve inter-facility referrals. This led to improvements in information transfer and care provided during patient referrals. However, despite most interventional studies being reported as effective, they were predominantly of non-randomised pre-post design and medium or low quality; common challenges included limited reporting of methods and inadequate accounting for confounders. The majority of interventional studies focussed on hospital discharge.

8.1.2 Handover and healthcare communication within and between levels of healthcare for chronic NCD patients

8.1.2.1 *Handover and healthcare communication practices*

The mixed-methods outpatient study (Chapter 4) evidenced that predominantly unstructured and disparate patient-held medical documents served as the main vehicle for information transfer between HCPs, due to a lack of outpatient medical-record keeping in public healthcare facilities. Over half of patients carried documents from previous HCPs to outpatient clinics (OPCs) and all patients were provided with documented information during OPC consultations. However, the majority of these patient-held documents did not contain all key items of healthcare information for effectively facilitating continuity of care (i.e. diagnosis, medication information, long-term care advice and follow-up information). Outpatient questionnaire and interview data also revealed inconsistencies in the provision of verbal healthcare information during OPC appointments, particularly regarding follow-up visits and lifestyle advice. HCP interview data indicated the presence of inconsistent inter-hospital handover practices across healthcare facilities. Whilst some HCPs reported that an absence of available referral documentation resulted in them writing referral notes on patient-held medical documents intended for other purposes (i.e. prescription cards), others described more structured procedures, such as making referral telephone calls and use of specific transfer/referral documents.

Regarding chronic NCD inpatients, in the qualitative inpatient study (Chapter 5), multiple patients reported that they were referred to the hospital without being given any referral documentation. Similar to the outpatient study, both inpatient and HCPs also reported that numerous patients transported medical documents from previous HCPs to the hospital. Regarding hospital admission, patient reports indicated that the provision of verbal healthcare management information by nurses/doctors was

inconsistent and, at times, inadequate. Some patients also described receiving impolite/impatient treatment from hospital HCPs. Regarding referral communication for inpatients, similar to the outpatient study some doctors reported making specific phone calls, but this was dependent on how well they knew the patient and/or HCP. As for discharge, a nurse reported providing predominantly verbal instructions to patients.

In the prospective inpatient study (Chapter 6), patient questionnaire data indicated that verbal post-discharge care advice varied notably between patients; whilst the majority were instructed to return to the OPC for a check-up, only half were given ongoing management information and less than a quarter received lifestyle advice. In addition, less than a quarter of patients were judged by researchers to have a good understanding of important details regarding their condition and care requirements. As for documented information, whilst all patients were provided with discharge notes, the majority of these were unstructured and did not contain all key items of healthcare information necessary for facilitating effective continuity of care.

In the HCP study (Chapter 7) questionnaire data revealed varying reports of referral and discharge communication procedures across private and public healthcare facilities, with the most commonly reported procedure for both transitions of care being the provision of patient-held documents. Other procedures included letters/forms sent directly to HCPs, phone calls to HCPs and, more rarely, emails/other electronic communications.

8.1.2.2 *Factors affecting the quality of handover communication*

Regarding record keeping, HCP interview data from the mixed-methods outpatient and qualitative inpatient studies (Chapters 4 and 5) revealed that the absence of in-house

OPC records and poorly accessible inpatient records in public healthcare facilities were factors affecting the quality of intra-facility handover communication.

Regarding referrals, HCP interview data from the mixed-methods outpatient and qualitative inpatient studies (Chapters 4 and 5) indicated that a lack of standardised procedures was a factor affecting the quality of referral communication between HCPs. In addition, questionnaire data from the HCP study (Chapter 7) showed that HCPs most frequently considered the following barriers to be highly applicable to referral communication: lack of timely communication, time pressures, lack of involvement/interest/care from family/carer/patients about referral notes, poor health systems integration and poor health systems in general.

Regarding hospital discharge, questionnaire data from the HCP study (Chapter 7) showed that HCPs most frequently considered the following barriers to be highly applicable to discharge communication: poor patient-record keeping, lack of timely communication, excessive workload/time pressures, lack of resources, poor health systems integration and poor health systems in general.

Regarding factors affecting multiple areas of handover communication, the following were identified via patient and HCP interview data in the mixed-methods outpatient and qualitative inpatient studies (Chapters 4 and 5): HCP time constraints (resulting from busy hospital workloads) and inconsistent transport of patient-held medical documents between HCPs. Additionally, patient questionnaire data in the mixed-methods outpatient and prospective inpatient studies (Chapters 4 and 6) displayed a deficiency of structured patient-held medical documents. Another factor identified via HCP interview and questionnaire data in the mixed-methods outpatient, qualitative inpatient and HCP studies (Chapters 4, 5 and 7) was a dearth of HCP handover training during medical school or whilst working. Lastly, patient interview data from the qualitative

inpatient study (Chapter 5) indicated that non patient-centred communication regarding lifestyle advice affected the quality of handover communication between HCPs and patients during hospital discharge.

8.1.3 Association between the quality of discharge handover communication and chronic NCD patient outcomes

Questionnaire data from the prospective inpatient study (Chapter 6) was analysed to investigate the association between quality of verbal and documented handover communication provided at hospital discharge and the following chronic NCD patient outcomes at 5 and 18-week follow-up: death, hospital readmission and self-reported deterioration of NCD/s. Adjusted logistic regression analyses found significantly increased odds of death within 5 and 18 weeks of follow-up for patients who received low-quality discharge notes compared to those who received high-quality discharge notes. In addition, significantly decreased odds of self-reported deterioration of NCD/s within 18 weeks of follow-up were found for patients who received low-quality verbal discharge communication compared to those who received high-quality discharge notes.

8.1.4 HCP training and protocols for handover communication

HCP interview data from the mixed-methods outpatient and qualitative inpatient studies (Chapters 4 and 5) evidenced multiple reports of a dearth of handover training. Further, in the HCP study (Chapter 7), questionnaire data revealed that the majority of (public and private) HCPs had not received structured training for transferring information during shift-change, referrals and hospital discharge and no training-related documents were found. Of those who had received shift-change training, the majority further

reported that it was only available for hospital doctors. HCP interview and questionnaire data also revealed inconsistent public and private HCP reports of local and statewide handover communication protocols. Searches for relevant policy/guideline documents revealed an absence of evidence regarding the existence of such protocols in place across public healthcare facilities. One private hospital in Kerala had policies and structured documents for information transfer during patient care transitions. The only other documents found that mandated the use of structured information exchange protocols during handover were standards for national voluntary accreditation schemes, which are used to assess the quality of public and private healthcare facilities.

8.1.5 Possible strategies to improve the storage and exchange of healthcare information for chronic NCD patients

Following the first stage of data collection for the outpatient and inpatient studies (Chapters 4 and 5), a handover expert meeting took place to present preliminary findings from the India handover project and discuss possible interventions. At this meeting, based on international successes of patient-held/home-based records used in maternal and child healthcare and delays in developing universal electronic information systems,[1-8] a consensus was reached that patient-held booklets were likely to be a sustainable and cost-effective strategy to improve chronic NCD patient information exchange. Following this, during the second (and final) stages of data collection for the outpatient and the qualitative inpatient studies, interview data revealed that both patients and HCPs expressed predominantly positive views towards the structured patient-held booklet idea for storing, organising and transporting medical documents between HCPs.

Regarding other strategies, in the mixed-methods outpatient and qualitative inpatient studies (Chapters 4 and 5) interview data from HCPs in Kerala revealed that there were plans for public healthcare facilities to transition to computerised healthcare information systems (i.e. “e-health”). In addition, during interviews in the qualitative inpatient study (Chapter 5) HCPs suggested the following requirements for improving information exchange: increasing public healthcare resource provision and introducing standardised referral forms and registers.

8.2 Interpretation and implications of findings

8.2.1 Assessment of evidence regarding the quality of handover communication and interventions for handover communication in LMICs

At the beginning of the PhD project, it became evident that LMIC-based research was hardly featured in existing reviews on handover. Therefore, it was necessary to conduct a systematic review to assess the existing evidence and obtain a comprehensive understanding of the quality of handover communication and evaluated interventions aiming to improve handover communication in LMICs.

The review demonstrated that the quality of handover communication and interventions for improving the quality of handover communication are under-researched across LMICs and that many existing (particularly interventional) studies had notable methodological limitations. Regarding the quality of handover communication, the suboptimal recording and/or transfer of healthcare information between HCPs commonly reported across all studied areas of handover reflected similar findings from HIC studies and reviews.[9-18] Multiple accounts of suboptimal communication between

HCPs and patients during hospital shift-change and discharge also highlighted issues of deficient patient involvement that have been identified in HIC research.[19 20] The factors found to be affecting each area of handover communication resonated with a range of previous LMIC and HIC research;[9 10 15 19 21-28] in particular, HIC-based evaluations of HCP attitudes and practices regarding handover have evidenced a variety of similar systems-based challenges, including HCP time constraints and a lack of systematic procedures and training.[9 10 15 19 24] With regard to interventions, for hospital shift-change, referrals and transfers the majority of strategies were reported as being effective and predominantly involved structured HCP training, protocols and/or documents, resembling methods that have been successfully implemented in HIC research.[29-31] For example, structured communication tools such as SBAR (Situation, Background, Assessment and Recommendation) have proven to be effective across a range of healthcare transitions.[29 31] As for discharge communication, the majority of interventional studies were also reported as being effective and predominantly involved the use of education sessions and/or tools for patients/carers, which too have improved a range of patient-related outcomes in HICs.[32]

The review also highlighted a variety of methodological issues in the existing research, particularly across interventional studies where common challenges included an inability to determine the appropriateness of measurements used and inadequate accounting for confounders. Therefore, findings regarding the observed/perceived quality of handover communication and the impact of interventions may be somewhat distorted.[33] The review also evidenced heterogeneity in handover communication quality assessment methods. This indicates a potential need for the development and validation of objective, standardised assessment tools, based on minimal datasets of key information that should be exchanged during specific care transitions. In addition, aside from demonstrating the need for further high-quality research, the review

evidenced a specific dearth of observational studies focussing on intra-facility referrals and inter-facility transfers. It also highlighted a lack of interventional studies focussing on intra and inter-facility referrals and transfers and the impact of handover communication on health outcomes. Further, several important study areas that have yet to be thoroughly explored were identified, including the impact of patient-related factors (i.e. attitudes, knowledge, engagement etc.), higher-level system factors (i.e. regarding political, environmental and/or financial issues) and digital/e-health projects on the quality of handover communication.

8.2.2 Handover and healthcare communication within and between levels of healthcare for chronic NCD patients

8.2.2.1 *Handover and healthcare communication practices*

The finding that handwritten medical notes were given to patients on sheets of paper/other minimally structured documents during public healthcare outpatient and discharge consultations and transported between HCPs (Chapters 4-6) reflects the limited previous research from India, which has demonstrated the provision of patient-held discharge notes and patient transportation of various medical documents during referrals to hospital.[34-36] The finding that the majority of the patient-held medical documents provided to outpatients and inpatients contained insufficient information levels for facilitating effective continuity of care also mirrors previous Indian and international literature. Whilst LMIC-based research on handover systems for outpatients is relatively scarce, a recent (2019) study from Mongolia has evidenced similar levels of deficient documented information exchange between HCPs and chronic NCD patients during outpatient consultations.[37] In addition, the issues surrounding the quality of hospital discharge notes reflect previous reports from

document content reviews in India and multiple other LMICs of the suboptimal recording of patient discharge information by hospital HCPs.[36 38-44] Numerous HIC studies have also demonstrated that discharge letters commonly lack sufficient levels of clinical information, often as the result of a lack of HCP prioritisation. [17 45-49]

Regarding verbal HCP-patient communication, the results from the mixed-methods outpatient, qualitative inpatient and prospective inpatient studies (Chapters 4-6) evidenced frequent patient reports of inconsistent and subsequently suboptimal handover and healthcare communication from HCPs during outpatient consultations, inpatient care and discharge consultations. These findings are in line with the limited Indian and wider international literature; regarding outpatients, the particular lack of verbally explained lifestyle advice resonates with chronic NCD patient reports of verbal communication during outpatient consultations in the aforementioned Mongolia handover study.[37] Regarding inpatients, the few previous observations of shift-change and discharge communication practices in Indian hospitals have also demonstrated deficient HCP-patient interactions.[50-52] Further, similar to documented communication, verbal HCP-patient communication during hospital discharge consultations appears to be a relatively universal issue; multiple LMIC and HIC-based studies have demonstrated patient reports of suboptimal discharge advice, particularly regarding follow-up, self-care and lifestyle recommendations.[19 42 53-56]

A potential consequence of deficiencies in HCP-patient communication is a lack of patient understanding of key healthcare information, which was evidenced in the prospective inpatient study (Chapter 6); as well as researchers deeming less than a quarter of inpatients/carers to have a good understanding of all important NCD and ongoing care requirements, more than 10% only planned to return to a HCP when they were unwell again. These findings reflect the wider LMIC and HIC literature, in which notable proportions of patients have reported poor levels of understanding regarding

their discharge instructions and requirements for post-discharge care.[55 57-62] Aside from HCP-patient communication during healthcare consultations, HCP and patient reports from the mixed-methods outpatient, qualitative inpatient and cross-sectional HCP studies (Chapters 4, 5 and 7) also evidenced inconsistent and, at times, inadequate referral communication practices. Such findings are in line with previous research in India that has demonstrated poor documentation and exchange of clinical information between HCPs in different healthcare facilities.[63] Other LMIC-based studies have also evidenced suboptimal referral communication practices via reviews of incomplete referral documents.[64-67]

Overall, the results regarding HCP-patient handover and healthcare communication during public healthcare outpatient and inpatient consultations showed that whilst some good practices exist, many chronic NCD patients left healthcare facilities with insufficient levels of information to effectively facilitate their continuity of care. The fact that the majority of documented information exchange was found to be suboptimal is especially problematic, as the global literature has shown that patients can struggle to absorb verbal information offered during HCP consultations and so may come to rely on available notes.[68 69] Given the role that patients and patient-held medical documents play in assisting handover between HCPs in the study areas of India and the established link between poor handover communication and adverse outcomes, current practices may be compromising patient safety.[17 70-74] The findings also indicate that the majority of chronic NCD patients are leaving public healthcare facilities with unmet information needs and inadequate understanding regarding their ongoing management/self-care requirements. This may be posing further risks to continuity and safety of care, particularly during discharge where the poor understanding of HCP instructions has been shown to lead to adverse events such as medication errors and unplanned hospital revisits. [60 61 62] In general, the findings regarding deficient discharge

communication are noteworthy as poor handover practices during this care transition have been shown to disproportionately affect vulnerable populations such as the elderly and patients with multiple comorbidities.[56 57 75 76]

8.2.2.2 *Factors affecting quality of handover communication*

HCP descriptions of an absence of in-house outpatient clinic record keeping, as well as poorly accessible inpatient records and low-quality patient record keeping in public healthcare facilities (Chapters 4, 5 and 7) are in line with previous reports from India of a lack of systematic/standardised record keeping in medical institutions.[77] Such findings also resonate with previous HIC research that has found poor-quality record keeping to be a common issue affecting handover communication.[20] Alongside previously described findings of suboptimal contents of patient-held documents and HCP and chronic NCD patient reports of inconsistent transportation of patient-held documents (Chapters 4 and 5), the lack of accessible and high-quality in-house records could be further compromising continuity and safety of patient care. This is because, at best, HCPs are reliant on frequently incomplete patient-held medical information and, at worst, are left without any access to reliable patient background and/or treatment details. Ultimately, these fragmented information exchange processes may be resulting in critical clinical oversights, which have been shown to lead to adverse events.[29 70 71]

Another factor reported by HCPs and patients as affecting multiple areas of handover communication for chronic NCD outpatients and inpatients visiting public healthcare facilities was excessive workload/time pressures (Chapters 4, 5 and 7). Patient loads and subsequent time pressures in hospitals were reported to be particularly high as the result of patients preferring to visit them rather than primary/community health centres, where services were more limited. Further, concerning excessive workload/time

pressures, in the HCP study (Chapter 7) a lack of resources was a barrier predominantly considered to be highly applicable to improving discharge handover communication. Whilst there is a dearth of similar findings on handover and time pressures in India, limitations of primary care systems are well-recognised and similar infrastructural challenges have been reported across multiple LMICs.[78-80] In addition, previous LMIC and HIC research has evidenced numerous HCP reports of busy workloads and subsequent time pressures hampering their ability to provide high-quality handover communication to other HCPs and/or patients during shift-change, intra-facility transfers and hospital discharge.[15 19 21 53 81 82] Overall, the time pressures experienced by HCPs in the study areas of India contributed to suboptimal information exchange for both outpatients and inpatients as they restricted consultation times; previous HIC studies have shown that HCP awareness of time pressures can reduce the amount of information exchanged during patient consultations.[83 84]

Other factors affecting multiple areas of handover communication reported by patients and HCPs in the mixed-methods outpatient, qualitative inpatient and cross-sectional HCP studies were a dearth of structured and standardised practices. This was predominantly evidenced via mixed patient and HCP reports of referral communication practices and document content reviews that revealed the use of a range of structured and unstructured patient-held medical documents to record and exchange information during chronic NCD patient care. Such findings reflect previous research on hospital shift-change and discharge practices in India, which have demonstrated a lack of standardised HCP processes.[34 50 51 77] They also resemble other LMIC-based research, which has evidenced a lack of organised procedures in place for hospital shift-change and the use of disparate medical documents during referrals.[85-87] The absence of standard communication procedures is problematic as the international (LMIC and HIC) literature has continually demonstrated that compared to those with systematic

structure, disorganised/unsystematic handover practices result in inferior information transfer and subsequent quality and safety of care.[20 29 34 65 88-90]

A number of HCPs in the mixed-methods outpatient and qualitative inpatient studies (Chapters 4 and 5) also mentioned that they had not received any handover communication training at medical school or work. As a result, some reported developing their communication skills by observing the practices of their senior colleagues. Such findings are in line with previous reports of a historic lack of communication skills training in Indian medical education.[91-93] They also indicate that many HCPs are not being provided with the appropriate awareness and skills to be able to ensure effective communication during transitions of care, which is likely contributing to information exchange deficiencies evidenced in the study areas of India (Chapters 4, 5 and 6). In addition, previous research from India and other parts of Asia has indicated a tendency for paternalistic/dominant HCP communication styles during healthcare consultations, which can result in unmet information needs via patients feeling intimidated and unable to ask questions.[91 94 95] Alongside the lack of specific handover communication training, such communication styles may have further contributed to the deficient and, at times, non patient-centred HCP-patient information exchange evidenced in the current research. Previous LMIC and HIC-based research has evidenced similar issues regarding a lack of patient-centred practices during transitions of care.[20 81 86]

Overall, the studies in Chapters 4-7 of this thesis have assisted in elucidating current handover communication practices as well as multiple key systems and patient-related factors that are affecting the quality of such practices for chronic NCD patients (and likely many others) in Himachal Pradesh and Kerala states, India. This has facilitated a deeper understanding of areas that can be targeted to minimise the perpetuation of suboptimal patient information exchange practices and subsequent continuity and

safety of care. Targeting these areas will also help to improve the timeliness of communication as well as health systems integration and functioning, which were barriers identified by most HCPs as being highly applicable to handover communication between levels of care (i.e. referral and discharge - Chapter 7). The majority of factors found were systems-based, revealing the need for the development and implementation of structured and standardised record-keeping and handover communication protocols, documents and HCP training across public healthcare facilities; further discussion of recommendations for the development of such protocols is included in the following “HCP training and protocols” section (8.2.4).

Other factors were patient-related and involved the transportation of and attitudes towards patient-held medical documentation. Such findings indicate a further need to implement strategies to increase patient engagement and awareness regarding the importance of patient-held documents for facilitating continuity and safety of care. One such strategy recommended during a handover expert meeting (Chapters 4 and 5) was the introduction of patient-held record booklets, which is further discussed in the following “strategies to improve the exchange of chronic NCD patient information” section (8.2.5). Ultimately, given the workload and time pressures that are being placed on public HCPs, there is also a growing recognition in India of the need for the government to strengthen primary care infrastructure in line with the declaration of Alma-Ata.[96] An increase in resources and subsequent specialisation of primary healthcare would greatly assist in improving preventative efforts, reducing pressure on hospital services and addressing the United Nations’ sustainable development goals regarding university health coverage and reducing premature NCD-related deaths.[79 97]

8.2.3 Associations between quality of discharge handover communication and chronic NCD patient outcomes

In the prospective inpatient study (Chapter 6), results from adjusted regression revealed significant associations between increased odds of death within 5 and 18 weeks follow-up and chronic NCD patients' receipt of low-quality discharge notes. Such findings are in line with previous HIC research, which has demonstrated links between an increased risk of post-discharge adverse events and deficient discharge communication between HCPs and between HCPs and patients.[17 71-74] In particular, the inadequate exchange of documented discharge information (i.e. letters, summaries etc.) between HCPs has been repeatedly identified as a significant risk factor for patient safety.[17 73 74] The outpatient and inpatient studies in this thesis (Chapters 4, 5, 6) demonstrated that patient-held medical documents (including discharge summaries) serve as the predominant vehicle for facilitating information exchange between HCPs and between HCPs and patients in the study areas of India. Therefore, the provision of low-quality documented information may have resulted in adverse events due to it impairing the continuity of care that could be provided by subsequent HCPs and/or impairing the ability of patients/carers to successfully manage their ongoing health needs. An additional unexpected finding from the adjusted regression analyses was a significant association between decreased odds of self-reported deterioration of chronic NCD/s within 18 weeks follow-up and chronic NCD patients' receipt of low-quality verbal discharge communication. The mixed-methods outpatients, qualitative inpatient and HCP studies in this thesis (Chapters 4, 5, 7) and multiple HIC studies on discharge practices have demonstrated that HCP time pressures can affect patient consultations.[19 98] Therefore, a possible explanation may be that patients provided with less verbal information were those with less severe health issues (due to time pressures/HCP case prioritisation), resulting in them being less likely to report a deterioration later on.

The findings suggest that current discharge communication practices are likely to be compromising the safety of chronic NCD patient care. However, due to the observational nature of the study, it is not possible to say whether low-quality discharge communication caused some, or all, of the reported health outcomes. The small scale of the research, limitations of the regression models and the complex nature of factors affecting health outcomes have resulted in the findings being interpreted cautiously and requiring further validation. Regardless, given the evidenced significance of high-quality discharge communication for continuity and safety of patient care, the imperative to improve the recording and transfer of key healthcare information remains.

8.2.4 HCP training and protocols for handover communication

Qualitative HCP data in the mixed-methods outpatient and qualitative inpatient studies (Chapters 4 and 5) indicated that whilst multiple public HCPs were aware of patient information that should be exchanged during transitions of care, many had never received formal handover communication training. Quantitative HCP survey data in the cross-sectional HCP study (Chapter 7) further confirmed that the majority of both public and private HCPs had not received any handover communication training during medical school nor whilst working and no handover training materials were found during document searches. These findings are in line with the aforementioned previous reports of deficiencies in the availability of communication skills training in Indian medical curricula.[91-93] The dearth of relevant training evidenced in the HCP study also resonates with the international literature, which has highlighted the low level of prominence placed on handover during medical education and training.[24 99] Therefore, this thesis research has highlighted a pressing need for the wide-scale and comprehensive provision of handover communication education and training to HCPs involved in transitions of care during medical education and whilst working. This is

likely to assist with developing the necessary awareness and skills to facilitate consistently high-quality information transfer within and between levels of care. There is a sizeable body of international literature focussing on educational and training-based strategies implemented during medical education and postgraduate acute care settings that can be drawn upon, which have demonstrated improvements in HCP confidence, skills and handover practices.[24 30 100-102] Such strategies commonly involve a combination of activities including simulations with patients and/or staff, didactic sessions, discussions on recorded handover practices and feedback.[30]

Regarding handover communication protocols, qualitative HCP data in the mixed-methods outpatient and qualitative inpatient studies (Chapters 4 and 5) indicated a lack of formal and systematic procedures via inconsistent reports of local handover practices. Following searches of relevant policy/guideline/training documents in the cross-sectional HCP study (Chapter 7), just one private super-speciality tertiary hospital in Kerala was found to have specific policies and documents in place for handover; however, it was mentioned by a senior hospital manager that whilst these exist, implementation lacks consistency as physicians often follow their own "working style". The absence of further relevant policy/guideline/training documents provided more robust evidence of an absence of formal medical record-keeping or handover communication protocols in place across public healthcare facilities in Kerala or Himachal Pradesh states. The only formal requirements found for public or private healthcare facilities to have structured protocols for exchanging healthcare information during care transitions came from national voluntary quality accreditation schemes,[103 104] which none of the studied public healthcare facilities were involved in. As far as the author is aware, the research within this thesis is the first of its kind to specifically investigate handover communication training and protocols in India. The findings regarding public healthcare facilities reflect the aforementioned previous indications

from Indian research of a lack of quality assurance methods for medical record keeping and standardised protocols for patient information exchange during hospital shift-change and discharge.[34 50 51 77] Overall, the results indicate that the importance of handover communication for continuity and safety of care and health systems functioning has been largely overlooked and subsequently deprioritised in Himachal Pradesh and Kerala states, India. This has resulted in a lack of HCP awareness, inconsistent practices and suboptimal information exchange between HCPs and between HCPs and patients.

Furthermore, whilst issues relating to the quality and safety of care provided across public healthcare facilities have become increasingly recognised and publicised by the Government of India in recent years,[105] notable disparities persist at the individual facility level regarding practices and participation in quality accreditation/certification schemes.[106] Given the long-term care needs of chronic NCD patients that require effective continuation of care and the growing NCD burden across India,[107] the findings indicate an urgent requirement for wide-scale implementation of standardised handover communication policies and protocols; particularly across public healthcare facilities where handover frequently occurs within and between levels of care. Policies and protocols also need to be supported by audit cycles to assess the quality of HCP practices and obtain feedback on the effectiveness of the methods used. In addition to information exchange during care transitions, standardised methods of high quality and accessible medical-record keeping within healthcare facilities should be addressed as in-house records can also facilitate handover communication between HCPs.

Regarding effective methods that can support the development of handover protocols, communication tools such as the ISBAR (Identify, Situation, Background, Assessment and Recommendation) can improve the efficiency, structure and quality of information transfer between HCPs, therefore reducing the risk of error-related adverse events.[29]

[108 109] These tools can also be modified to incorporate communication between HCPs and patients and subsequently involve patients/carers in decision-making processes. This is likely to enhance patient-centred care, which has been shown to result in improved patient satisfaction and outcomes.[29 110] In addition, there is a body of LMIC and HIC evidence that can be drawn upon regarding the effective use of patient-centred/condition-specific approaches and educational tools for strengthening HCP to patient communication during hospital discharge, which has proven to be a particularly critical point of care transition.[32 111 112] Such approaches are vital for enhancing patients' abilities to comprehend and follow medical instructions (i.e. health literacy) and facilitating effective self-management, which can lead to improved health outcomes.[111]

Given the predominantly paper-based systems that remain in use in the study areas, communication tools could further assist with developing structured forms for specific care transitions. Previous research from India, other LMICs and HICs has evidenced improvements in the quality of documented information transfer between HCPs across numerous areas of handover (such as shift-change, inter-facility referrals and discharge) following the implementation of structured forms/proformas.[34 89 113-115]

8.2.5 Strategies to improve the exchange of chronic NCD patient information

The collection of qualitative data from outpatients, inpatients and HCPs (Chapters 4 and 5) facilitated a deeper exploration of chronic NCD patient and HCP attitudes regarding strategies to improve chronic NCD patient information exchange in the study areas of India. One strategy that both patients and HCPs were specifically asked about was patient-held record booklets, which could be used to store, organise and transport medical documents between HPCs and serve as a source of key information for patient/carer self-management. This strategy was focussed upon following international

(HIC and LMIC) successes of patient-held/home-based record books in improving health promotion and the continuity of maternal and outpatient healthcare.[1 2 4 7 8 37] In addition, handover experts recognised the value of an intervention that could facilitate and improve current handover communication practices, which predominantly rely on patient-held documents in the study areas of India. Interviews with patients revealed mostly positive views regarding the idea of introducing patient-held booklets. In particular, patients expressed interest in booklets containing information to assist with their self-management and in using booklets to simplify the organisation/transport of documents. Interviews with HCPs also evidenced support for the idea, with multiple doctors recognising the potential to improve current practice and provide patients with clearer instructions. However, reservations were also expressed, with some feeling that patient attitudes would need to be addressed to ensure that booklets are consistently transported. The findings indicate that patient-held booklets are an acceptable and likely sustainable strategy for improving chronic NCD patient information exchange. Patients' interest in the utility of booklets for organising records and self-management may have a positive influence on their engagement with care, which in turn could enhance health literacy, treatment adherence and clinical outcomes.[116] In addition, the inclusion of patient/condition-specific instructions could result in more patient-centred care, which, as mentioned in the previous section of the discussion, has been shown to lead to improved outcomes and increased patient satisfaction.[110] HCP reports of inconsistent transportation of patient-held documents have also highlighted the need to incorporate patient/carer education regarding the utility and significance of booklets to maximise utilisation.

Other suggestions of strategies for improving chronic NCD patient information exchange arose organically during HCP interviews. In the qualitative inpatient study (Chapter 5) both an increase in public healthcare resource provision and the

introduction of structured referral forms/registers were posited by doctors. These suggestions indicate that current resource and handover protocol deficiencies are resulting in HCP's desire for more systemic support. As previously mentioned, there is a growing recognition in India of the need for the government to strengthen public healthcare infrastructure, particularly regarding primary care resourcing and specialisation.[79 96] In addition, the introduction of structured referral documents has repeatedly proven to be effective for improving the quality of information exchanged between HCPs in HIC and LMIC settings.[114 117-119]

During interviews with HCPs in Kerala, it was also mentioned that all public healthcare facilities would be transitioning to computerised "e-health" information systems; Kerala is the first state in India to undergo comprehensive e-health system reforms.[120] More recently, in 2018 the national Indian government announced long-term plans to digitise public healthcare information systems across the country.[121] These new systems hold great promise for improving patient information exchange and similar structures implemented internationally have resulted in improvements in the efficiency and quality of healthcare provided.[122-124] However, at present, all developments in India remain in their early stages and are principally being used for recording disease surveillance, service utilisation and prescribing. Therefore, patient-held medical documents remain the predominant vehicle for information transfer across public healthcare. As far as the author of this thesis is aware (and following searches conducted in Chapter 7), there remains an absence of government protocols and policies concerning the standardisation and evaluation of the quality of healthcare information exchanged between HCPs using new e-health systems. Given the impact that these developments are likely to have on handover communication practices, the findings highlight the need to enhance policy-maker and HCP awareness of the significance of handover communication for continuity and safety of care. Effective policies and protocols must

be put in place that focus on the quality as well as the efficiency of information transfer, with adequate measures put in place (such as regular audits) to assess the consistency of HCP practices.

8.3 Strengths and limitations

There has been a dearth of research conducted on handover communication in India, particularly between levels of healthcare. Therefore, the research reported in this thesis has provided novel and valuable contributions to the existing body of evidence to highlight the importance of transferring key healthcare information during transitions of care. In addition, the findings have been reported in accordance with the following peer-reviewed guidelines: PRISMA guidelines for the systematic review;[125] STROBE guidelines for the mixed-methods and quantitative studies (Chapters 4, 6 and 7);[126] and COREQ guidelines for the qualitative study (Chapter 5).[127] The utilisation of a mixed-methods approach, including systematic review, qualitative and quantitative methods, has enhanced the quality of the research by providing a greater depth and breadth of evidence from both HCPs and chronic NCD patients. It has also helped to strengthen the reliability and validity of findings and conclusions. The findings from this research have been disseminated as follows:

- Three oral presentations at a clinical handover expert meeting with representatives from international, Indian national and state-level healthcare organisations
- Three peer-reviewed publications
- Five poster presentations at national and international research conferences, including the Global Symposium on Health Systems Research (Vancouver,

Canada, 2016 and Liverpool, United Kingdom, 2018) and the World Non-communicable Disease (NCD) Congress (Chandigarh, India, 2017)

The systematic review (Chapter 3) provided a comprehensive summary of the literature regarding the quality of handover communication and interventions for handover communication in LMICs. The scope of the review was extensive, covering multiple areas of handover communication with no time or language restrictions. The final search strategy used validated search filters and was developed via preliminary testing to reduce the omission of eligible studies. A limitation of the review was that unpublished and national LMIC database literature was not searched, which may have resulted in missing eligible studies. In addition, some findings may be dated as searches were conducted from the inception of databases and the list of LMICs that were included in the review have since slightly changed (due to annual World Bank data updates).

Regarding the mixed-methods, qualitative and quantitative studies (Chapters 4-7), the use of pre-developed and locally piloted questionnaires and/or interview topic guides ensured that the data collection tools were relevant, acceptable and comprehensible. Also, the use of data from multiple healthcare sites across two diverse Indian states has enhanced the scope and generalisability of findings. A common limitation was the absence of documented inclusion/exclusion rates; this could not be accurately recorded due to the dynamic nature of the study settings. In addition, given the lack of in-depth assessment of private healthcare facilities and India's vast size and health system complexities, the findings from these studies may be difficult to generalise to all areas of the country.

The use of numerous qualitative interviews with both chronic NCD patients and HCPs in the mixed-methods outpatient study and the qualitative inpatient studies (Chapters 4

and 5) facilitated data saturation and ensured that the findings were grounded in the experiences of both key participant groups.[128] In addition, study credibility was strengthened via the utilisation of multi-analyst triangulation.[129] Qualitative participants were predominantly older (i.e. 45yrs +), which limited exploration of younger patient experiences but was largely unsurprising given the focus on chronic NCD patients. The cross-cultural nature and use of individual interviews may have resulted in ingroup bias and/or social desirability bias, therefore affecting the truthfulness of the data.[130 131] However, the recurrence of themes indicative of data saturation and the finding that the results reflect existing literature indicate that this had minimal impact.[128] Additionally, the accuracy of recall of patients interviewed at home in the qualitative inpatient study (Chapter 5) may have been reduced by the delay between recruitment and data collection.

The use of questionnaire data from a relatively large number of chronic NCD patients in the mixed-methods outpatient and the prospective inpatient studies (Chapters 4 and 6) improved the representativeness of samples and generalisability of findings. The inclusion of patient-held medical document content checklists also facilitated the objective assessment of documented information transfer between HCPs and patients. A limitation is that questionnaire data relied on patient recall following outpatient and discharge consultations, which may have affected the reliability of findings. However, the majority of post-consultation questionnaire interviews were conducted immediately following patient outpatient and discharge consultations to limit issues of recall accuracy. In addition, questionnaire data could have been affected by response bias and the delivery and completion of questionnaires by researchers may have resulted in social desirability bias.[131 132]

The use of a mixed-methods approach in the outpatient study (Chapter 4) facilitated the incorporation of convergent triangulation of results, which increased the validity and reliability of findings regarding handover-related barriers to continuity of care.[133 134]

The prospective inpatient study (Chapter 6) facilitated a relatively large-scale investigation of chronic NCD patient experiences of discharge communication in public hospitals in two diverse states of India. It also provided a valuable opportunity to explore post-discharge patient experiences in the community, as follow-up data can be particularly challenging to collect in LMIC settings. The use of various statistical methods strengthened the validity of the results. The regression analyses were limited by reliance on patient/carer self-reported data, a lack of data regarding diagnostic accuracy and an inability to make causal inferences due to the observational nature of the study. The limited number of deaths also meant it was unclear how well the regression models adjusted for confounding, which has resulted in the findings being interpreted with caution. Six researchers were involved in inpatient data collection and were not blinded to the quality of discharge communication, which may have increased the chances of researcher (also known as “experimental”) bias;[135] however, each section of the questionnaire was filed away immediately after completion and not referred to again, therefore reducing the potential for such bias. Also, the follow-up questionnaire did not capture further readmission data on patients who had died, potentially affecting the accuracy of readmission data; sensitivity analyses were conducted to mitigate this limitation.

The use of questionnaire data from a range of public and private HCPs in the HCP study (Chapter 7) provided a broader range of insights into handover communication processes within Himachal Pradesh and Kerala states. The use of expert consultations and document reviews strengthened the reliability of findings and conclusions. Regarding limitations, response bias and social desirability bias may have affected

questionnaire data, possibly as the result of the delivery and completion of questionnaires by researchers.[131 132] Findings regarding private facilities may lack generalisability due to the independence of each facility's operational management. In addition, HCP recruitment was challenged by a lack of available contact information regarding state-wide healthcare facilities and staff. However, the resulting amount of questionnaire data obtained via opportunistic recruitment was considered to be reasonably sizeable.

8.4 Future research

The research within this thesis has made a valuable contribution to the relative dearth of handover communication literature from LMICs and particularly within India. Given the globally increasing recognition of the significance of handover communication for continuity and safety of patient care, there is a pressing need for further research to guide the development and implementation of strategies to improve patient information exchange during transitions of care. During the course of the research the following areas for future exploration were identified as having potential value for facilitating the improvement of handover communication, health systems integration and chronic NCD management:

8.4.1 Chronic NCD patient-held booklets

The suggestion of introducing patient-held booklets to assist with storing, organising and transporting medical documents was made by handover experts, based on preliminary findings from this thesis research and subsequently supported by several

chronic NCD patients and HCPs (Chapters 4 and 5). It also took into account that whilst e-health developments are underway in the study areas of India,[121] these remain in their early stages and will not address integrative issues between public and private healthcare providers, patient access to their healthcare information and the quality of handover communication exchanged between HCPs and patients. As well as across international maternal and child healthcare, the use of home-based records/booklets has also been evidenced in outpatient care in multiple LMICs (i.e. China, Mongolia, South Africa and Zambia) and has proven effective for improving the continuity of chronic disease patient care.[1 2 4 7 8 37 136-138] Therefore, chronic NCD patient-held booklets appear to be a pragmatic, acceptable and potentially sustainable strategy that warrants further investigation in the study areas of India. Future research is needed to facilitate the design and assessment of booklets to ensure they are context-relevant and effective in improving continuity of care and overall chronic NCD management. Given the mixed reports of patient understanding regarding the importance of medical documents and inconsistent transportation of patient-held medical documents in the mixed-methods outpatient and qualitative inpatient studies (Chapters 4 and 5), the introduction of booklets should be accompanied by relevant patient promotion and education. This is likely to assist in raising awareness of their importance and normalising utilisation. The following considerations could also prove beneficial:

- Inclusion of patients, HCPs and handover experts in the booklet design process to maximise relevance, utility and efficiency of use during outpatient and inpatient care
- Incorporation of a booklet design that enables paperwork to be easily added and removed, so that only the most clinically relevant information is stored and transported between HCPs

- Introduction of provisions to facilitate the safe and accessible storage of excess medical documents (i.e. those not required within patient-held booklets) in patients' home and/or within medical facilities
- Inclusion of relevant NCD-specific patient/carer self-care education sessions and information within booklets, to improve health literacy, patient-centred care and support engagement in effective self-management
- Introduction of booklets alongside relevant HCP education and training to assist in promoting the benefits and facilitate effective utilisation
- Use of patient and HCP incentives to maximise use, maintenance and transportation of booklets at each healthcare consultation
- Evaluation of the impact of booklets on a range of clinical, HCP and patient-reported outcomes (e.g. quality of handover communication, patient outcomes, patient health literacy and HCP and patient satisfaction and perceptions regarding continuity/quality of care etc.)

8.4.2 Structured HCP protocols for handover and healthcare communication

At present, interventional research from India demonstrating the impact of structured protocols on handover communication is very limited and has focussed on hospital shift-change in individual healthcare facilities.[88 139] In addition, the HCP study in this thesis (Chapter 7) demonstrated an absence of and subsequently pressing need for structured and standardised handover communication protocols across public healthcare facilities in the study areas of India. To ensure the implementation of context-relevant, efficient and beneficial protocols, future high-quality research in India is needed to facilitate the development and evaluation of strategies for care transitions both within and between levels of public healthcare. Given the heterogeneity of evaluative outcome measures found in the systematic review (Chapter 3) and the high

workloads experienced in public healthcare facilities in the study areas of India, it may also prove valuable for HCPs and handover experts to develop minimal datasets of key information that should be transferred to ensure continuity of care during each care transition; the datasets could then be used as a standardised tool to evaluate the effectiveness of protocols on quality of handover communication across India. The following considerations could prove beneficial when developing and evaluating protocols for handover and healthcare communication:

- Inclusion of patients, HCPs and handover experts in the protocol design process to maximise utility, efficiency and patient-centredness
- Introduction of protocols alongside relevant HCP education, training and supervision to assist in promoting the benefits and facilitating effective utilisation
- Evaluation of the impact of protocols on a range of clinical, HCP and patient-reported outcomes (e.g. quality of handover communication, clinical error rates, patient outcomes, patient health literacy and HCP and patient satisfaction and perceptions of continuity/quality of care etc.)

8.4.3 Evaluation of e-health systems regarding the impact on handover communication and subsequent continuity and safety of care

During the course of this PhD research, the Indian Government has announced plans for public healthcare across India to transition to utilising e-health information systems.[121] However, during expert consultations and handover communication policy document searches in the HCP study (Chapter 7), no policies or protocols were discovered regarding the standardisation or evaluation of the quality of healthcare information exchanged between HCPs using the new systems. Given the central role that future e-health systems will have in facilitating handover communication, there is a

need for future research to investigate their impact on the quality of information exchanged (both between HCPs and between HCPs and patients) and subsequent continuity, safety and overall quality of patient care; particularly for chronic NCD patients and those with multiple morbidities, who frequently require ongoing management from multiple HCPs.

8.4.4 Further investigation of the association between quality of discharge communication and chronic NCD patient outcomes

Whilst the findings from the multivariate analyses in the prospective inpatient study (Chapter 6) reflected similar findings from the HIC literature,[71-74] the small scale of the research and limitations of the data collection methods and subsequent regression models mean the results must be interpreted with caution. Further investigation of the associations between the quality of verbal and documented and chronic NCD patient outcomes in India is needed to assess the validity of the findings and gain a better understanding of the impact of discharge handover communication for patient safety. The following methods are recommended to improve the robustness of future prospective research:

- Collection of data from a larger sample of chronic NCD patients
- Collection of data regarding patient diagnoses (i.e. primary, secondary etc.), diagnostic accuracy and severity of comorbidities (to enable the creation of a comorbidity index to include as an independent variable in the regression analyses)
- Collection of data regarding patient socio-economic status (to be included as an independent variable in the adjusted regression analyses)

- Direct observation of verbal HCP-patient handover communication (rather than relying on patient recall)
- Collection of NCD-related health outcome data (i.e. NCD-related deaths and readmissions)
- Blinding of researchers collecting follow-up health outcome data to the quality of discharge communication received by each patient

8.4.5 Continued exploration of factors affecting the quality of handover communication

The systematic review (Chapter 3) and outpatient, inpatient and HCP studies (Chapters 4-7) within this thesis revealed a number of systems, organisational cultural, HCP and patient-related factors affecting the quality of handover communication and elucidated important study areas that require further exploration. Given the relative dearth of LMIC-based research focussing on handover communication, additional high-quality studies investigating key factors affecting the quality of handover communication are required to inform context-relevant and sustainable intervention efforts. Potentially valuable areas for future in-depth exploration across LMICs and within India that have been identified during this PhD research include:

- Patient and/or carer engagement and understanding (e.g. patient/carer participation and understanding during medical consultations/care transitions and patient/carer attitudes and engagement regarding self-management and ongoing care instructions)
- HCP interpersonal relationships and communication styles within and between levels of healthcare

- Higher-level system factors (e.g. political, environmental and financial motivators/stressors affecting HCPs and patients practices/behaviours)

8.5 Conclusion

The studies presented within this thesis have made a valuable contribution to the scarcity of research focussing on handover communication and continuity of care across LMICs and within India.

The systematic review highlighted predominantly suboptimal recording and/or transfer of patient information during hospital shift-change, discharge and intra and inter-facility referrals and transfers across LMICs. It also elucidated several systems, organisational cultural and individual HCP factors affecting the quality of handover communication and a range of evaluated interventions, which will help to guide further programmes and studies.

Analyses of mixed-methods data from HCPs and chronic NCD patients from studies conducted in Himachal Pradesh and Kerala states, India, facilitated a deeper exploration of handover and healthcare communication practices. Findings from the outpatient and inpatient studies demonstrated that despite some examples of good practice, there were pervasive deficiencies in the provision of verbal and documented handover and healthcare communication for chronic NCD patients during healthcare consultations and transitions of care. Findings from the prospective inpatient study evidenced significant associations between the quality of discharge communication and adverse health outcomes, indicating that the safety of chronic NCD patient care may be being compromised by the suboptimal exchange of documented discharge information.

The outpatient, inpatient and HCP studies each demonstrated a lack of structured and standardised handover communication practices, protocols and HCP training and highlighted further systems and patient-related factors affecting the quality of handover communication. Interviews with patients and HCPs helped to identify possible strategies for improving chronic NCD patient information exchange.

Given the rising burden of NCDs across LMICs and within India, the findings from this thesis research are timely and critical for effective health systems development. They have highlighted a pressing need for structured handover communication training and protocols and indicated that patient-held booklets are likely to be an acceptable and effective part of improving the storage and exchange of chronic NCD patient information. Further high-quality research is required to investigate the impact of context-specific training, protocols and patient-held booklets, as well as to assess the validity of the associations found between the quality of discharge communication and chronic NCD patient outcomes. There is also a need for further in-depth exploration of factors affecting the quality of handover communication within and between levels of care in India and other LMICs; both patients and HCPs should be actively involved in this research to assist in identifying areas for effective and sustainable intervention.

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APPENDICES

Appendix 1. Methods

Previous handover research study questionnaire used as basis for the India handover project patient questionnaires

PATIENT QUESTIONNAIRE
PRIMARY AND SECONDARY CARE INTEGRATION IN LOW AND MIDDLE INCOME COUNTRIES; A CASE STUDY OF CLINICAL HANDOVER IN TWO GOVERNMENT HOSPITALS IN NIGERIA

Instructions: please complete all. **Tick** the appropriate space that suits your best response to each question
All the information below will remain confidential and for the research project use only.

SECTION A: DEMOGRAPHICS

1. Age (years)

20-29 ……..
30-39 ……..
40-49 ……..
50-59 ……..
60-69 ……..
70 and older ……..
Don't know ……..

2. Sex-

Male ……..
Female ……..

3. Religion-

Christianity ……..
Islam ……..
Traditional ……..
Other ……..

4. Ethnicity-

Yoruba ……..
Hausa ……..
Igbo ……..
Others ……..

5. Highest level of education -

Literate but not completed primary school…….
Primary school completed…..……..
Secondary School completed …..……..
University completed…..……..
Vocational Studies completed…..……..
None …..……..

6. Occupation-

Artisan/craftsman …..……..
Small Business (e.g. carpenter, plumber, petty trading) …..……..
Average business (e.g. own/rent a shop/shed) …..……..
Large business (e.g. own a company, employ staff/labour) …..……..
Junior civil servant (e.g. secretary, assistant) …..……..
Senior civil servant (e.g. team lead, director)
Primary/secondary school teacher …..……..
University lecturer …..……..
Other (E.g. farmer, street vendor, taxi driver, etc.) …..……..

7. Where do you live?

Kwara State. …..……..
FCT …..……..
Other (please specify) …..……

8. Marital status-

Single …..……..
Married …..……..
Divorced …..……..
Widow(er) …..……..

SECTION B: PAST MEDICAL HISTORY

9. What medical condition has brought you to hospital today?

Diabetes …..……..
Hypertension …..……..
Heart disease …..……..
Don't' know …..……..
Other (Please explain) ……

10. Have you visited any other health centre/doctor/nurse/chemist before coming here?

Yes …..……..
No …..……..

11. If your answer to the last question 10 is yes, please specify- (You can choose more than one)

Local Government Health Centre ……..
Another general hospital ……..
Private hospital ……..
Private Doctor or nurse ……..
Traditional healer ……..
Religious healer ……..Other

12. For how long have you used this other health service before coming to this hospital (or at the same time as occasional visits to this hospital)?

Less than 6 months ……..
6months – 1year ……..
1year – 2years ……..
More than 2 years ……..
Don't know ……..

13. For how long have you used this current hospital?

Less than 6 months ……..
6months – 1year ……..
1year – 2years ……..
More than 2 years ……..
Don't know ……..

SECTION C: PREVIOUS CARE HISTORY

14. What has made you visit this hospital today instead of the health service you mentioned in question 11?

Cost is lower here ……..
This hospital is nearer to where I live ……..
The other clinic or someone else referred (sent) me here ……..
Employment reasons ……..
Quality of care is better here ……..
Personal reasons ……..
Other ……..

15. Do you have any document, notes or other pieces of paper from your previous health provider to this hospital?

Yes ……..
No …….. **[if your answer is 'No' please proceed to question 17]**

16. Do you have that note with you today?

Yes ……..
No ……..

17. If your answer to question 16 is No, please provide a reason-

Forgot it at home …..…..
Lost it …..…..
I've always had it but never used it …..…..
I've never been asked for it here …..…..
My children/spouse handle such documents, so I don't know …..…..

18. If your answer to question 15 was yes, please how did you get it- (please may I see it?)

I was given one without asking …..…..
I had to ask for a document …..…..
In this hospital I need one before I am can be attended to …..…..

19. Note for researcher: is the referral paper any of the following?

Picture card ……..
Letter ……..
Referral form ……..

20. Does it contain any of the following:

Past medical history ……..
Patient's symptoms ……..
Tests already performed ……..
Tests to be performed ……..
Differential diagnosis ……..Medication ……..

Thank you for your participation

PATIENT QUESTIONNAIRE (PART II)
TITLE OF RESEARCH PROJECT: PRIMARY AND SECONDARY CARE INTEGRATION IN LOW AND MIDDLE INCOME COUNTRIES; A CASE STUDY OF CLINICAL HANDOVER IN TWO GOVERNMENT HOSPITALS IN NIGERIA

Instructions: please answer all. Tick the appropriate space that suits your best response to each question. You may choose more than one option where possible

1. Do you plan to return to your previous care provider (nurse, doctor, etc) you visited before coming here if you had one?

Yes ……..
No ……..
Don't know ……..

2. If yes, how will you explain to them what was done for you here?

I told the doctor here to explain to my child/spouse ……..
I asked the doctor here to explain to me so I can tell the other doctors I may see ……..
The doctor here gave me a note to take back to my other health provider ……..
Don't know ……..

3. In your opinion does having a note make the care you received here better than other places you have visited?

Yes ……..
No ……..
Don't know ……..

4. If yes, why?

Because I don't know how to explain my condition and the note helps ……..
It helps me to get attended to faster ……..
I feel it's more professional ……..
I don't know ……..

5. If no, why?

I don't know ……..
Everyone receives the same standard of care regardless ……..
It's a waste of time ……..
Other (Please explain briefly)
……
……

6. Did the doctor explain your condition to you?

Yes ……..
No ……..
Don't know ……..

7. What were you asked to do after leaving here?

Come back ……..
Go to local hospital ……..
Get some new medication ……..
Continue with old medication ……..
Do some tests ……...

8. Did the doctor give you a **note to give your other doctor** or a **note to come back here**?

Yes ……..
No ……..
Don't know ……..

9. If yes please may I see it?

10. Note for researcher- is the referral paper any of the following?

Patient card/note ……..
Letter ……..
Referral form ……..

11. Does it contain any of the following:

Past medical history ……..
Patient's symptoms ……..
Tests already performed ……..
Tests to be performed ……..
Differential diagnosis ……..
Medication ……..

Thank you for your participation

Outpatient study questionnaire

BEFORE SEEING THE DOCTOR

PRIMARY AND SECONDARY HEALTHCARE INTEGRATION

Instruction to the researcher: Tell patient all information given is confidential and will be stored in a safe and secure place, make sure you hand the form to you supervisor as soon as you finish each day

Instructions: please complete all. **Tick** the appropriate space that suits your best response to each question or write in as appropriate.

All the information below will remain confidential and for the research project use only.

Patient I.D/ MRD No:	
Patient first name:	

Date of filling questionnaire: dd/mm/yy

Hospital at which recruited:

Researcher's initials:

SECTION A: DEMOGRAPHICS (Choose one only)

1. **If known, please provide your age. If not exactly known, please proceed to Question 2.**

   _____ years **[Skip to question 3]**

   ☐$_{1a}$ Exact age not known

2. **Age (years)**

   ☐$_{1}$ 18-29

   ☐$_{2}$ 30-39

   ☐$_{3}$ 40-49

   ☐$_{4}$ 50-59

☐5 60-69

☐6 70 and older

☐7 Don’t know

3. **Sex**

☐1 Male
☐2 Female
☐3 Other

4. **Religion**

☐1 Hinduism
☐2 Sikhism
☐3 Buddhism
☐4 Christianity
☐5 Islam
☐6 Other (please specify)

5. **Highest level of education**

☐1 Illiterate
☐2 Literate but not completed primary school
☐3 Primary school completed (4th std)
☐4 Secondary School completed (7th std)
☐5 Higher School/Vocational Studies completed (12th std)
☐6 Graduate or above
☐7 None

6. **Are you currently working/employed?**

☐1 Yes
☐2 No
☐3 Retired
☐4 Student

7. **How long did it take you to reach this hospital?**

☐1 within 1 hour
☐2 1-4 hours
☐3 >4 hours

8. **Marital status**

☐1 Single
☐2 Married
☐3 Divorced
☐4 Widow(er)

9. How many adults (aged 18 and over) live in the same house other than you?

☐1 0

☐2 1-2

☐3 3-4

☐4 5-6

☐5 More than 6 adults

10. How many children (aged 17 and under) live in the same house other than you?

☐1 0

☐2 1-2

☐3 3-4

☐4 5-6

☐5 More than 6 children

11. How many rooms do your have in your house (other than kitchen and bathroom/toilet)? (Please count the hall)

☐1 1

☐2 2-3

☐3 4 or more

SECTION B: MEDICAL condition

12. What medical condition has brought you to hospital today? (You may choose more than one)

☐1 Diabetes

☐2 Hypertension/high blood pressure

☐3 Heart disease (other than hypertension alone)

☐4 Brain stroke

☐5 long term breathing problems (not heart problem, things like asthma or COPD e.g. having inhalers/puffs)

☐6 Don't know

☐7 Other (Please explain, including other conditions)

_____

13. For this condition that made you come to this hospital today, have you visited any of the following to get advice before coming? (You may choose more than one)

☐1 No, not asked advice from anyone else and came to hospital only for this illness

☐2 Government Primary Care

☐3 This hospital OPD/IPD

☐4 Other Government Hospital

☐5 Private hospital or nursing home

☐6 Private Doctor or nurse

☐7 Pharmacist/chemist

☐8 Traditional healer (Ayurveda, yoga, Unani, siddha, homoepathy)

☐9 Religious healer

☐10 Other (please specify)

_____

14. Who sent you here?

☐1 No-one told me and I decided to come to hospital myself

i. Affordable
ii. Better quality of treatment
iii. I know someone here

iv. Its near my house

v. Other

☐2 Government Primary Care

☐3 Other Government Hospital

☐4 This hospital OPD/IPD

☐5 Private hospital or nursing home

☐6 Private Doctor or nurse

☐7 Pharmacist/chemist

☐8 Traditional healer (Ayurveda, Yoga, Unani, Siddha, Homoepathy)

☐9 Religious healer (prayer/spiritual related)

☐10 Family/friends

☐11 Other (please specify)

15. When you came here did you bring a note from doctor that lists your medicines

☐1 Yes

☐2 No

☐3 I don't have a prescription card

☐4 I had but I didn't bring it

☐5 I had lost it (misplaced)

16. When you came here did you bring your medicine with you

☐1 Yes

☐2 No

☐3 I didn't have medicines to bring

17. **When you came here, did you bring any document (other than prescription card), such as notes or other pieces of paper from your previous health provider to this hospital? (Choose one only)**

☐1 Yes **[Go to Q.19, 20]**

☐2 No **[Go to Q.18, skip Q.19, 20]**

☐3 I didn't have given any… to bring **[Please end here]**

18. **If you answered no to Q. 17 that you had a note but did not bring it, please provide a reason (you may choose more than one):** ***(Note for Researcher: Don't read the options)***

☐1 Forgot it at home
☐2 Lost it
☐3 I've always had it before but never used it so did not bring this time
☐4 I didn't think that its relavant to bring the note with me to hospital
☐5 I've never been asked for it here so did not bring it this time
☐6 My children/spouse handle such documents, so I don't know
☐7 Other (please specify)

19. **If you answered Yes Q. 17, you brought the note, how did you get it (you may choose more than one) -**

☐1 I was given one without asking

☐2 I had to ask for a document

☐3 In this hospital I need one before I can be attended to

☐4 Other (please specify)

_____

_____

20. **If you answered Yes Q. 17, you brought the note, please may I see the note.**

☐1 Yes

☐2 No

RESEARCHER SECTION

21. Note for researcher; please try to find the referral paper in the hospital records, or from the patient if he/she still has it. Is the referral paper any of the following? (Choose one only)

☐**1** Discharge summary of other hospital

☐**2** Opd card of other hospital/clinic

☐**3** Prescription card

☐**4** Letter

☐**5** Referral form

☐**6** Other (please specify)

_____

22. Researcher, please look at the referral paper and note if it contains any of the following: (you may choose more than one)

☐1 Clinical notes-**NOT LEGIBLE**

☐2 Name of the doctor/person to contact at the hospital

☐3 Date on notes

☐4 Name, age and sex of the patient

☐5 Past medical history for this condition

☐6 Past medical history for other conditions

☐7 Patient's symptoms, signs and problems when admitted

☐8 Tests performed during admission (no results)

☐9 Tests performed during admission (with results)

☐10 Diagnosis

☐11 Medication to take at home after discharge

☐12 Recommendation for how long to take the medication after discharge and what to do in the long term

☐13 Lifestyle changes (Diet, Tobacco, Alcohol and Exercise)

☐14 Advice to return to OPD or other doctor for a review

☐15 Other (please specify)

_____

Thank you for your participation

AFTER SEEING THE DOCTOR

PRIMARY AND SECONDARY HEALTHCARE INTEGRATION

Instruction to the researcher: Tell patient all information given is confidential and will be stored in a safe and secure place, make sure you hand the form to you supervisor as soon as you finish each day

Instructions: please complete all. **Tick** the appropriate space that suits your best response to each question or write in as appropriate. All the information below will remain confidential and for the research project use only.

Section A: Checkup plans

1. **Do you plan to return to your previous DOCTOR (researcher say the name of the provider) you visited before coming here if you had one? (Choose one only)**

   ☐1 Yes **[Go to Q.2]**

   ☐2 No **[Please proceed to Question 3]**

   ☐3 Don't know **[Please proceed to Question 3]**

2. **If yes, how will you explain to them what was done for you here in this OPD clinic? (You may choose more than one)**

   ☐1 I told the doctor here to explain to my child/spouse/person who is with me

   ☐2 I asked the doctor here to explain to me so I can tell the other doctors I may see

   ☐3 The doctor here gave me a note to take back to my other health provider

   ☐4 Don't know

   ☐5 Other (please specify)

   _____

   _____

3. **Did the doctor explain your condition to you? (Choose one only)**

   ☐1 Yes

   ☐2 No

☐3 Don't know

4. **What were you asked to do after leaving here? (You may choose more than one)**

☐1 Come back for a check-up

☐2 Go to local hospital for a check-up

☐3 Get some new medication

☐4 Continue with old medication

☐5 Do some tests

☐6 Don't know

☐7 Other (please specify)

_____

_____

5. **Did the doctor give you a <u>note to give to your local doctor</u>? (Choose one only)**

☐1 Yes

☐2 No

☐3 Don't know

6. **Did the doctor give you a <u>note to come back here to the clinic</u>? (Choose one only)**

☐1 Yes
☐2 No
☐3 Don't know

7. **Do you think it is important to get such a note? Why?** ***(Note for Researcher: Please don't read out the options)*** **(You may choose more than one)**
Yes because:

☐1 Don't know

☐2 It helps to understand my condition and explain to others

☐3 It helps me to get attended to faster when I visit local/family doctor or outpatients next time

☐4 I feel it's more professional

☐5 I have to submit this for claiming insurance

☐6 Other (please specify)

_____

_____

No because:

☐1 The note gets lost

☐2 Everyone receives the same standard of care regardless

☐3 Other (Please explain briefly)

_____

_____

If you have a note, please may I see it?

☐1 Yes

☐2 No (If no, then please end the interview)

RESEARCHER SECTION

8. **Note for researcher- is the referral paper any of the following? (Choose one only)**

☐**1** Patient card/note

☐**2** Letter

☐**3** Referral form

☐**4** Other (please specify)

_____

9. **Does it contain any of the following: (you may choose more than one)**

☐A Referral paper-**NOT LEGIBLE**

☐B Name of the doctor/person to contact at the hospital

☐C Date on notes

☐D Name, age and sex of the patient

☐E Past medical history for this condition

☐F Past medical history for other conditions

☐G Patient's symptoms, signs and problems when admitted

☐H Tests performed during admission (no results)

☐I Tests performed during admission (with results)

☐J Diagnosis

☐11 Medication to take at home after discharge

☐12 Recommendation for how long to take the medication after discharge and what to do in the long term

☐13 Lifestyle changes (Diet, Tobacco, Alcohol and Exercise)

☐14 Advice to return to OPD or other doctor for a review

☐15 Other (please specify)

_____

Thank you for your participation

Inpatient study questionnaire

PATIENT ID/MRD No:					
Patient first name:					

Date of filling questionnaire:

Hospital at which recruited:

Researcher's initials:

Researcher should ensure the address of patient is correctly taken below for home visit:

House and street name:	
District:	
Town/village:	
Phone number:	
Phone numbers of a relative/friend who knows how to find you and can give you messages:	

Describe how to get to your house from a main shop or building in your town/village:

_____

_____

_____

_____

_____

_____

Please draw a map if possible to help finding the address:

AT TIME OF ADMISSION

PRIMARY AND SECONDARY HEALTHCARE INTEGRATION

Instruction to the researcher:

Tell patient all information given is confidential and will be stored in a safe and secure place.

Please complete all. **Tick** the appropriate space that suits your best response to each question or write in as appropriate.

At the end make sure you hand the form to your supervisor as soon as you finish each day

PATIENT ID/MRD No:					
Patient first name:					

Date of filling questionnaire: dd/mm/yy

Hospital at which recruited:

Researcher's initials:

SECTION A: DEMOGRAPHICS (Choose one only)

23.If known, please provide your age. If not exactly known, please proceed to Question 2.

_____ years Skip to question 3

☐1 Exact age not known

24.Age (years)

☐1 18-29

☐2 30-39

☐3 40-49

☐4 50-59

☐5 60-69

☐6 70 and older

☐7 Don't know

25.Sex

☐1 Male
☐2 Female
☐3 other

26.Religion

☐1 Hinduism
☐2 Sikhism
☐3 Buddhism
☐4 Christianity
☐5 Islam
☐6 Other (please specify)

27.Highest level of education

☐1 Illiterate
☐2 Literate but not completed primary school
☐3 Primary school completed (4th std)
☐4 Secondary School completed (7th std)
☐5 Higher School/Vocational Studies completed (12th std)
☐6 Graduate or above
☐7 None

28. Are you currently working/ employed? (when you are not admitted to hospital)

☐1 Yes
☐2 No
☐3 Retired

29. How long will it take you normally to reach this hospital?

☐1 within 1 hour
☐2 1-4 hours
☐3 >4 hours

30. Marital status

☐1 Single
☐2 Married
☐3 Divorced
☐4 Widow(er)

31. How many adults (aged 18 and over) live in the same house other than you?

☐1 0

☐2 1-2

☐3 3-4

☐4 5-6

☐5 More than 6 adults

32. How many children (aged 17 and under) live in the same house other than you?

☐1 0

☐2 1-2

☐3 3-4

☐4 5-6

☐5 More than 6 children

33. How many rooms do your have in your house (other than kitchen and bathroom/toilet)? (Please count the hall)

☐1 1

☐$_2$ 2-3

☐$_3$ 4 or more

SECTION B: MEDICAL condition

34. What medical condition has brought the patient to hospital for this admission – researcher should ask the nurse in charge? (You may choose more than one)

☐$_1$ Diabetes
☐$_2$ Hypertension/high blood pressure
☐$_3$ Heart disease (other than hypertension alone)
☐$_4$ Brain stroke
☐$_5$ long term breathing problems (not heart problem, things like asthma or COPD e.g. having inhalers/puffs)
☐$_6$ Don't know
☐$_7$ Other (Please explain)

_____

35. Have you visited anyone to get advice <u>before coming for admission for this illness</u>? Please list all the people you visited. (You may choose more than one)

☐$_1$ No, not asked advice from anyone else and came to hospital only for this illness

☐$_2$ Government Primary Care

☐$_3$ This hospital OPD

☐$_4$ Other Government Hospital

☐$_5$ Private hospital or nursing home

☐$_6$ Private Doctor or nurse

☐$_7$ Pharmacist/chemist

☐$_8$ Traditional healer (Ayurveda, Yoga, Unani, Siddha, Homoepathy)

☐$_9$ Religious healer

☐$_{10}$ Other (please specify)

_____

36.Who sent you here?

☐1 No-one told me and I decided to come to hospital myself (Skip to Q 18)

a) Affordable

b) Better quality of treatment

c) I know someone here

d) Its near my house

e) Other (please specify)

☐2 Government Primary Care

☐3 Other Government Hospital

☐4 This hospital OPD

☐5 Private hospital or nursing home

☐6 Private Doctor or nurse

☐7 Pharmacist/chemist

☐8 Traditional healer (Ayurveda, Yoga, Unani, Siddha, Homoepathy)

☐9 Religious healer (prayer/spiritual related)

☐10 Family/friends

☐11 Other (please specify)

37.If a doctor sent you here, did they give you a note, document or letter to bring with you to hospital (other than just a list of drugs or a test result). Did you bring with you to the hospital? Or did he call the doctor in hospital? (other than prescription card), such as notes or other pieces of paper from your previous health provider to this hospital? (Choose one only)

☐1 Yes and I handed it in to the doctors/nurses here

☐2 Yes and I have it with me

☐3 Yes I was given something, but did not bring it to the hospital

☐4 I was not given a document to bring, but my doctor talk to the hospital doctor about my condition

☐5 I was not given any documents or notes to bring

38. If you answered that you had a note but did not bring it, please provide a reason (you may choose more than one):

☐1 Forgot it at home
☐2 Lost it
☐3 I've always had it before but never used it so did not bring this time
☐4 I didn't think that its relevant to bring the note with me to hospital
☐5 I've never been asked for it here so did not bring it this time
☐6 My children/spouse handle such documents, so I don't know
☐7 Other (please specify)

39. If you answered Yes you brought the note, how did you get it (you may choose more than one) -

☐1 I was given one without asking (Doctor gave it himself)

☐2 I had to ask for a document

☐3 In this hospital I need one before I can be attended to

☐4 Other (please specify)

_____

40. When you came here did you bring a note from doctor that lists your medicines

☐1 Yes

☐2 No **[Please end here]**

☐3 I don't have a prescription card

☐4 I had but I didn't bring it

☐5 I had lost it (misplaced)

41. When you came here did you bring your medicine with you

☐1 Yes

☐2 No

☐3 I didn't have medicines to bring

42. If you answered Yes Q 17, you brought the note, please may I see the note.

☐1 Yes

☐2 No permission to see the note

RESEARCHER SECTION

43. Note for researcher; please try to find the referral paper/prescription card in the hospital records, or from the patient if he/she still has it. Is the referral paper any of the following? (Choose one or more)

☐1 Discharge summary of other hospital

☐2 OPD note of other hospital/ doctor clinic note

☐3 Medicine's list from doctor

☐4 Test Results sheet

☐5 Formal Letter (to….)

☐6 Referral form (says referral form on top and has subheadings for info to write in it)

☐7 Other (please specify)

_____

44. Researcher, please look at the referral paper and note if it contains any of the following: (you may choose more than one)

☐1 Couldn't find/ not allowed to see

☐2 Referral Letter- **NOT LEGIBLE**

☐3 Past medical history for this condition

☐4 Past medical history for other conditions

☐5 Patient's signs and symptoms

☐6 Tests already performed (no results)

☐7 Tests already performed (with results)

☐8 Diagnosis

☐9 Medication currently taking

☐10 Lifestyle changes (tobacco, diet, alcohol, exercise)

☐11 Tests to be performed/Requested from hospital

☐12 Other (please specify)

_____

Thank you for your participation

AT TIME OF DISCHARGE

PRIMARY AND SECONDARY HEALTHCARE INTEGRATION

Instruction to the researcher:

Tell patient all information given is confidential and will be stored in a safe and secure place.

Please complete all. **Tick** the appropriate space that suits your best response to each question or write in as appropriate.

At the end make sure you hand the form to your supervisor as soon as you finish each day

PATIENT ID/ MRD No:					
Patient first name:					

Date of filling questionnaire:

Hospital at which recruited:

Researcher's initials:

Section: Checkup plans

10.What are your plans for check-up?
(Note for Researcher: Don't read the options for patients)

☐1 I don't plan to go for checkup again until I am sick next time

☐2 I will come to this hospital OPD

☐3 Government Primary Care (local government doctor)

☐4 Private Doctor or nurse (local)

☐5 Other Government Hospital

☐6 Private hospital or nursing home

☐7 Pharmacist/chemist

☐8Traditional healer (Ayurveda, Yoga, Unani, Siddha, Homoepathy)

☐9 Religious healer (prayer/spiritual related)

☐10 Family/friends

☐11 Other (please specify)

11. **How will you explain to the next doctor what was done for you here during admission? (You may choose more than one) (Note for Researcher: Don't read the options for patients)**

☐1 I asked the doctor here to explain to my child/spouse/person who is with me

☐2 I asked the doctor here to explain to me so I can tell the other doctors when I see him

☐3 The doctor here gave me a note or discharge summary to take back to my local/family doctor

☐4 The doctor here telephoned my local/family doctor and told him about my admission

☐5 I will return here and they have my records

☐6 Don't know what I will do because I cannot remember what the doctor said

☐7 Other (please specify)

_____

12. Did the doctor/nurse/someone else explain your condition to you during this admission? (Choose one only)

☐$_1$ Yes

☐$_2$ No

☐$_3$ Don't know

13. Please explain briefly what you understand about your health problem and what you should do to look after yourself after discharge:
(Please ask if the patient or the carer knows about the disease)
(Researcher – please look at the discharge note and judge if the patient has understood correctly? If there is no discharge note, after ask the nurse and see if what the nurse says is the same as patient?) (Please ask about Disease, Control measures, Medicines, Next checkup, signs and symptoms)

☐**$_1$** Patient/Carer understood well almost all important things

☐**$_2$** Patient/Carer understood broadly correct

☐**$_3$** Patient/Carer only knows a little such as diagnosis and medicine

☐**$_4$** Patient/Carer does not know anything much

14. What advice were you given to look after yourself after discharge? (You may choose more than one)

☐**$_1$** don't know

☐**$_2$** Further tests (please explain):

☐**$_3$** Ongoing/Lifelong treatment (please explain):

☐**$_4$** Medicine given at hospital to stop after the course and reviewed

☐**$_5$** Non-drug based advice (please explain – e.g. diet, exercise, tobacco and alcohol)

☐**$_6$** Physiotherapy

☐**$_7$** Other (please explain):

_____

15. What advice were you given about getting the next visit to doctor for check up? (You may choose more than one)

☐1 don't know

☐2 Repeat visits to the Outpatients of this hospital (please explain when you should visit?):----------

☐3 Check-up visits to the Outpatients of another hospital or another specific doctor (please explain when you should visit?):----------

☐4 Visits to a non-doctor providers (please explain):

_____

☐5 Other (please explain):

_____

16. Did the doctor give you a <u>note or discharge summary to give to your other doctor</u> or a <u>note to bring back to OPD here</u>? (Choose one only)

☐1 Yes

☐2 No

☐3 Don't know

17. Do you think it is important to get such a note at discharge? Why? *(Note for Researcher: Don't read the options for patients)*

Yes because:

☐1Don't know

☐2 It helps to understand my condition and explain to others

☐3 It helps me to get attended to faster when I visit local/family doctor or outpatients next time

☐4 I feel it's more professional

☐5 I have to submit this for claiming insurance

☐6 Other (please specify)

_____

No because:

☐1 The note gets lost

☐2 Everyone receives the same standard of care regardless

☐3 Other (Please explain briefly)

_____

RESEARCHER SECTION

18. Researcher please conduct the examination and record the Examination findings:

BP x 3 measurements (with interval of minimum 2 min)

1 ----------

2----------

3----------

(Note for the researcher:

- *Sitting Position*
- *Right arm always, if not then we can measure it in left arm*
- *One finger above the joint*
- *Cuff not too tight, little finger should be abled*

- *if at all the three times BP is higher than 140/100 mmHg then inform the nurse in charge about this)*

Pulse x 3 measurements over 1min each with a minimum of 2 min gap in between

4----------

5----------

6----------

RR x 3 measurements over 1min each with a minimum of 2 min gap in between

7----------

8----------

9----------

19. If you have a note, please may I see it?

☐1 Yes

☐2 No (If No, Please go to Q 14)

20. Note for researcher- please see the discharge note and mark if the discharge paper is any of the following? (Choose one only)

☐1 discharge booklet

☐2 Discharge note /note/ Letter (not structured)

☐3 discharge form/Patient card (structured)

☐4 it is just a prescription card (only medicines are written)

☐5 Other (please specify)

_____

21. Does it contain any of the following: (you may choose more than one)

☐1 Clinical notes-**NOT LEGIBLE**

☐2 Name of the doctor/person to contact at the hospital

☐3 Date on notes

☐4 Name, age and sex of the patient

☐5 Past medical history for this condition

☐**6** Past medical history for other conditions

☐**7** Patient's symptoms, signs and problems when admitted

☐**8** Tests performed during admission (no results)

☐**9** Tests performed during admission (with results)

☐**10** Diagnosis

☐**11** Medication to take at home after discharge

☐**12** Recommendation for how long to take the medication after discharge and what to do in the long term

☐**13** Lifestyle changes (Diet, Tobacco, Alcohol and Exercise)

☐**14** Advice to return to OPD or other doctor for a review

☐**15** Other (please specify)

_____

22. Note for researcher- please see the CLINICAL NOTES and mark if it has any of the following? (Choose one or more) (Note for Researcher: It will be hospital nurse)

☐**1** I was not allowed to see/ couldn't find

☐**2** Demographics/ Personal details

☐**3** Major problem admitted for

☐**4** Diagnosis

☐5 Plan of treatment

☐6 Vitals on admission (Blood pressure, pulse, respiratory rate, temperature)

☐7 Daily entries (at least vitals)

☐8 Test results

☐9 Follow-up dates

☐10 Treatment given/advised after discharge

Thank you for your participation

PATIENT'S COMMUNITY QUESTIONNAIRE 5 WEEKS FOLLOW UP

PRIMARY AND SECONDARY HEALTHCARE INTEGRATION

Instruction to the researcher:

Tell patient all information given is confidential and will be stored in a safe and secure place.

Please complete all. **Tick** the appropriate space that suits your best response to each question or write in as appropriate.

At the end make sure you hand the form to your supervisor as soon as you finish each day

PATIENT ID /MRD No:						
First and middle name:						

Date of filling questionnaire:

Hospital:

Researcher's initials:

Section: Follow up details

1. **How your medical condition is now since you left the hospital after discharge? (Choose one only)**

   ☐1 The same

   ☐2 Better

   ☐3 Worse

   ☐4 Patient died – researcher to thank family and end interview

2. Have you consulted anyone about <u>same illness</u> since being discharged from hospital? (Choose one only)

☐1 Yes **[Please complete Table 2i below]**

☐2 No **[Please proceed to Question 3]**

☐3 Don't know **[Please proceed to Question 3]**

Table 2i

<u>Since discharge, patient has been seen by:</u>	**<u>Time after discharge:</u>**				
	1st week (a)	**2nd week (b)**	**3rd week ©**	**4th week (d)**	**5th week (e)**
I was readmitted into hospital again					
Government Primary Care					
Other Government Hospital					
OPD from same hospital that was admitted					
Private hospital or nursing home					

Private Doctor or nurse					
Pharmacist/chemist					
Traditional healer (Ayurveda, Yoga, Unani, Siddha, Homoepathy)					
Religious healer (prayer/spiritual related)					
Family/friends					
Other non-professional (please specify below)					

3. Are you still taking the medicines you were given in hospital or changed it?

☐$_1$ I had no medication when I left the hospital-skip Q 4

☐$_2$ no – I am still taking same medicine the hospital gave me-skip Q 4

☐$_3$ no – I finished the medicine the hospital gave me and got some more to continue the same medicines-skip Q 4

☐$_4$ some of the medicine I am taking now is different from what the hospital gave me but some of it is the same

☐5 yes changed – I stopped the medicine after it finished and I am on no medicines now

☐6 yes changed – I am now on a different medicine - I stopped the medicine from hospital after it finished

☐7 yes changed – I am now on a different medicine than what the hospital gave me - I stopped the medicine from hospital after I got new advice

4. If answered yes, was the change of medicine because of a new advise and who gave you this advice?

☐1 I was readmitted into hospital again

☐2 Government Primary Care

☐3 Other Government Hospital

☐4 OPD from same hospital that was admitted

☐5 Private hospital or nursing home

☐6 Private Doctor or nurse

☐7 Pharmacist/chemist

☐8 Traditional healer (Ayurveda, Yoga, Unani, Siddha, Homoepathy)

☐9 Religious healer (prayer/spiritual related)

☐10 family/friends

☐11 Other (please specify)

_____

5. After leaving hospital was the medication prescribed to the patient easy to get? (choose one only)

☐1 I was given it at the hospital

☐2 Yes it was easy to get in a pharmacy/chemist

☐3 No I could not find it or was very hard to find (Please specify why)

☐4 Don't know

---

6. Was getting the medication affordable? (choose one only)

☐1 I was given it at the hospital

☐2 Yes, it was affordable to get in a pharmacy/chemist

☐3 No it was expensive for me

☐4 Don't know

7. When you got home from hospital were you clear how to look after yourself and how to take medication? (Carer or patient can respond) (choose one only)

☐1 Yes (For patient/carer)

☐2 No

☐3 I had no medication

8. When you got home from hospital were you clear on when to see your doctor (local or hospital doctor) next? (Carer or patient can respond) (Choose one only)

☐1 Yes

☐2 No

☐3 Don't know

9. At the time of discharge did <u>someone</u> in the hospital explain to you in what situations/condition (signs and symptoms) you need to visit the doctor again without delay (before your follow-up appointment)? (Carer or patient can respond) (Choose one only)

☐1 Yes

☐2 No

☐3 Don't know

Note: Please explain the patient that nothing will happen with the result of the monetary questions

10. **Overall during the admission how much did you/family spent approximately on the following?** ***(Note for researcher: Either patient or carer can answer)***

Items	**Cost**
a) Travel	
b) Accommodation and food	
c) Medication and equipment	
d) Tests	
e) Hospital Staff	

11. **How did you cope up with the expenses during admission at hospital?**

☐$_1$ Borrow

☐$_2$ Savings

☐$_3$ Take loans

☐$_4$ Sale of assets (animals, house, jewelery and others)

☐$_5$ insurance

☐$_6$ Others (Please specify)

Please update/confirm patient's future address and phone number details if these are likely to be different from the discharge address.

House and street name:	
PIN Code	
Landline phone number:	
Mobile phone number:	
Phone number of a relative/friend who knows how to find you:	

Describe how to get to your house from a main shop or building in your town/village:

_____

_____

Thank you for your participation

COMMUNITY QUESTIONNAIRE 4 MONTHS FOLLOW UP

PRIMARY AND SECONDARY HEALTHCARE INTEGRATION

Instruction to the researcher:

Tell patient all information given is confidential and will be stored in a safe and secure place.

Please complete all. **Tick** the appropriate space that suits your best response to each question or write in as appropriate.

At the end make sure you hand the form to your supervisor as soon as you finish each day

PATIENT ID/MRD No:						
First name:						

Date of filling questionnaire:

Hospital:

Researcher's initials:

Section: Follow up details

1. **How is your medical condition now compared to when you left the hospital after discharge? (Choose one only)**

   ☐1 The same

   ☐2 Better

   ☐3 Worse

   ☐4 Patient died – researcher to thank family and end interview

2. **Have you consulted anyone about your illness since being discharged from hospital? (Choose one only)**

   ☐1 Yes **[Please complete Table 2i below]**

   ☐2 No **[Please proceed to Question 3]**

☐3 Don't know **[Please proceed to Question 3]**

Table 2i

Since discharge, patient has been seen by:	**Time after discharge:**				
	1st month (a)	**2nd month (c)**	**3rd month (d)**	**4th month (e)**	
I was readmitted into hospital again					
Government Primary Care					
Other Government Hospital					
OPD from same hospital that was admitted					
Private hospital or nursing home					
Private Doctor or nurse					

Pharmacist/chemist					
Traditional healer (xxx options)					
Religious healer (prayer/spiritual related)					
Family/friends					
Other non-professional (please specify below)					

_____

_____

3. Are you still taking the medicines you were given in hospital or changed it?

☐1 I had no medication when I left the hospital- skip Q.4

☐2 no – I am still taking the medicine the hospital gave me – skip Q.4

☐3 no – I finished the medicine the hospital gave me and got some more to continue the same medicines -skip Q.4

☐4 some of the medicine I am taking now is different from what the hospital gave me but some of it is the same

☐5 yes changed – I stopped the medicine after it finished and I am on No medicines now

☐6 yes changed – I am now on a different medicine - I stopped the medicine from hospital after it finished

☐7 yes changed – I am now on a different medicine than what the hospital gave me - I stopped the medicine from hospital after I got new advice

4. Was the change of medicine because of a new advise and who gave you this advice?

☐1 I was readmitted into hospital again

☐2 Government Primary Care

☐3 Other Government Hospital

☐4 OPD from same hospital that was admitted

☐5 Private hospital or nursing home

☐6 Private Doctor or nurse

☐7 Pharmacist/chemist

☐8 Traditional healer (Ayurveda, Yoga, Unani, Siddha, Homoepathy)

☐9 Religious healer (prayer/spiritual related)

☐10 family/friends

☐11 Other (please specify)

---

5. If you have seen a DOCTOR since admission 4 months ago, were you clear how to look after yourself and how to take medication? (Carer or patient can respond) (choose one only)

☐1 Yes

☐2 No

☐3 I was given no medication

☐4 I have not seen any doctor since hospital admission

☐5 Don't know

6. **If you have seen a DOCTOR since admission 4 months ago, were you clear on when to see your doctor (local or hospital doctor) next? (Carer or patient can respond) (Choose one only)**

☐1 Yes

☐2 No

☐3 I have not seen any doctor since hospital admission

☐4 Don't know

7. **At the time of discharge did someone in the hospital explain to you in what situations/condition (signs and symptoms) you need to visit the doctor again without delay (before your follow-up appointment)? (Carer or patient can respond) (Choose one only)**

☐1 Yes

☐2 No

☐3 Don't know

8. **Researcher please conduct the examination and record the Examination findings:**

BP x 3 measurements (sitting position according to instructions with a minimum

of 2 min gap in between)

1 ----------

2 ----------

3 ----------

Note for the researcher:

- *Sitting Position*
- *Right arm always, if not then we can measure it in left arm*
- *One finger above the joint*
- *Cuff not too tight, should be able to insert little finger*
- *if at all the three times BP is higher than 140/100 mmHg then inform the nurse in charge about this)*

Pulse x 3 measurements over 1min each with a minimum of 2 min gap in between

4 ----------

5 ----------

6 ----------

RR x 3 measurements over 1min each with a minimum of 2 min gap in between

7 ----------

8 ----------

9 ----------

Thank you for your participation

Healthcare provider questionnaire

PRIMARY AND SECONDARY HEALTHCARE INTEGRATION

Instructions: please complete all. **Tick** the appropriate space that suits your best response to each question or write in as appropriate. All the information below will remain confidential and for the research project use only.

Date of filling the form (dd/mm/yyyy) --------/---------/----------

Hospital or clinic name:

State:

District:

SECTION A: DEMOGRAPHICS (Choose one only)

1. **What is your highest medical qualification please?**

   ☐1 MBBS/BAMS
   ☐2 Post graduate specialty
   ☐3 Super specialty/PhD
   ☐4 Other

2. **Age (years)**

   ☐1 18-29
   ☐2 30-39
   ☐3 40-49
   ☐4 50-59
   ☐5 60-69
   ☐6 70 and older

3. **Sex**

   ☐1 Male
   ☐2 Female

4. **What is your designation and specialty:**

   ---------- ----------

SECTION B: WORK & TRAINING

5. Have you ever worked in any of the following? (You may choose more than one)

HEALTH SETTING	PERIOD WORKED (in months)	POSITION
Primary Health Centre(s)$_1$		
Private Hospital$_2$		
Government/district Hospital$_3$		
Teaching Hospital$_4$		

6. As far as you recall, as an undergraduate or while working, have you had any structured training for hospital shifts or for transfer of information at shift times in hospital practice? (Choose one only)

☐$_1$ Yes **[Go to Q.7]**
☐$_2$ No **[Go to Q.8]**
☐$_3$ Don't know

7. If you answered Yes to Question 6, is the training promoted or regulated nationally? (Choose one only)

☐$_1$ Yes
☐$_2$ No
☐$_3$ Don't know

8. As far as you recall, as an undergraduate or while working, have you had any structured training for primary care staff writing referral notes when referring patients to hospitals or hospital doctors writing discharge notes for primary care doctors to pass on patient's clinical information to them? (Choose one only)

☐$_1$ Yes for referral notes to hospitals **[Go to Q.9]**
☐$_2$ Yes for discharge notes to primary care **[Go to Q.9]**
☐$_3$ No **[Go to Q.10]**

☐$_4$ Don't know

9. If you answered Yes to Question 8, is the training promoted or regulated nationally? (Choose one only)

☐$_1$ Yes
☐$_2$ No
☐$_3$ Don't know

10. Is the training only for clinical staff in hospital specifically or includes nurses and midwives etc? (Choose one only)

☐$_1$ Yes
☐$_2$ No
☐$_3$ Don't know

11. Please specify the training you had (you may choose more than one):

☐$_1$ Undergraduate clinical training in University
☐$_2$ In-service training in most government hospitals
☐$_3$ Training in only a few teaching hospitals
☐$_4$ Training in most private hospitals
☐$_5$ Training in only a few private hospitals
☐$_6$ Don't know
☐$_7$ Other (please specify)

_____

12. In your opinion, how applicable are each of the following <u>barriers to improving the information that doctors and nurses pass on to each other between shifts in this hospital</u>? (You may choose more than one)

	Not Applicable	Not Very Applicable	Moderately Applicable	Very applicable	Don't know
Poor patient record keeping in hospitals[1]					
Lack of timely communication *(i.e. delayed transfer of information)* [2]					
Excessive workload/time pressure of health professionals, [3]					
Lack of resources*(e.g. financial, equipment including paper records, communication systems of computer or phone etc, no postal system, no finances)* [4]					
Lack of involvement from family/carer/patient [5]					
Poor health system integration or guidelines between institutions *(e.g. primary health care system and hospitals exist, but there are no guidelines or*					

systesm for transfer of patient information on discharge or transfer) [6]					
Poor health systems in general *(e.g. no systematic primary health care system or no transfer system since there are very few hospitals and all work independently)* [7]					

13. Which of the following procedures exist in your area when primary care doctors or other health providers refer a patient to hospital?

[The health care provider here means at any level e.g. the next hospital, the primary care doctor, or nurse, or physiotherapist, or ASHA, or any other health professional] (You may choose more than one)

☐1 Brief note or picture referral cards sent somehow to the hospital (posted or internal system)
☐2 Letters or standard referral forms given to patient to give to hospital
☐3 Letter or standard referral form sent somehow to the hospital (posted or internal system or emailed)
☐4 Phone calls to the hospital by the primary care doctor for telling him about the referred patient (as a regular system of referral)
☐5 Email or other electronic communication to hospital about the referred patient (as a regular system of referral)
☐6 None of the above
☐7 Don't know
☐8 Other (please specify)

_____

_____

_____

14. Which of the following procedures exist in your area when hospital discharges a patient? (You may choose more than one)

☐1 Brief note sent somehow to primary care doctor (posted or internal system)
☐2 Letters or standard referral forms given to patient

☐$_3$ Letter or standard referral form sent somehow to primary care doctor (posted or internal system or emailed)

☐$_4$ Phone calls to the primary care doctor from the hospital for telling him about the referred patient (as a regular system)

☐$_5$ Email or other electronic communication to the primary care doctor from the hospital about the discharged patient (as a regular system of referral)

☐$_6$ None of the above

☐$_7$ Don't know

☐$_8$ Other (please specify)

_____

_____

_____

15. In your opinion, how applicable are each of the following <u>barriers to improving</u> the referral notes/information that <u>primary care staff (doctors or others) pass on to hospital doctors about the patient they refer</u>? (You may choose more than one)

	Not Applicable	**Not Very Applicable**	**Moderately Applicable**	**Very applicable**	**Don't know**
Lack of timely communication$_1$ *(i.e the referral note is not there at the time of seeing the patient)*					
Excessive workload/time pressure of primary care staff/doctors, $_2$					
Lack of resources – *need forms, stationary, postal system*$_3$					
Lack of involvement from family/carer/patient –					

patients do not care about referral notes[4]					
Poor health system integration or guidelines between institutions *(e.g. primary health care system and hospitals exist, but there are no guidelines or systems for transfer of patient information on referral or transfer)* [5]					
Poor health systems in general *(e.g. no systematic primary health care system and do not generally work hand in hand with hospitals)* [6]					

16. In your opinion, how applicable are each of the following <u>barriers to improving discharge information that gets passed on after inpatient or OPD from to primary care doctors</u>? (You may choose more than one)

	Not Applicable	Not Very Applicable	Moderately Applicable	Very applicable	Don't know
Poor patient record keeping in hospitals$_1$					
Lack of timely communication *(i.e. delayed sending of discharge note to patient or primary care doctor)* $_2$					
Excessive workload/time pressure of hospital staff (dr or nurses) $_3$					
Lack of resources *(e.g. equipment including paper formats, communication systems of computer or phone etc, no postal system, no finances to encourage)* $_4$					
Lack of involvement from family/carer/patient (patient not care about discharge notes) $_5$					
Poor health system integration or guidelines between institutions					

(e.g. primary health care system and hospitals exist, but there are no guidelines or systesm for transfer of patient information on discharge or transfer) [6]					
Poor health systems in general *(e.g. no systematic primary health care system and do not generally work hand in hand with hospitals)* [7]					

17. In your experience, do any of the following systems exist for monitoring the quality of patient records in this hospital in any of the following ways? (You may choose more than one)

	Does not exist	Hardly ever used	Occasionally used	Alwasys used	Dont know
Supervisory checks of patient records$_1$					
Doctors doing a Clinical audit of a selection of patient records for completeness and quality$_2$					

Other, please specify in the space below and rate in the boxes opposite: 3					

18. As far as you know, are any written form of the following protocols in existence in your State's government hospitals? (You may choose more than one)

Protocol for the following	Does not exist	Hardly ever used	Occasionally used	Always used	Don't know
Referral notes to be sent from primary care to hospitals during referral of patients 1					
Daily doctors' notes in patient's paper records or a system of writing in patient patients case notes (hardcopy) 2					
Daily nurses' notes in patient's case notes (hardcopy) 3					
Computer based patient records (soft copy only) 4					
Summary patient records for discharges in paper or computer format (not updated daily) 5					
Hardcopy test results filed in patient records 6					
Computer based test results saved for reference 7					
Other, please specify in the space below and rate on the boxes opposite: 8					

Thank you for your participation

Outpatient interview topic guides

Interview topic guide for patient and carer

Participant information to be collected:

- Age
- Gender
- Religion
- Highest level of education
- Condition(s)
- Years of having this conditions
- Place village and district

Introduction: Patient, carer/s and researcher; Permission to record; Explanation of purpose of interview and consent process

Please explain your experience or observations in the below circumstances with health care providers in your town in small clinics near you or at hospitals:

Primary to secondary care:

1. Is there any way that your treating community doctor tells the hospital about your condition when they refer you there?

2. Do you think this is important and why? (pls explore if they think it is or is not important)

3. How do you share information with the hospital doctor about your previous medical treatments and conditions (in other hospitals or seeing your local doctors)?

Secondary to primary care:

How does your local treating doctor/close to your house, get to know about what was done in hospital when you are admitted or seen at OPD?

Do you think this is important and why?

What do you do with the discharge summary when you get home after admission in hospital?

Secondary care to patient:

After you are discharged from hospital, how do you know what to do to take best care of yourself (for the months ahead)?

Shortened interview topic guide for outpatients and carers

Patient information to be collected:

- Age
- Gender
- Religion
- Highest level of education
- Condition(s)
- Years of having this conditions
- Place village and district

Introduction: Patient, carer/s and researcher; Permission to record;

Explanation of purpose of interview and consent process

1. What advice/instructions are you given when you see the doctor at the hospital?
2. Do you think that having a patient-held booklet for storing and transporting medical records would be useful? Would you carry a record booklet to healthcare appointments?
3. Do you think that having a booklet would help you to manage your self-care at home?
4. Do you think that having information sheets would help you to manage your self-care at home?
5. Would you like to get detailed written information about your medicines, follow-up and lifestyle advice?

Inpatient interview topic guides

Interview topic guide for patients and carer/s

Patient information to be collected:

- Age
- Gender
- Religion
- Highest level of education
- Condition(s)
- Years of having this conditions
- Place village and district

Introduction: Patient, carer/s and researcher; Permission to record; Explanation of purpose of interview and consent process

1. Brief case description-no. of years they are suffering from chronic condition/s, admitted for what complaint
2. Presenting complaint and general condition-vitals (BP, Pulse, Respiration)
3. Past medical history of this condition or other conditions
4. MRD No. of patients
5. Mobile number/contact details of the patient
6. The local doctors contact details (if any)
7. Ask the patient to narrate what he understood from the doctor's explanation of his/her condition? If not, then did anyone else in the hospital explain to you?
8. Have you got any particular date for follow up appointment?
9. What was nature of your admission? Emergency/during routine check-ups/ transfer from elsewhere?
10. Were you given any lifestyle advice like diet/tobacco/alcohol/physical activity? Was it explained verbally and/or written?
11. Will you prefer to buy medicines from the hospital or outside pharmacy? Why? What are those medicines?
12. Do you get referred to other hospitals for specialised care?
13. In that case, how does your treating doctor pass information regarding your medical requirements to the doctor/hospital he wants to refer you to?
14. Do you think you get some special attention/care with those kind of papers sent by your treating doctor? Or you just get ordinary care irrespective of those letters?
15. If you don't have papers from your previous doctors will you be able to explain your medical condition to the other doctor (could be local/ specialist doctor)? If yes, then can you tell us how? If no, then what do you do?
16. After getting treatment from a specialist do you wish to go back to your local doctor or do you want to continue with the specialist? If yes, then do you get any papers to give? If no, why?
17. So what is the information given in that kind of papers?

18. Where do you usually go for medical treatment / where have you been for treatment since hospital discharge (if applicable)?
19. From your point of view, which is better: treatment at primary health centre, community health centre or hospitals?
20. How long does the doctor spend time with you in primary health centre/community health centre/ hospitals respectively?

Shortened interview topic guide for inpatients and carers

Patient information to be collected:

- Age
- Gender
- Religion
- Highest level of education
- Condition(s)
- Years of having this conditions
- Place village and district

Introduction: Patient, carer/s and researcher; Permission to record;

Explanation of purpose of interview and consent process

1. What advice/instructions are you given when you see the doctor at the hospital?
2. Do you think that having a patient-held booklet for storing and transporting medical records would be useful? Would you carry a record booklet to healthcare appointments?
3. Do you think that having a booklet would help you to manage your self-care at home?
4. Do you think that having information sheets would help you to manage your self-care at home?
5. Would you like to get detailed written information about your medicines, follow-up and lifestyle advice?

Healthcare provider interview topic guides

Interview topic guide for healthcare providers

Note to Researchers: If a healthcare provider states they have limited time to be interviewed, please use the shortened topic guide below.

Healthcare provider information to be collected:

- Speciality
- Years of relevant experience
- Place of work
- Designation

Introduction: Healthcare provider and researcher; Permission to record;

Explanation of purpose of interview and consent process

1. Do patients bring documents to the hospital related to their health condition?
2. How frequently do they bring them? (i.e, I can get it once but not always), if they don't bring then why? Doctors are not giving or patients are not giving? Where is the problem? From your experience what can be done for this?
3. How many patients bring in a day? (i.e, 3 out of 10 or so)
4. What are advantages and/or disadvantages of having old medical records?
5. From your experience, do you get patients referred from Primary Health Centres/Community Health Centres? What do they bring when they come?
6. From your experience, do you have to refer some patients to other hospitals? What do you do then? Please help me understand in situations like Diabetes (controlled/uncontrolled), Stroke, High Blood Pressure, Myocardial Infarction, COPD, Asthma, heart diseases, complications of diabetes
7. How do you refer in that situation? What is the important information that you think should be transferred?
8. Once patients are managed at higher centres, are they encouraged to come back to you? Do they come back and why?
9. Do you also encourage patients to go back to primary/community health centres for follow up care? Please help me understand in what situations you would do that and in which situations you would what them to come back to you?
10. In your hospital do you have a format for writing referrals to different hospitals (be it primary or tertiary hospital)? If not, would it be useful to have?
11. Is it available for both outpatients and inpatients?
12. When the patients are referred from peripheral institutions, will they have a referral letter or paper communicating the medical condition of the patient? What would be the information that is passed on?
13. Do we have training on how to write referrals in MBBS or jobs?

14. What could be motivating the doctors to write a referral letters?
15. What are patients told at discharge? Are they given any documents/papers?
16. How can we improve this situation? E.g. Accreditation/department rules/ audit on discharge summaries/grading/promotion of doctors?
17. What would you like to know from the local treating doctor about the patient (i.e. medically) when they come to you?
18. What are the barriers in writing regarding the medical information of the patient while they are being referred? How can things be improved?
19. Can you think of any formats/systems in which we can improve patient information exchange?
20. Do you think introducing patient-held booklets for improving the storage, organisation and transportation of patient-held medical records would be useful? If so, why? If not, why?
21. Ballpark figures of no. of- Diabetes,
22. CADs
23. Hypertension
24. Stroke
25. COPD, Asthma
26. Small concise description of hospital: facilities available, doctors available, no. of beds,
27. No. of admissions per day/ no. of discharges per day/ no. of patients seen in outpatient clinics per day
28. Please share your experiences so that I can understand your problems better with examples (ask this where ever more explanation is required)

Shortened interview topic guide for healthcare providers

Healthcare provider information to be collected:

- Speciality
- Years of relevant experience
- Place of work
- Designation

Introduction: Healthcare provider and researcher; Permission to record;

Explanation of purpose of interview and consent process

1. Would you prefer it if patients came to consultations with all their previous medical records?
2. Will having previous records of patients in a booklet format help with clinical management?
3. Do you think that introducing patient-held booklets for recording and organising key healthcare information (e.g. blood pressure, sugar levels etc.) would help clinical management?

4. Would you like to write in patient-held booklets about patients' clinical management?
5. Please share your views on how to improve the clinical management of chronic non-communicable disease patients

Appendix 2. Handover communication in low and middle-income countries: a systematic review

S1 Search Strategies

EMBASE / MEDLINE

1. Afghanistan/ or Albania/ or Algeria/ or American samoa/ or angola/ or argentina/ or Armenia/ or azerbaijan/ or Bangladesh/ or "republic of Belarus"/ or belize/ or benin/ or Bhutan/ or Bolivia/ or "bosnia and herzegovina"/ or Botswana/ or brazil/ or Bulgaria/ or Burkina faso/ or Burundi/ or cape verde/ or Cambodia/ or Cameroon/ or central African republic/ or chad/ or china/ or Colombia/ or comoros/ CONGO/ or "DEMOCRATIC REPUBLIC OF THE CONGO"/ or costa rica/ or Cote d'Ivoire/ or cuba/ or Croatia/ or Djibouti/ or dominica/ or Dominican republic/ or Ecuador/ or Egypt/ or el Salvador/ or equatorial guinea/ or Eritrea/ or Ethiopia/ or Fiji/ or gabon/ or gambia/ or "Georgia (republic)"/ or Ghana/ or grenada/ or Guatemala/ or GUINEA/ or GUINEA-BISSAU/ or Guyana/ or Haiti/ or Honduras/ or India/ or Indonesia/ or Iran/ or Iraq/ or Jamaica/ or Jordan/ or Kazakhstan/ or kenya/ or Kiribati/ or "Democratic People's Republic of Korea"/ or Kosovo/ or Kyrgyzstan/ or laos/ or Lebanon/ or Lesotho/ or Liberia/ or Libya/ or "MACEDONIA (REPUBLIC)"/ or Madagascar/ or Malawi/ or Malaysia/ or Maldives/ or mali/ or marshall islands/ or Mauritania/ or Mauritius/ or mexico/ or Micronesia/ or Moldova/ or Mongolia/ or Montenegro/ or Morocco/ or Mozambique/ or Myanmar/ or Namibia/ or Nepal/ or Nicaragua/ or niger/ or Nigeria/ or Pakistan/ or panama/ or papua new guinea/ or Paraguay/ or peru/ or Philippines/ or Romania/ or Russia/ or Rwanda/ or Samoa/ or "Sao Tome and Principe"/ or Senegal/ or Serbia/ or Sierra Leone/ or Solomon islands/ or Somalia/ or south Africa/ or south sudan/ or sri lanka/ or saint lucia/ or "Saint Vincent and the Grenadines"/ or sudan/ or suriname/ or Swaziland/ or Syria/ or Tajikistan/ or Tanzania/ or Thailand/ or timor-leste/ or togo/ or tonga/ or Tunisia/ or turkey/ or Turkmenistan/ or Tuvalu/ or Uganda/ or Ukraine/ or Uzbekistan/ or Vanuatu/ or Venezuela/ or Vietnam/ or yemen/ or Zambia/ or Zimbabwe/ or "west bank and gaza".mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
2. exp Developing Countries/
3. ((third world or emerging or low or middle or resource-poor) adj3 (countr* or nation* or setting*)).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word,

keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]

4. patient handoff/ or (handover$1 or hand over$1 hand-over$1 or handoff$1 or hand off$1 or hand-off$1 or shift change$1 or shift-change$1 or change of shift or change-of-shift or shift report$1 or bedside report$1 or signout$1 or sign out$1 or sign-out$1 or signoff$1 or sign off$1 or sign-off$1 or ward round$1 or clinical round$1).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
5. "continuity of patient care"/ or patient transfer/ or transition to adult care/ or transitional care/ or "referral and consultation"/ or gatekeeping/ or physician self-referral/ or secondary care/ or tertiary healthcare/ or patient discharge/ or discharge summaries/ or aftercare/ or (continuity of care or continuity of patient care or patient discharge or client discharge or hospital discharge or discharge summar* or aftercare or care transition$1 or transition$1 of care or transitional care or patient transition$1 or client transition$1 or patient referral$1 or client referral$1).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating subheading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
6. (communicat* or interact* or correspond* or plan or planning or pass* or exchang* or transfer* or share* or sharing or transmit* or transmission or access*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
7. ((predischarge or pre-discharge or discharge or aftercare) adj (instruction$1 or advice or education*)).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
8. medical records/ or health records, personal/ or medical record linkage/ or medical records, problem-oriented/ or medical records systems, computerized/ or electronic health records/ or health information exchange/ or health smart cards/ or nursing records/ or Information Systems/ or Hospital Information Systems/ or ambulatory care information systems/ or operating room information systems/ or medical order entry systems/ or Health information systems/ or telemedicine/ or remote consultation/ or telepathology/ or teleradiology/ or telerehabilitation/ or ((patient held or patient-held or home based or home-based or personal child or "mother and child" or "maternal and

child" or mother-child) adj2 (record$1 or book* or handbook$1 or card$1)) or ((health information exchang* or healthcare information exchang* or medical information exchang* or medical document exchang* or clinical data exchang* or health information system$1 or healthcare information system$1 or medical information system$1 or hospital information system$1 or medical record$1 or health record$1 or patient record$1 or medical chart$1 or nursing record$1 or telehealth or telemedicine)).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]

9. 1 or 2 or 3
10. 4 or 5
11. 5 and 6
12. 8 and 10
13. 4 or 7 or 11 or 12
14. 9 and 13

MEDLINE IN-PROCESS

1. Afghanistan.mp. or Albania.mp. or Algeria.mp. or American Samoa.mp. or Angola.mp. or Argentina.mp. or Armenia.mp. or Azerbaijan.mp. or Bangladesh.mp. or "Republic of Belarus".mp. or Belize.mp. or Benin.mp. or Bhutan.mp. or Bolivia.mp. or "Bosnia and Herzegovina".mp. or Botswana.mp. or Brazil.mp. or Bulgaria.mp. or Burkina Faso.mp. or Burundi.mp. or Cape Verde.mp. or Cambodia.mp. or Cameroon.mp. or Central African Republic.mp. or Chad.mp. or China.mp. or Colombia.mp. or Comoros.mp. CONGO.mp. or "DEMOCRATIC REPUBLIC OF THE CONGO".mp. or Costa Rica.mp. or Cote d'Ivoire.mp. or Cuba.mp. or Croatia.mp. or Djibouti.mp. or Dominica.mp. or Dominican Republic.mp. or Ecuador.mp. or Egypt.mp. or el Salvador.mp. or Equatorial Guinea.mp. or Eritrea.mp. or Ethiopia.mp. or Fiji.mp. or Gabon.mp. or Gambia.mp. or "Georgia (republic)".mp. or Ghana.mp. or Grenada.mp. or Guatemala.mp. or GUINEA.mp. or GUINEA-BISSAU.mp. or Guyana.mp. or Haiti.mp. or Honduras.mp. or India.mp. or Indonesia.mp. or Iran.mp. or Iraq.mp. or Jamaica.mp. or Jordan.mp. or Kazakhstan.mp. or Kenya.mp. or Kiribati.mp. or "Democratic People's Republic of Korea".mp. or Kosovo.mp. or Kyrgyzstan.mp. or Laos.mp. or Lebanon.mp. or Lesotho.mp. or Liberia.mp. or Libya.mp. or "MACEDONIA (REPUBLIC)".mp. or Madagascar.mp. or Malawi.mp. or Malaysia.mp. or Maldives.mp. or Mali.mp. or Marshall Islands.mp. or Mauritania.mp. or Mauritius.mp. or Mexico.mp. or Micronesia.mp. or Moldova.mp. or

Mongolia.mp. or Montenegro.mp. or Morocco.mp. or Mozambique.mp. or Myanmar.mp. or Namibia.mp. or Nepal.mp. or Nicaragua.mp. or Niger.mp. or Nigeria.mp. or Pakistan.mp. or Panama.mp. or Papua New Guinea.mp. or Paraguay.mp. or Peru.mp. or Philippines.mp. or Romania.mp. or Russia.mp. or Rwanda.mp. or Samoa.mp. or "Sao Tome and Principe".mp. or Senegal.mp. or Serbia.mp. or Sierra Leone.mp. or Solomon islands.mp. or Somalia.mp. or South Africa.mp. or South Sudan.mp. or Sri Lanka.mp. or Saint Lucia.mp. or "Saint Vincent and the Grenadines".mp. or Sudan.mp. or Suriname.mp. or Swaziland.mp. or Syria.mp. or Tajikistan.mp. or Tanzania.mp. or Thailand.mp. or Timor-Leste.mp. or Togo.mp. or Tonga.mp. or Tunisia.mp. or Turkey.mp. or Turkmenistan.mp. or Tuvalu.mp. or Uganda.mp. or Ukraine.mp. or Uzbekistan.mp. or Vanuatu.mp. or Venezuela.mp. or Vietnam.mp. or Yemen.mp. or Zambia.mp. or Zimbabwe.mp. or "West Bank and Gaza".mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
2. ((third world or emerging or low or middle or resource-poor or developing) adj3 (countr* or nation* or setting*)).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
3. (handover$1 or hand over$1 hand-over$1 or handoff$1 or hand off$1 or hand-off$1 or shift change$1 or shift-change$1 or change of shift or change-of-shift or shift report$1 or bedside report$1 or signout$1 or sign out$1 or sign-out$1 or signoff$1 or sign off$1 or sign-off$1 or ward round$1 or clinical round$1).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
4. (continuity of care or continuity of patient care or patient discharge or client discharge or hospital discharge or discharge summar* or aftercare or care transition$1 or transition$1 of care or transitional care or patient transition$1 or client transition$1 or patient referral$1 or client referral$1).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
5. (communicat* or interact* or correspond* or plan or planning or pass* or exchang* or transfer* or share* or sharing or transmit* or transmission or access*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word,

protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]

6. ((predischarge or pre-discharge or discharge or aftercare) adj (instruction* or advice or education*)).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
7. (health information exchang* or healthcare information exchang* or medical information exchang* or medical document exchang* or clinical data exchang* or health information system$1 or healthcare information system$1 or medical information system$1 or hospital information system$1 or medical record$1 or health record$1 or patient record$1 or medical chart$1 or nursing record$1 or telehealth or telemedicine).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
8. ((patient held or patient-held or home based or home-based or personal child or "mother and child" or "maternal and child" or mother-child) adj2 (record* or book* or handbook* or card*)).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
9. 1 or 2
10. 3 or 4
11. 4 and 5
12. 7 and 8
13. 12 and 10
14. 3 or 6 or 11 or 13
15. 9 and 14

PSYCHINFO

1. Afghanistan.mp. or Albania.mp. or Algeria.mp. or American Samoa.mp. or Angola.mp. or Argentina.mp. or Armenia.mp. or Azerbaijan.mp. or Bangladesh.mp. or "Republic of Belarus".mp. or Belize.mp. or Benin.mp. or Bhutan.mp. or Bolivia.mp. or "Bosnia and Herzegovina".mp. or Botswana.mp. or Brazil.mp. or Bulgaria.mp. or Burkina Faso.mp. or Burundi.mp. or Cape Verde.mp. or Cambodia.mp. or Cameroon.mp. or Central African Republic.mp. or Chad.mp. or China.mp. or Colombia.mp.

or Comoros.mp. CONGO.mp. or "DEMOCRATIC REPUBLIC OF THE CONGO".mp. or Costa Rica.mp. or Cote d'Ivoire.mp. or Cuba.mp. or Croatia.mp. or Djibouti.mp. or Dominica.mp. or Dominican Republic.mp. or Ecuador.mp. or Egypt.mp. or el Salvador.mp. or Equatorial Guinea.mp. or Eritrea.mp. or Ethiopia.mp. or Fiji.mp. or Gabon.mp. or Gambia.mp. or "Georgia (republic)".mp. or Ghana.mp. or Grenada.mp. or Guatemala.mp. or GUINEA.mp. or GUINEA-BISSAU.mp. or Guyana.mp. or Haiti.mp. or Honduras.mp. or India.mp. or Indonesia.mp. or Iran.mp. or Iraq.mp. or Jamaica.mp. or Jordan.mp. or Kazakhstan.mp. or Kenya.mp. or Kiribati.mp. or "Democratic People's Republic of Korea".mp. or Kosovo.mp. or Kyrgyzstan.mp. or Laos.mp. or Lebanon.mp. or Lesotho.mp. or Liberia.mp. or Libya.mp. or "MACEDONIA (REPUBLIC)".mp. or Madagascar.mp. or Malawi.mp. or Malaysia.mp. or Maldives.mp. or Mali.mp. or Marshall Islands.mp. or Mauritania.mp. or Mauritius.mp. or Mexico.mp. or Micronesia.mp. or Moldova.mp. or Mongolia.mp. or Montenegro.mp. or Morocco.mp. or Mozambique.mp. or Myanmar.mp. or Namibia.mp. or Nepal.mp. or Nicaragua.mp. or Niger.mp. or Nigeria.mp. or Pakistan.mp. or Panama.mp. or Papua New Guinea.mp. or Paraguay.mp. or Peru.mp. or Philippines.mp. or Romania.mp. or Russia.mp. or Rwanda.mp. or Samoa.mp. or "Sao Tome and Principe".mp. or Senegal.mp. or Serbia.mp. or Sierra Leone.mp. or Solomon islands.mp. or Somalia.mp. or South Africa.mp. or South Sudan.mp. or Sri Lanka.mp. or Saint Lucia.mp. or "Saint Vincent and the Grenadines".mp. or Sudan.mp. or Suriname.mp. or Swaziland.mp. or Syria.mp. or Tajikistan.mp. or Tanzania.mp. or Thailand.mp. or Timor-Leste.mp. or Togo.mp. or Tonga.mp. or Tunisia.mp. or Turkey.mp. or Turkmenistan.mp. or Tuvalu.mp. or Uganda.mp. or Ukraine.mp. or Uzbekistan.mp. or Vanuatu.mp. or Venezuela.mp. or Vietnam.mp. or Yemen.mp. or Zambia.mp. or Zimbabwe.mp. or "West Bank and Gaza".mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
2. ((third world or emerging or low or middle or resource-poor) adj3 (countr* or nation* or setting*)).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
3. exp Developing Countries/
4. (handover$1 or hand over$1 hand-over$1 or handoff$1 or hand off$1 or hand-off$1 or shift change$1 or shift-change$1 or change of shift or change-of-shift or shift report$1 or bedside report$1 or signout$1 or sign out$1 or sign-out$1 or signoff$1 or sign off$1 or sign-off$1 or ward round$1 or clinical round$1).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word,

keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]

5. continuum of care/ or facility discharge/ or hospital discharge/ or psychiatric discharge/ or treatment termination/ or discharge planning/ or professional referral/ or client transfer/ or aftercare/ or (continuity of care or continuity of patient care or patient discharge or client discharge or hospital discharge or discharge summar* or aftercare or care transition$1 or transition$1 of care or transitional care or patient transition$1 or client transition$1 or patient referral$1 or client referral$1).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
6. (communicat* or interact* or correspond* or plan or planning or pass* or exchang* or transfer* or share* or sharing or transmit* or transmission or access*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
7. ((predischarge or pre-dicharge or discharge or aftercare) adj (instruction* or education* or advice)).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
8. information systems/ or medical records/ or client records/ or telemedicine/ or ((patient held or patient-held or home based or home-based or personal child or "mother and child" or "maternal and child" or mother-child) adj2 (record* or book* or handbook* or card*)) or (health information exchang* or healthcare information exchang* or medical information exchang* or medical document exchang* or clinical data exchang* or health information system$1 or healthcare information system$1 or medical information system$1 or hospital information system$1 or medical record$1 or health record$1 or patient record$1 or medical chart$1 or nursing record$1 or telehealth or telemedicine).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
9. 1 or 2 or 3
10. 4 or 5
11. 5 and 6
12. 8 and 10
13. 4 or 7 or 11 or 12
14. 9 and 13

COCHRANE

1. [Afghanistan] or [Albania] or [Algeria] or [American Samoa] or [Angola] or [Argentina] or [Armenia] or [Azerbaijan] or [Bangladesh]. or [Republic of Belarus] or [Belize] or [Benin] or [Bhutan] or [Bolivia] or [Bosnia and Herzegovina] or [Botswana] or [Brazil] or [Bulgaria] or [Burkina Faso] or [Burundi] or [Cape Verde] or [Cambodia] or [Cameroon] or [Central African Republic] or [Chad] or [China] or [Colombia] or [Comoros] or [CONGO] or [Democratic Republic of The Congo] or [Costa Rica] or [Cote d'Ivoire] or [Cuba] or [Croatia] or [Djibouti] or [Dominica] or [Dominican Republic] or [Ecuador] or [Egypt] or [el Salvador] or [Equatorial Guinea] or [Eritrea] or [Ethiopia] or [Fiji] or [Gabon] or [Gambia] or [Georgia (republic)] or [Ghana] or [Grenada] or [Guatemala] or [Guinea] or [Guinea-Bissau] or [Guyana] or [Haiti] or [Honduras] or [India] or [Indonesia] or [Iran] or [Iraq] or [Jamaica] or [Jordan] or [Kazakhstan] or [Kenya] or [Kiribati] or [Democratic People's Republic of Korea] or [Kosovo] or [Kyrgyzstan] or [Laos] or [Lebanon] or [Lesotho] or Liberia] or [Libya] or [Republic of Macedonia] or [Madagascar] or [Malawi] or [Malaysia] or [Maldives] or [Mali] or [Marshall Islands] or [Mauritania] or [Mauritius] or [Mexico] or [Micronesia] or [Moldova] or [Mongolia] or [Montenegro] or [Morocco] or [Mozambique] or [Myanmar] or [Namibia] or [Nepal] or [Nicaragua] or [Niger] or [Nigeria] or [Pakistan] or [Panama] or [Papua New Guinea] or [Paraguay] or [Peru] or [Philippines] or [Romania] or [Russia] or [Rwanda] or [Samoa] or [Sao Tome and Principe] or [Senegal] or [Serbia] or [Sierra Leone] or [Solomon Islands] or [Somalia] or [South Africa] or [South Sudan] or [Sri Lanka] or [Saint Lucia] or [Saint Vincent and the Grenadines] or [Sudan] or [Suriname] or [Swaziland] or [Syria] or [Tajikistan] or [Tanzania] or [Thailand] or [Timor-Leste] or {Togo] or [Tonga] or [Tunisia] or [Turkey] or [Turkmenistan] or [Tuvalu] or [Uganda] or [Ukraine] or [Uzbekistan] or [Vanuatu] or [Venezuela] or [Vietnam] or [Yemen] or [Zambia] or [Zimbabwe] or [West Bank and Gaza]
2. [Developing Countries] explode all trees
3. [Patient Handoff] or “handover*” or “hand over*” or “hand-over*” or “handoff*” or “hand off*” or “hand-off*” or “shift change*” or “shift-change*” or “change of shift” or “change-of-shift” or “shift report*” or “bedside report*” or “signout*” or “sign out*” or “sign-out*” or “signoff*” or “sign off*” or “sign-off*” or “ward round” or “clinical round*”:ti,ab,kw (Word variations have been searched)
4. [Continuity of Patient Care] or [Transitional Care] or [Aftercare] or [Patient Discharge] or [Patient Transfer] or [Transitional to Adult Care] or [Referral and Consultation] or [Physician Self-Referral] or [Gatekeeping] or [Secondary Care] or [Tertiary Healthcare] or [Patient Discharge Summaries] or “continuity of care” or “continuity of patient care” or

“patient discharge” or “client discharge” or “hospital discharge” or “discharge summar*” or “aftercare” or “care transition*” or “transition* of care” or “transitional care” or “patient transition*” or “client transition*” or “patient referral*” or “client referral*”:ti,ab,kw (Word variations have been searched)

5. “communicat*” or “interact*” or “correspond*” or “plan” or “planning” or “pass*” or “exchang*” or “transfer*” or “share*” or “sharing” or “transmit” or “transmission” or “access*”:ti,ab,kw (Word variations have been searched)
6. (“predischarge” or “pre-discharge or “discharge” or “aftercare” near/1 (“instruct*” or “advice” or educat*”:ti,ab,kw (Word variations have been searched)
7. [Medical Records] or [Medical Record Linkage] or [Medical Records, Problem-Oriented] or [Medical Records Systems, Computerized] or [Health Smart Cards] or [Electronic Health Records] or [Health Records, Personal] or [Nursing Records] or [Hospital Information Systems] or [Ambulatory Care Information Systems] or [Operating Room Information Systems] or [Health Information Systems] or [Health Information Exchange] or [Telemedicine] or [Telerehabilitation] or [Telepathology] or [Information Systems] or “health information exchang*” or “healthcare information exchang*” or “medical information exchang*” or “medical document exchang*” or “clinical data exchang*” or “health information system*” or “healthcare information system*” or “medical information system*” or “hospital information system*” or “medical record*” or “health record*” or “patient record*” or “medical chart*” or “nursing record*” or “telehealth” or “telemedicine” or ((“patient held” or “patient-held” or “home based” or “home-based” or “personal child” or “mother and child” or “maternal and child” or “mother-child”) near/2 (“record*” or “book*” or “handbook*” or “card*”)):ti,ab,kw (Word variations have been searched)
8. 1 or 2
9. 3 or 4
10. 4 and 5
11. 7 and 9
12. 3 or 6 or 10 or 11
13. 8 and 12

CINAHL

1. (MH "Developing Countries") OR "developing countries" or “LMIC”
2. TX (LIC or MIC) and countr*
3. TX (third world or emerging or low or middle or resource-poor or developing) N (countr* or nation* or setting* or econom*)

4. (MH “Hand Off (Patient Safety)+”) or (MH “Continuity of Patient Care+”) or (MH “Referral and Consultation+) or (MH “Patient Discharge Summaries”) or (MH “Patient Care Plans+”) or (MH “Nursing Records) or (MH “Patient Record Systems+”) or (MH “Medical Records”) or (MH “Computerised Patient Record”) or (MH Medical Records, Personal”) or (MH “Health Information Systems”) or (MH “Health Care Information Exchange”) or (MH “After Care”) or (MH “Home Health Care”) or (MH “Multidisciplinary Care Team+”) or (MH “Nursing Assessment”) or “personally controlled health record*” or “ward change” or “shift change” or “child health book*” or “maternal health book*” or “health book*”
5. 1 or 2 or 3
6. 4 and 5

GOOGLE

Clinical handover or handover or clinical handoff or handoff or shift change or ward change or change of shift or shift report or bedside report or patient transfer or intrahospital transfer or interhospital transfer or patient referral or intrahospital referral or interhospital referral or patient discharge or hospital discharge or transitional care or care transition or transition of care or low-income or middle-income or low and middle-income or developing country or developing countries

S2. MMAT methodological quality criteria

Part I: Mixed Methods Appraisal Tool (MMAT), version 2018

Category of study designs	Methodological quality criteria	Responses			
		Yes	No	Can't tell	Comments
Screening questions (for all types)	S1. Are there clear research questions?				
	S2. Do the collected data allow to address the research questions?				
	Further appraisal may not be feasible or appropriate when the answer is 'No' or 'Can't tell' to one or both screening questions.				
1. Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?				
	1.2. Are the qualitative data collection methods adequate to address the research question?				
	1.3. Are the findings adequately derived from the data?				
	1.4. Is the interpretation of results sufficiently substantiated by data?				
	1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?				
2. Quantitative randomized controlled trials	2.1. Is randomization appropriately performed?				
	2.2. Are the groups comparable at baseline?				
	2.3. Are there complete outcome data?				
	2.4. Are outcome assessors blinded to the intervention provided?				
	2.5 Did the participants adhere to the assigned intervention?				
3. Quantitative non-randomized	3.1. Are the participants representative of the target population?				
	3.2. Are measurements appropriate regarding both the outcome and intervention (or exposure)?				
	3.3. Are there complete outcome data?				
	3.4. Are the confounders accounted for in the design and analysis?				
	3.5. During the study period, is the intervention administered (or exposure occurred) as intended?				
4. Quantitative descriptive	4.1. Is the sampling strategy relevant to address the research question?				
	4.2. Is the sample representative of the target population?				
	4.3. Are the measurements appropriate?				
	4.4. Is the risk of nonresponse bias low?				
	4.5. Is the statistical analysis appropriate to answer the research question?				
5. Mixed methods	5.1. Is there an adequate rationale for using a mixed methods design to address the research question?				
	5.2. Are the different components of the study effectively integrated to answer the research question?				
	5.3. Are the outputs of the integration of qualitative and quantitative components adequately interpreted?				
	5.4. Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?				
	5.5. Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?				

S3. Observational studies data extraction sheet

Hospital shift-change					
Author, year, **low/middle-income country**	**Objective/s**	**Study design, sample size**	**Study healthcare setting/s**	**Outcome measure/s (regarding handover communication)**	**Summary of results** **(regarding handover communication)**
Uys L R *et al.,* 2004, South Africa	To describe and compare the quality of nursing service and care in three health districts in the KwaZulu Natal Province	Quantitative analytic cross-sectional study, 10 handover observations; 42 universal precaution checklists; 73 patient satisfaction questionnaires; 137 medical record audits	3 hospital medical, surgical and gynaecological units	Contents, interpersonal skills and clinical skills during handover (via observations with checklist)	• The average score of nurses handover was 5.8 of a possible 10 and there were no significant differences between districts • Though 60% of observations contained a positive score, in 50% of cases the nurse's verbal report did not include aspects of psychosocial care • In all three districts, there was a poor response to issues in relation to correct procedures to be followed for managing drug registers and report writing for the occurrence of negative incidents
Liu Y *et al.,* 2009, China	To assess the safety culture as perceived by clinical nurses in acute care hospitals in China	Quantitative analytic cross-sectional study, 179 nurses	19 hospitals (all units/wards/departments)	Perceptions of shift-change procedures with regard to promoting patient safety (via questionnaires)	• 89.9% of nurses agreed that shift-change procedures promote patient safety in their hospital

Teodoro W R *et al.,* 2010, Brazil	To examine the shift handover process in a hospital unit; to identify its methods, the sort of information passed over to the team, what is considered relevant to be informed, and the positive aspects of practice	Mixed-methods descriptive cross-sectional study, 28 nursing staff	Paediatric hospital unit	Reports of and quotes regarding practices and attitudes regarding shift-change handover communication (via questionnaires)	• The most commonly reported aspect of information exchanged was complications (82%); less reported were care provided (24%), medications in use (24%), diet (18%), procedures to be performed (12%), diagnosis (12%), companion information (12%), clinical picture (6%), discharges and deaths (6%) and emotional state (6%) • The majority (59%) of the team uses spoken and written communication, while the remainder (41%) use only spoken communication • It was identified that several issues considered important by the nursing staff, such as sleep conditions and vital signs, are not addressed during shift-change. • The majority (71%) of nursing staff reported that continuity of care was a positive aspect of shift-change

Kaye D K *et al.,* 2015, Uganda	To gain a deeper understanding of the structure, process and outcome of intra-partum care during handovers through the clients' perspective	Qualitative study, 40 patients	Hospital labour ward	Themes developed (via interviews containing questions on perceptions of quality of duty handovers)	• Theme: poor organisation and poor conduct of handovers – all participants indicated there was no structured, formal or consistent approach to how handovers actually occurred or were conducted; handovers ranged from a very brief exchange between teams of health workers to a prolonged ward round; In either case there was minimal involvement of the mothers in labour (or their attendants) in the handover process • Theme: gaps in continuity of care during and after handovers – for some women, satisfaction and continuity of care was maintained because the new teams showed them more care and reassessed them with urgency after the handover process; for other women, the new teams focused on finishing the handover round as soon as possible without giving the mothers much attention or addressing their problems/needs; this often necessitated the oncoming teams to repeat the ward rounds, inevitably leading to inefficiencies and delays; some women indicated that critical information was frequently not transmitted between health professionals, wrong decisions were taken or delays in receiving care were caused • Theme: traumatic experiences and negative outcomes of care related to handovers – most participants believed that duty shift-change, duty transfers and poorly coordinated or poorly communicated health worker sign-offs triggered off several problems that affected quality of care/continuity of care; negative outcomes related to poorly organised or poorly conducted handovers included problems with the following: emergency care decision-making, drug prescription changes, interpretation of results of investigations and evaluation of treatment/patient management plans; where errors occurred, participants reported negative or even traumatic experiences

					• Theme: poor handovers as a feature of health system failures – several mothers reported that health workers could not communicate to them about their health status/the health status of their babies during handovers; neither did the healthcare providers seem concerned about the mothers' anxiety; the mothers felt left out in the decision-making when important decisions were being made; they were thus able to distinguish between the human aspect of healthcare and professional/technical skills; however, the consensus view was that these two aspects were essential and complementary

Kumar P *et al.,* 2015, India	To study clinical handover practices among nurses and doctors in a neurosciences centre in India	Quantitative analytic cross-sectional study, 764 handovers (382 nursing handovers; 382 doctor handovers)	Hospital neurology ward	Levels of compliance with time, place, record, process, staff interaction and patient communication (via observations with checklist)	• Handovers of nurses and doctors revealed varying adherence for time (44%), place (63%), documentation (50%), process (78%), staff interaction (50%) and patient communication (45%), with overall compliance being 55% • Doctors fared better only in process elements and bedside handovers • Nurses had a statistically significant fall in compliance levels over weekends and in night shifts • Staff interaction and patient communication were positively correlated and bedside handover was negatively related to handover duration in both groups
Sarevstani R S *et al.,* 2015, Iran	To explore the challenges of the nursing handover process during shift rotation in hospitals	Qualitative study, 14 nursing handovers	3 hospital paediatric wards	Themes and categories developed (via observations of handovers and interviews containing questions on experiences and issues with handovers)	• Theme: non-holistic approach – categories: nonholistic/unstructured content, nurses' low ethical and practical involvement, non-patient-centred approach • Theme: poor management – categories: poor task management, poor time and space management
Gonçalves M I *et al.,* 2016, Brazil	To identify the factors related to patient safety concerning the communication on the shift-change process of nursing teams	Quantitative analytic cross-sectional study, 70 nursing professionals (17 nurses; 39 nursing technicians; 14 nursing auxiliaries)	3 hospital neonatal intensive care units	Views on factors interfering with shift-change communication and characteristics of shift-change communication (via questionnaires)	• Handovers were most frequently reported as having the following characteristics: verbal (60.0%), take place at the patient's bedside (70.0%) and take between 11 to 20 minutes (50.0%) • Most professionals (62.8%) answered that there were opportunities to review information in the patient history and/or files, or through the repetition or reading of the information transmitted by the colleague (48.6%) and ask questions during shift-changes (97.1%); the majority affirmed that colleagues were paying attention to information transmitted (97.1%), although 31.4% affirmed the existence of side talk and 34.8% indicated colleague delays

					• 38.6% of professionals indicated that delays and early departures negatively affected the shift-change; nurses most frequently reported the following interferences; noise and side talk; technicians and auxiliaries most frequently reported interruptions and side talk • Most professionals answered that, during the shift-changes, all necessary information about the patient was discussed (80%); the shift-change tended to be considered "good" (57.1%) and none were characterised as "bad"; participants with a longer mean length of experience at the neonatal intensive care unit indicated more frequently that all information about the patient was transmitted; professionals with shorter training reported more information related to "patients' clinical conditions", "drugs/medicines" and "nursing care/procedures"
Kumar P *et al.,* 2016, India	To study nursing handover practices in the neurosciences centre	Quantitative analytic cross-sectional study, 525 nursing handovers	3 hospital neurology wards and 2 hospital neurosurgery wards	Levels of compliance with time, duration, process, nurse interaction and patient communication (via observations with checklist)	• Nursing handovers revealed varying compliance levels among time (63%), place (76%), process (82%), staff interaction (53%) and patient communication (44%); significantly poorer compliance was seen in morning shifts and weekends • Bedside handovers were more frequent during weekends and night shifts and were positively correlated with increased staff interaction and patient communication and negatively correlated to handover duration • Though nurses showed better adherence to process-related elements, background patient information and assessment was explained less frequently • Differences between wards were insignificant except in categories of nurse interaction and patient communication, which was better in the neurosurgery and neurology wards ($p<.05$)

Ortega A P *et al.,* 2016, Colombia	To evaluate communication and coordination of nursing in a highly complex institution in Cartenga, Colombia	Quantitative descriptive cross-sectional study, 100 nurses	Hospital (all units/wards/departments)	Effectiveness of shift-change communication (via questionnaires)	• Hospital unit scores (out of 4) for shift-change communication were as follows: Emergency 3.7; Surgery 3.7; Internal medicine 3.6; Intensive care 3.8; Obstetrics & gynaecology 3.7; Paediatrics 3.6; Surgical 3.5; Intermediate 3.5; Special programs 3.7; Referral & counter-referral 3.7
Kilic S P *et al.,* 2017, Turkey	To determine the approaches and attitudes of nurses regarding clinical handover in Turkey	Quantitative analytic cross-sectional study, 480 nurses	7 hospitals (all units/wards/departments)	Reports of use of handover, procedures for handover, staff presence during handover, location of handover, form of handover, information exchanged during handover and opinions regarding handover (via questionnaires)	• The majority of the nurses (96.0%) stated that they made handover in their departments; 93.8% stated there was a handover procedure; 95.6% stated they carried out handover with the clinic's head nurse and the nurse providing patient care; 91.5% stated that handover was carried out at the bedside; 53.1% stated that they did not use a specific handover form; 74.4% stated that they carried out the handover both verbally and in writing; 87.5% stated that they handed over care, treatment and disease information during handover; 45.8% of nurses introduced themselves to the patient, 54.4% allowed neither the patient nor the relatives to express themselves and answered questions of 52.1% of patients and relatives after handover; 95.2% tried to use suitable expressions when communicating with patients and relatives • The positive aspect of handover most reported was "Simplifies the follow-up of patient information" (80.2%); the negative aspect most reported was "Clinical handover takes too much time" (24.4%)

Siriwardena E M *et al.,* 2017, Sri Lanka	To assess staff involvement, time taken for the handover, key components addressed, availability of a standard format and factors causing disturbances to an effective handover	Quantitative descriptive cross-sectional study, 120 healthcare staff (50 doctors; 70 nurses)	Hospital: general, surgical, trauma, cardiothoracic, neurosurgical, medical and obstetric intensive care units (ICUs)	Reports of staff presence during handover, time taken for handover, information exchanged during handover, handover format and disturbances during handover (via questionnaires)	• The doctor's presence on the nurse's handover and nurse's presence in doctor's handover was less than 70% in all the ICUs; There was no fixed time for handover in 92% of ICU shifts and nearly 90% of times it happened after the conclusion of the shift; the average time taken was 30 minutes • The majority of doctors (69%) failed to mention the patient's name during handover; all other factors were mentioned satisfactorily by doctors and nurses; handing over information regarding discussions with the family was markedly lacking in the handover process among doctors and nurses; compliance with the recommended content of handover was more than 60% in almost all the ICUs • There was no structured format for handover in any of the ICUs; telephone calls were the most common distracting factor identified

Dutra M *et al.,* 2018, Brazil	To identify missed diagnoses and goals immediately after a shift handover; to assess clinicians' diagnostic accuracy in anticipating clinical events during the night shift	Quantitative analytic cohort study, 352 patient encounters (over 44 day-to-night handovers)	Hospital intensive care unit	The percentage of diagnoses and goals reported by the daytime clinician, which were correctly identified by the night-time clinician and clinician accuracy of anticipatory guidance for night-time events (via surveys and patient medical chart review)	• Daytime clinicians reported a total of 857 diagnoses, of which night-time clinicians correctly identified 454 (53%; 95% CI, 50–56); there were 31 patients with diagnoses considered unclear by the daytime clinician, and the night-time clinician identified only four; night-time clinicians identified 306 diagnoses not originally reported by the daytime clinician • We observed differences in the correct identification of diagnosis within each of the five problem categories (p<.01 for trend); in particular, patients with changes in level of consciousness were less likely to have the diagnosis correctly identified and patients with shock were more likely to have the diagnosis correctly identified • Night-time clinicians correctly identified 123 of the 304 goals reported by the daytime clinicians; the most common goals were to wean vasoactive agents (59 goals; 49% identified), monitor C - reactive protein (50 goals; 48% identified), manage electrolyte disturbances (29 goals; 41% identified), promote a negative fluid balance (28 goals; 36% identified), focus on end-of-life care (28 goals; 54% identified), and others (110 goals; 28% identified) • There were a total of 85 events in 72 individual patients at night; daytime clinicians anticipated more potential complications than night-time clinicians (411 vs. 230; p<.01) and their predictions were more sensitive (65% vs. 46%; p<.01) but had lower specificity (82% vs. 91%; p<.01); the discriminatory ability of daytime and night-time clinicians for any event was not different; the positive predictive value of both daytime and night-time clinicians was low (13% vs. 17%) and not statistically different

Wen D *et al.,* 2018, China	To understand physicians' information needs in their interactions with nurses; to explore the challenges involved in integrating information technology into clinical work	Quantitative analytic cross-sectional study, 617 doctors	3 hospitals (all units/wards/departments)	Reports of shift-change handover procedures and perceptions of effectiveness regarding doctor-nurse interactions (via surveys)	• The reported frequencies of handover interaction methods were as follows: shift-change reports 69.7%; paper shift-change reports 13.0%; internet shift-change reports 1.7% • Regarding the effectiveness of physician-nurse interactions, the most common responses for the four explored indicators were as follows: 74.2% of the physicians responded that the interactions are only moderately accurate; 69.7% that they are only moderately timely; 72.5% that they are only moderately time sufficient; 70.3% that they are only moderately satisfying
Transfers within healthcare facilities					
Author, year, **low/middle-income country**	**Objective/s**	**Study design, sample size**	**Study healthcare setting/s** **(regarding handover communication)**	**Outcome measure/s (regarding handover communication)**	**Summary of results** **(regarding handover communication)**

Reda E *et al.,* 2008, Brazil	To identify nurses' difficulties in obtaining information regarding the post-anaesthetic recovery period; to identify the best strategy to obtain information for continuity of nursing care; to identify aspects that supported the patients' evaluation regarding the post-anaesthetic recovery period	Quantitative descriptive cross-sectional study, 59 nurses	2 hospitals (all units receiving patients from post-anaesthetic recovery)	Reports of the frequency of issues of poor-quality transfer communication and reports on the use and importance of patient transfer records (via questionnaires)	• Difficulties in Hospital 1: the transfer record was often not included in the patient record (84.62%) and absence of information when changing shifts over the telephone (84.62%); Hospital 2: incorrect (75.76%) and incomplete (57.58%) completion of the transfer record • Best strategy in Hospital 1: transfer record and handover over the telephone (65.35%); Hospital 2: aggregating several means of information (60.61%) • Use and views of transfer record: Hospital 1: 30.77% consulted the record; Hospital 2: 63.64% consulted the record; both groups reported that it helps in the planning because it is a way to document patient care and considered the aspects contained in the instrument as important and pertinent
Transfers between healthcare facilities					
Soysal D D *et al.,* 2004, Turkey	To evaluate the current situation of inter-hospital transport of paediatric patients requiring emergent care	Quantitative descriptive cross-sectional study, 854 inter-hospital transfers	5 hospital and 13 medicine faculty emergency departments	Type of pre-transport notifications and the adequacy of contents of pre-transport information (via checklist and document audit)	• In 174 transports (20.7%), pre-transport notifications were made by telephone calls in 83.3% (n=145); a written statement in 7.5% (n=13); by sending the family members with the patient in 6.9% (n=12) or by radiophone in 2.3% (n=4). • Pre-transport information about the patients were adequate in 213 cases (26.1%) and inadequate in 260 cases (31.8%); no information was available in 344 cases (42.1%)

Crandon I W *et al.,* 2008, Jamaica	To evaluate the inter-hospital transfer process of injured patients in Jamaica	Quantitative descriptive cross-sectional study, 122 inter-hospital transfers	Hospital emergency department	Contents of patient referral documentation (via referral document audit)	• The time of injury was documented in only 19 (15.6%) of cases and referral time in only 11 (9.0%) of cases by the referring hospitals • The level of documentation at the referral hospitals was generally sub-optimal, with records of pulse rates in 13.1% (16/122); blood pressure in 9.8% (12/122); respiratory rate in 9.8% (12/122) and pupillary reaction in 4.9% (6/122) of cases • At the referral hospitals 13 patients had documentation of the total Glasgow Coma Score as well as the individual eye opening, motor and verbal scores while a total score was recorded in only 11 other patients
Azim A *et al.,* 2013, India	To analyse the content of notes of out of hospital patients transferred to the intensive care unit	Quantitative descriptive study, 124 referred patient admissions	Hospital intensive care unit	Completeness of the following items of information: patient demographics, source of referral, time of referral, severity of illness based on ICU scores, information on clinical details, progression of organ failures and management (via referral summary audit)	• All summaries (100%) did not contain information on the following items of information: presenting complaints, progression of signs and symptoms, ventilator settings on Arterial Blood Gas, use of sedation/paralysis, nutrition details, use of any Deep Vein Thrombosis prophylaxis, blood/blood product transfusion, type of glycaemic control and criteria for selection of antibiotics • The majority of summaries did not contain information on the rest of the assessed items of information: progression of organ failure (89.6%), neurological assessment (92.8%) and use of vasoactive drugs (89.6%)
Multiple areas of hospital-based handover					
Author, year,	**Objective/s**	**Study design, sample size**	**Study healthcare setting/s**	**Outcome measure/s (regarding**	**Summary of results** **(regarding handover communication)**

low/middle-income country			**(regarding handover communication)**	**handover communication)**	
Khater W A *et al.,* 2014, Jordan	To answer the following research questions: How do nurses working at Jordanian hospitals perceive patient safety culture?; What are the factors influencing patient safety culture in Jordanian Hospitals?	Quantitative analytic cross-sectional study, 658 nurses	21 hospitals (all units/wards/departments)	Perceptions of hospital handoffs and transitions (via surveys)	• Percentages of positive scores for the following sub-dimensions of handoffs and transitions were as follows: things 'fall between the cracks' when transferring patients from one unit to another (47.7%); important patient care information is often lost during shift-changes (49.1%); problems often occur in the exchange of information across hospital units (24.8%); shift changes are problematic for patients in this hospital (43.0%) Overall, the percentage of positive scores for the dimension handoffs and transitions was 41.15%; nurses felt that this dimension required improvement
Top M *et al.,* 2015, Turkey	To investigate nurses' perceptions about the culture of patient safety in a Turkish public hospital	Quantitative analytic cross-sectional study, 200 nurses	Hospital (all units/wards/departments)	Perceptions of hospital handoffs and transitions (via surveys)	• Hospital handoffs and transitions received an average of 32% positive responses • Hospital handoffs and transitions were considered as one dimension showing potential for improvement

Šklebar I *et al.,* 2016, Croatia	To assess the state of patient safety culture in Croatian hospitals and compare it with hospitals in the United States	Quantitative analytic cross-sectional study, Croatia: 576 healthcare staff; US: 338,607 healthcare staff	3 hospitals (all units/wards/departments)	Perceptions of hospital handoffs and transitions (via surveys)	• Percentages of positive scores for the following sub-dimensions of handoffs and transitions for Croatian healthcare staff were as follows: things fall between the cracks when transferring patients between units – 55%; important patient care information is often lost during shift-changes – 78%; problems often occur in information exchange across hospital units – 57%; shift-changes are problematic for patients – 71% • Percentages of positive scores for the following sub-dimensions of handoffs and transitions for US healthcare staff were as follows: things fall between the cracks when transferring patients between units – 41%; important patient care information is often lost during shift-changes – 49%; problems often occur in information exchange across hospital units – 42%; shift-changes are problematic for patients – 44% • In the dimension of handoffs and transitions, the Croatian responses for all sub-dimensions were significantly more positive in comparison to the Americans (p<.001)
Arias-Botero J H *et al.,* 2017, Colombia	To identify the nursing staff's view of the performance of the post-anaesthetic care unit (PACU)	Mixed-methods analytic cross-sectional study, 154 nurse surveys and 18 nurse interviews	Hospital post-anaesthesia care units	Perceptions of PACU handover and discharge practices (via surveys and interviews)	• Although 57% of nurses surveyed felt that handover information is good quality, 26% considered it incomplete • When asked how often is specific pre- or intra-operative information reported at PACU handover, 20-45% felt the information provided was incomplete; no relationship was found between the level of complexity of the institution and the quality of information • During interviews, lack of knowledge regarding the patient's baseline condition prior to surgery was considered a limitation for management – workload prevents from having comprehensive information regarding the patient's medical history and any intra-operative events in the medical record • According to interviews, when the patient is discharged some forms may not be completed,

					such as post-operative recommendations and proof of understanding of caregiver regarding care recommendations, because these processes are usually slow and time-consuming
Arpí L *et al.,* 2017, Argentina	To know the attitudes, practices and safety conditions of the paediatric patient in Argentina	Quantitative descriptive cross-sectional study, 6424 paediatric students	N/A (nationwide survey; paediatric medical students)	Reports of practices for handover communication and communication during patient transfers (via surveys)	• Regarding the transfer of information between doctors, 55% answered that there was always an exchange of all the important data • 70% of students reported that there was no communication with nursing staff during patient transfers
Asefzadeh S *et al.,* 2017, Iran	To determine the relationship between patient safety culture and levels of job stress	Quantitative analytic cross-sectional study, 380 nurses	20 hospitals (all units/wards/departments)	Perceptions of hospital handoffs and transitions (via surveys)	• Handoffs and transitions received the lowest percentage of positive responses (24.5%) among all aspects of patient safety culture • Different aspects of patient safety among nurses had a reverse and significant relationship with the level of stress, non-punitive response to error and handoffs and transitions, but a direct and significant relationship with other aspects ($p \leq 0.05$)

Farzi S *et al.,* 2017, Iran	To study the perspective of nurses regarding patient safety culture in intensive care units of teaching hospitals in Isfahan	Quantitative descriptive cross-sectional study, 367 nurses	9 hospital intensive care units	Perceptions of hospital handoffs and transitions (via surveys)	• Handoffs and transitions received the lowest percentage of positive responses (21.1%) among all aspects of patient safety culture
Farzi S *et al.,* 2017, Iran	To evaluate the perspective of newborn intensive care unit nurses toward patient safety culture	Quantitative descriptive cross-sectional study, 156 nurses	4 hospital intensive care units	Perceptions of hospital handoffs and transitions (via surveys)	• Handoffs and transitions received the lowest percentage of positive responses (15.3%) among all aspects of patient safety culture

Wang M *et al.,* 2017, China	To assess the strengths and weaknesses of surgical departments compared with all other departments in county hospitals in China with Hospital Survey on Patient Safety Culture	Quantitative analytic cross-sectional study, 1379 healthcare staff (779 from surgical units; 600 from other units)	19 hospitals (all units/wards/departments)	Perceptions of hospital handoffs and transitions (via surveys)	• Overall percentages of positive scores for the following sub-dimensions of handoffs and transitions were as follows: things fall between the cracks when transferring patients between units – 45%; important patient care information is often lost during shift-changes – 82%; problems generally often occur in information exchange across hospital units – 65%; shift-changes are problematic for patients – 68% • Surgical department percentages of positive scores for the following sub-dimensions of handoffs and transitions were as follows: things fall between the cracks when transferring patients between units – 46.%; important patient care information is often lost during shift-changes – 82%; problems generally often occur in information exchange across hospital units – 65%; shift-changes are problematic for patients – 69% • Other department percentages of positive scores for the following sub-dimensions of handoffs and transitions were as follows: things fall between the cracks when transferring patients between units – 44%; important patient care information is often loss during shift-changes – 81%; problems generally often occur in information exchange across hospital units – 66%; shift-changes are problematic for patients – 68% • There were no significant differences between percentages of positive scores for handoffs and transitions between surgical and other departments • The dimension “hospital handoffs and transitions” was related to “patient safety grade” and “number of events reported” – the high scores of the dimension equated to a good “patient safety grade” and “number of events reported”

Rajalatchumi A *et al.,* 2018, India	To assess perceptions of patient safety culture among Health Care Professionals at a tertiary care hospital in Puducherry	Quantitative analytic cross-sectional study, 386 healthcare staff (3 doctors; 255 nurses; 128 others)	Hospital (all units/wards/departments)	Perceptions of hospital handoffs and transitions (via surveys)	• Overall, handoffs and transitions received 41.8% positive responses – the third lowest score among all aspects of patient safety culture • "Other" healthcare staff obtained a lesser score in the handoffs and transitions domain (34.5%) compared to doctors (53.4%) and nurses (50.3%) (p<.001)
Hospital discharge					
Author, year, **low/middle-Income country**	**Objective/s**	**Study design, sample size**	**Study healthcare setting/s**	**Outcome measure/s (regarding handover communication)**	**Summary of results** **(regarding handover communication)**
Lalani N S *et al.,* 2001, Pakistan	To assess nurses' knowledge, perceptions, and actual practice with relation to patient discharge	Quantitative descriptive cross-sectional study, 15 nurses and 15 patients	3 hospital medical-surgical units	Nurse knowledge, perceptions and reported practices of discharge planning and patient perceptions regarding their involvement in discharge planning (via questionnaires); contents of documented discharge planning completed by nurses (via medical file audit)	• All of the nurses agreed that discharge planning is an important role of nursing; 40% agreed that they effectively participate in discharge planning; 73% agreed that physicians were actively involved in discharge planning; 47% of nurses agreed that families were involved in discharge planning; 33% reported that discharge planning begins early • 20% of the nurses were able to give the appropriate definition for "discharge planning"; 33% said that they did not know the definition; 67% of the nurses said that discharge planning starts after the physician writes the discharge orders, whereas 33% reported it should begin at the time of admission; the average time nurses spent on discharge planning was 10.42 min. • Almost 60% of the nurses said that they give discharge teaching regarding diet and medications;

					40% said that it includes information regarding the follow-up visits; only 27% reported that it includes information about diet, medication, activity, exercise, and follow-up visits; 93% of the nurses said they were unable to perform discharge planning well because of increased workload; other reasons given were lack of time (60%), lack of interest and motivation (27%), and lack of awareness and late information received from the physicians about the patients' discharge (20%) • The majority of the nurses (93%) reported documenting all of the discharge planning activities in the nurses notes, 13% in the nursing care plan and 7% in the nursing assessment form; 60% of the files did not show any nurses' notes about discharge planning; in 40% of the files there were incomplete nurses' notes present; no information regarding patients' care plans was documented; 90% of the assessment forms showed no documentation about discharge plans; no nursing care plan contained discharge planning documentation • 27% of patients said they were involved in discharge planning; when those patients were asked who discussed the plan with them, responses were physicians (73%), no one (13%) and both nurses and physicians (7%); when asked whether the discharge instructions helped at home, 53% responded "yes"; 53% also said that because of the lack of information given about their post-care, they incurred post-care expenses

Kumar S, 2004, India	To assess the quality of discharge tickets received by breast cancer patients	Quantitative descriptive cross-section study, 736 discharge tickets (DTs)	Hospital surgical department	Legibility of DTs and completeness and accuracy of the following information: entries for central registration (CR) number, TNM stage, in-hospital treatment details, instructions for subsequent treatment and instructions regarding surgical wound care (via DT audit)	• Legibility of the DTs was acceptable in all DTs except one (i.e. 99.9%) • Central registration No. was written accurately in all DTs (736; 100%); correct tumour stage was written in 423 (57.5%) DTs; meaningful details of the in-hospital treatment were entered accurately in 721 (98%) DTs; follow-up instructions were written clearly in 536 (76.5%) DTs; instructions regarding wound care were written clearly in 397 (53.9%) DTs
Topacoglu H *et al.,* 2004, Turkey	To identify factors that affect overall satisfaction of patients admitted to the emergency department	Quantitative analytic cross-sectional study, 1019 patients	Hospital emergency department	Satisfaction with discharge instructions (via surveys)	• Explanations of discharge instructions were reported to be received by 964 patients (94.6%); 55 patients (5.4%) reported that they were not given any instructions • Of the 964 patients receiving discharge instructions, 865 (89.7%) were satisfied with instructions • Patient satisfaction with explanations of discharge instructions had a significant relation to overall satisfaction (p<.05)
Hussain S F *et al*., 2005, Pakistan	To evaluate the hospital-based management of acute asthma in South Asia and to compare practices over a 10-year period	Quantitative analytic cohort study, 1995: 100 medical records; 2004: 102 medical records	Hospital emergency department	Contents of documented discharge planning (via medical record audit)	• 1995 discharge planning: documentation of inhaler technique – n/a; follow-up appointment given – 88% • 2003-2004 discharge planning: documentation of inhaler technique – 7; follow-up appointment given – 95% • No formal documents were found regarding patient self-management plans
Miasso A I *et al.,* 2005, Brazil	To evaluate the final nursing orientation for the discharge from the hospital in an inpatient clinic a university	Mixed-methods descriptive cross-sectional study, 38 patients	Hospital inpatient clinic	Reports of orientation environment, provision of prescription	• Inadequate places for orientation: 65.8% of the participants were oriented near the nursing station, an environment considered to be inadequate in view of the great flow of people, the delivery and collection of materials, the excess of noise related

	hospital in the interior of São Paulo			information, nursing guidance on drug therapy, duration of orientations and interactions from patients/carers (via observations and field notes)	to radio connected, telephone, talking, people, among other factors • Lack of written information: only 3 (7.9%) participants received written information regarding their medical prescription and the times they should take the medicines • Short time for orientation: 28 (73.7%) guidelines had a duration of 2 to 5 minutes, 7 (18.4%) lasted from 6 to 10 minutes and 3 (7.9%) guidelines lasted more than 10 minutes • There was no use of strategies that enabled nurses to confirm that patients/carers had fully comprehended all of the guidance provided during discharge within the orientation
Arotiba J T *et al.,* 2006, Nigeria	To assess the standard of medical notes in the maxillofacial surgery department using the CRABEL scoring system with a view to standardising it and improving it	Quantitative descriptive cross-sectional study, 100 patient case notes	Hospital oral and maxillofacial surgery department	CRABEL score for contents of discharge summaries (via discharge summary audit)	• The worst aspect of the notes was the discharge summary with a mean score of 29% • The maximum individual discharge summary score awarded was 5, the minimum was 0 (out of a possible maximum score of 5)
Carvalho A R S *et al.,* 2008, Brazil	To investigate the guidance offered at discharge to these patients who underwent surgery for myocardial revascularisation	Quantitative descriptive cross-sectional study, 23 patients	Hospital intensive care unit	Reports on desire for discharge information, who delivered discharge guidance, form and content of discharge guidance and comprehension of discharge guidelines (via questionnaires)	• 17 individuals (74%) reported that they would like to receive information on how to manage their home care after surgery • 52.2% of patients received the doctor's discharge guidance; the most addressed aspects of discharge guidelines were reported as follows: outpatient follow-up (100%), use of drugs 92.3%, physical activity 85.7% and incision care 78.6%; 55.6% of patients considered guidelines difficult to memorise due to great quantity • 10 (43,5%) said that they didn't remember their guidance; 74% said that written information would help them to remember

Mishra A K *et al.,* 2009, Nepal	To assess the adequacy of medical records in Bir Hospital	Quantitative descriptive cross-sectional study, 100 patient case notes and 130 discharge summaries	Hospital liver unit	Legibility and completeness of discharge summaries (via discharge summary audit)	• Age and sex were missing in 1 (0.76%) summary; patient's address was missing in 21 (16.1%) cases; none of the summaries contained the full mailing address • About 4 (3.%) patients' bed number was not present; 7 (5.38%) discharge sheets failed to mention the unit; date of admission (DOA) and date of discharge were missing in 2 (1.53%) and 1 (0.76%) summaries, respectively • Abbreviations were used in diagnosis in 96 (73.8%) summaries; 6 (4.61%) and 4 (3.076%) discharge summaries had no clinical history and physical examination findings, respectively; investigations and results were mentioned in all summaries; although the treatment during the hospital stay was present in all summaries, it included the drug treatment given but failed to mention the patient's improvement or deterioration in all but 6 cases; the patient's condition at discharge was missing in 86 (66.15%) summaries; 6 (4.61%) summaries had no advice on when to follow up; 126 patients (96.9%) were not given any self-care instructions on discharge • The date on which the discharge summary was written was missing in 24.6% of cases; 2 (0.02%) summaries lacked the signature of the doctor writing the summary; only 27 (20.7%) summaries had legible signatures; doctor's name and level/position were missing in 118 (90.76%) and 125 (96.1%), respectively; 65 (50%) patient's sheet did not include the name of the doctors under whom they were treated

Faydali S *et al.,* 2011, Turkey	To determine the post-discharge knowledge levels of the burn patients and their relatives	Quantitative analytic cross-sectional study, 192 patients and 88 relatives	Hospital burn policlinic	Reports of receipt of and knowledge and attitudes regarding the following discharge information: medication, dressing, infection protection, symptoms of infection, exercises, positions, nutrition, check-ups, pain and daily activities (via questionnaires)	• 50.7% of the patients/relatives stated they were informed of burn care and treatment, 49.3% stated they were not; participants were informed of the following: 43.9% wound care, 41.4% check-up time, 39.6% medication, 36.8% pain, 23.9% nutrition, 22.1% liquid intake, 13.2% burn protection and first aid, 11.8% exercise, 6.1% consultation hotline, 5.4% psychological support and 2.5% sleeping and resting; 69.6% of participants believed the information about burn care and treatment was insufficient • Having knowledge of the following aspects of post-discharge care was significantly associated with reports of receiving relevant discharge information ($p<.05$): dressing techniques, exercise requirements and elevation and positioning; higher education levels were associated with expressing the appropriate amount of liquid intake and having more knowledge about infection protection than the primary school or below graduates ($p<.05$)
Mata L R F *et al.,* 2013, Brazil	To characterise socio-demographic and disease characteristics of patients undergoing prostatectomy; to identify nursing actions in the peri-operative period and those related to preparation for hospital discharge	Quantitative descriptive cross-sectional study, 121 medical records	Hospital medical and statistical filing department	Contents of documented discharge planning (via medical record audit)	• Just 24 records relating to discharge guidance were found, leading researchers to question whether nurses were performing this step • Of the records containing discharge guidance the following activities were documented: management of permanent vesicle catheter (n=19), follow-up appointments (n=3), infection prevention (n=1) and management of surgical wound (n=1)

Flesch L D *et al.,* 2014, Brazil	To know and analyse the perception of the elderly on hospital discharge	Quantitative descriptive cross-sectional study, 30 patients	Hospital medical clinical and emergency department	Reports of perceptions regarding the following aspects of discharge: relationship in the hospital, community relationship, transmission of information, organisation of documents, continuity of care, communication between healthcare providers (via questionnaires)	• Participants expressed satisfaction with the information received on diagnosis (83.3%), prognosis (73.3%), emergency aid (73.3%), clinical findings (66.7%), medication (96.7%), food (90%), equipment/supplies and after discharge care (80%); only 6.7% reported receiving educational instruments • Continuity of care: there was satisfaction with information on follow-up consultations (86.7%) and continuous treatment after discharge (86.7%); however, resources and services to support patients was lacking (26.9%); 56.6% affirmed that a discharge plan was fulfilled, but only 38.4% participated in this planning and 41.4% said their family was engaged • Communication: 46.7% of participants were reminded of consultations; responses were mostly positive regarding information about activity restrictions (60%), communication among health professionals (86.7%) and information about the post-discharge health professional (80%); 96.7% of participants reported that forms had been completed and forwarded to the next health professional
Melese T *et al.,* 2014, Ethiopia	To identify the levels of client`s satisfaction and its determinants in maternity care at a referral hospital	Quantitative analytic cross-sectional study, 423 postpartum women	Hospital maternal care	Level of satisfaction with information provided at discharge (via questionnaires)	• 10.4% of women reported that they were completely satisfied with information at discharge, 50.1% reported that they were satisfied • The mean satisfaction score of information at discharge was 3.32 (out of a possible maximum score of 5) • Satisfaction with health workers' communication was more likely among secondary education group ($p<0.01$) and less likely among mothers with unwanted pregnancies ($p<0.05$)
Albuquerque D C *et al.,* 2015, Brazil	To describe the clinical features, treatment and prognosis of hospitalised patients	Quantitative analytic cohort study, 1263 patient registry records	N/A (BREATHE national multicentre heart failure registry)	Contents of documented discharge guidelines	• 63.7% of patients received discharge guidelines about the correct use of medications • Only 34.9% of patients were advised about post-discharge diet requirements

	admitted with acute heart failure in Brazil			(via registry record audit)	• Only 16.2% of patients were advised about post-discharge physical activity requirements
Deek *et al.,* 2016, Lebanon	To identify the prevalence and causes of readmission among patients admitted with heart failure at Rafic Hariri University Hospital, a large tertiary government hospital in Beirut; to identify demographic and clinical predictors of readmission and possible gaps in management that may contribute to these readmissions	Quantitative analytic cohort study, 187 patients	Hospital cardiology unit	Contents of documented discharge education and relationship between provision of discharge education and risk of readmission at 30, 60 and 90 days following discharge (via medical record audit)	• Documentation of discharge education was lacking for the majority of patients in the current sample, where only 4.3% had documented education about diet, symptom management, smoking cessation and medications • No association was found between discharge education and likelihood of readmission; the lack of documentation of discharge instruction limited drawing conclusions about the adequacy of discharge education for patients
Giordani A T *et al.,* 2016, Brazil	To identify post-operative complications in patients undergoing surgical procedures of medium and small size; to identify the difficulties experienced in self-care during the post-operative period and information provided in the process of discharge	Quantitative descriptive cohort study, 70 patients	Hospital surgical units	Reports of post-operative complications, discharge guidelines, questions regarding or difficulties of self-care at home and the identification of the individual who performed	• 87% of patients reported some type of complication • 95% of patients reported receiving discharge guidance on the use of medication, and 70% on outpatient treatment; only 37% received information on changing the dressing, other self-care guidelines in the post-operative period were not identified; 4% reported receiving no guidance • Although 54% of inquiries did not have doubts about self-care, 37% reported doubts about changing the dressing and 9% about the correct use of medication • As for the professional advisor, 64% were instructed by nurses, 58% by doctors and 5% by other professionals

				discharge guidelines (via telephone interviews)	
Chongthawonsatid S, 2017, Thailand	To examine the validity of the principal diagnoses on discharge summaries and coding assessments	Quantitative descriptive cross-sectional study, 118971 medical records	N/A (national medical record audit)	Comparing inpatient record coding and discharge summaries for level of agreement (i.e. having the same coding), proportion that were incorrect and the proportion that had a non-specific diagnosis (via record audit); sensitivity and specificity as well as positive and negative predictive values of inpatient record coding and summaries	• The lowest level of agreement was jointly shared by two categories: “Endocrine, nutritional, and metabolic diseases” and “Symptoms, signs, and abnormal clinical and laboratory finding not elsewhere classified”; the category with the highest proportion of incorrect diagnoses was “Factors influencing health status and contact with health services”; as for the coding of the principal diagnoses, the lowest agreement for coding was for “Injury, poisoning, and certain other consequences of external causes”; the category with the highest proportion of incorrect coding was “Factors influencing health status and contact with health services” • “Type 2 diabetes mellitus with coma” had the lowest overall sensitivity; around 5% of Type 2 diabetes mellitus diagnoses had no objective evidence to support them; miscoding also occurred in 6%–7% of diabetes records • Summary assessments had low sensitivities (7.3%–37.9%), high specificities (97.2%–99.8%), low positive predictive values (9.2%–60.7%), and high negative predictive values (95.9%–99.3%); coding

					assessments had low sensitivities (31.1%–69.4%), high specificities (99.0%–99.9%), moderate positive predictive values (43.8%–89.0%), and high negative predictive values (97.3%–99.5%)
Perera D M P *et al.,* 2017, Sri Lanka	To identify opportunities to optimise quality use of medicines and evaluate medication appropriateness and medication information exchanged with patients and carers on discharge in a Sri Lankan tertiary care hospital	Quantitative descriptive cohort study, 578 patients	1 male and 1 female hospital medical unit	Reports of receipt of information regarding medicines intended to be continued after discharge (via surveys)	• 52% of patients recalled being asked about their pre-admission medicine regimen • Of the 427 patients surveyed, 75% recalled being asked about their adverse drug reaction history • 39% of patients recalled someone explaining the changes that had occurred to their medicines in hospital at the point of discharge

Cichowitz C *et al.,* 2018, South Africa	To explore characteristics of patients discharged from an adult medical ward in South Africa, and compare care-seeking behaviours prior to the index hospitalisation, discharge instructions, and subsequent follow-up care for patients with and without HIV	Quantitative analytic cohort study, 293 patients	Hospital adult medical ward	Contents of documented discharge instructions (via medical record audit)	• Most participants (97%; 263/270) were given a referral for follow-up care, with the most common referral to return to the tertiary care facility for specialty ambulatory care (83%; 207/250) • Over half (64%; 150/234) were requested to return to the facility within two weeks of discharge
Saxena M *et al.,* 2018, India	To understand the quality of care that was provided to women during childbirth in health facilities and identify associated gaps in the process of maternity care	Qualitative study, 23 patients	3 primary health centres and 6 community health centres	Quality of discharge advice (via observations with checklist)	• At the time of discharge the staff usually vaccinated the babies, counselled the women on postnatal care and dispensed medicines • Across facilities, the staff nurse completed most of the discharge formalities except arrangement for transport, which was done by the Community Health Workers • A few women were counselled at their bed side; all others were counselled in the nurse duty room while the baby was being vaccinated • Discharge counselling mainly focused around immunisation, family planning and exclusive breastfeeding; identifying the baby's and mother's danger signs was the least discussed topic; most women and their companions were given information on the immunisation schedule, whereas only some of them received instructions for follow-up check-ups; close to half of the women did not receive free medicines and cotton/sanitary pads at the time of discharge; informal payments were demanded from a few women at the time of discharge • Theme of care – information sharing: an area of notable concern was discharge advice as women

					were not counselled on family planning, immunisation, exclusive breast feeding, baby's and mother's danger sign and instructions for follow-up check-ups were often not given

Singh S *et al.,* 2018, South Africa	To determine the quality of discharge summaries that were completed for general paediatric admissions at Chris Hani Baragwanath Academic Hospital (CHBAH)	Quantitative analytic cross-sectional study, 1148 discharge summaries	Hospital general paediatric wards	Legibility and contents of discharge summaries (via discharge summary audit)	• For patient identifiers and outcomes, 80.0-93.3% and 91.4% of fields, respectively, were appropriately recorded by the doctor completing the discharge summary; it was rare for the doctor to leave the patient name and surname domains blank (0.1%), but indecipherable or illegible handwriting accounted for 8.4% of instances where the name domains were not appropriately recorded • The HIV exposure of the admitted children was documented for 84.7% of cases, including 58 (5.4%) who were HIV-infected; among HIV-infected children, 89.7% had CD4+ lymphocyte counts and 87.9% HIV viral load measurements completed • The anthropometric parameters were appropriately documented in 50.0-91.4% of summaries; admission weight (91.4%) was more appropriately recorded than the admission length/height (70.9%) (p<0.0001) and discharge weight (50.0%) (p<0.0001) • The ICD-10 code for children with lower respiratory tract infection was appropriately recorded in 338 of 503 cases (67.2%) • Requirement for follow-up was appropriately completed for 1065 (92.8%) of the 1148 summaries; for the 794 children who required follow-up at CHBAH, the reason for follow-up was stated in 721 (90.1%); the main reasons for follow-up were clinical assessment (75.8%), evaluation of outstanding laboratory results (9.8%) and repeat anthropometric measurement (5.2%) • We further compared the rates of appropriately completed discharge summary fields by month to determine whether discharge summary quality improved as interns spent more time in the Department of Paediatrics; the same group of interns was assessed during the study period; although there were statistical differences in some parameters, they were not considered to be of

					major clinical relevance because the quality did not consistently improve with time

Dreyer R *et al.,* 2019, South Africa	To identify readmissions that were potentially avoidable, defined as preventable by a change in clinical decision-making by a clinician under the current standard of care	Quantitative analytic cohort study, 465 patients	Hospital internal medicine department	Adequacy of discharge planning and relationship between adequacy of discharge planning and risk of readmission at 30 days following discharge (via medical record audit)	When evaluating potentially avoidable causes for 30-day readmission, the second biggest contributor was inadequate discharge planning (7%)
Referrals within healthcare facilities					
Author, year, **low/middle-income country**	**Objective/s**	**Study design, sample size**	**Study healthcare setting/s**	**Outcome measure/s (regarding handover communication)**	**Summary of results** **(regarding handover communication)**
Akinmoladun J T *et al.,* 2006, Nigeria	To evaluate the quality and pattern of referral letters sent to the oral and maxillofacial surgery clinic from other specialties in the University College Hospital, Ibadan	Quantitative analytic cross-sectional study, 262 referral letters	Oral and maxillofacial surgery clinic	Contents grade scores (A = all 10 items, B = 9-7 items, C = 6-4 items, D = 3-0 items) of referral letters (via referral letter audit)	• Only 3% of letters were grade A; The majority of letters were of grade B (77%); The remaining 20% were of grade C quality - none of the letters were grade D • Plastic surgery and accident/emergency units each produced 3 of the 9 grade A letters; The remaining 3 were produced by paediatrics, anaesthesia and general surgery; No significant difference was found between specialty units and grades of letters • Current patient management being provided by the referring unit was the item of information most frequently omitted from letters (n=219), followed by patient's sex (n=105)
Referrals between healthcare facilities					

Author, year, low/middle-income country	Objective/s	Study design, sample size	Study healthcare setting/s (regarding handover communication)	Outcome measure/s (regarding handover communication)	Summary of results (regarding handover communication)
Mountford F P, 1973, South Africa	Phase 1: to determine the extent of contact between various field nursing services and other hospitals and healthcare agencies; Phase 2: to discuss a serious of statements formulated to promote discussion on health services and communication; Phase 3: to discuss the statement that "there is a breakdown in communication and consequently in the application of total healthcare which adversely affects the patient, the family and the work situation, which is wasteful of resources and undermines morale of all categories of staff	Mixed-methods descriptive study, Phase 1: 105 healthcare staff; Phase 2: 120 nurses; Phase 3: 250 healthcare staff	City-wide institutional and field health services	Phase 1: reports of current referral practices, satisfaction with practices and suggestions for improvement (via questionnaires); Phase 2: themes developed (via group discussion of 12 statements designed to elicit knowledge, opinions and ideas on health services and communication between sectors); Phase 3: themes developed (via group discussions of a statement regarding breakdown in communication and potential consequences for patients, family and staff)	• Phase 1: contact between field staff and other agencies is primarily made by telephone, letter and written report; the majority (51) found these methods satisfactory, 31 only sometimes, while 1 did not; 1 person believed that communication between departments was improving but overall there was felt to be room for considerable improvement • Phase 2: Theme: quality of communication – groups were unanimous that communication between all sections of the health service is grossly deficient, mainly due to lack of knowledge and appreciation, professional jealousy and a tendency for nurses to work in isolation; Theme: patient turnover – early discharge of patients does not improve quality of communication and long-term patients receive better total care; Theme: Health service structure – the existing administrative structure is confusing and hinders communication • Phase 3: Theme: the public – on admission, no one explains to the patient what is happening and communication fails during hospitalisation as co-operation between disciplines is poor; Theme: Professional education and in-service training – problems of communication were considered to be a result of lack of knowledge and a need for in-service training was expressed; Theme: Topical remedies – use of distinctive envelopes for patients correspondence and establishing contacts; Theme: Management – specialist trained management is required

Buchmann E *et al.,* 1994, South Africa	To assess the number, nature and quality of referrals and referral letters to the gynaecological outpatients' department (GOPD) in order to define more clearly any problems in the referral system and to make recommendations for improvements	Quantitative analytic cross-sectional study, 359 referral letters	Hospital gynaecological outpatient department	Number of referrals, their origins, main problems of patients presented to the GOPD, letter contents scores, proportions of diagnostic agreement (with GOPD clinical summaries), proportions of appropriate referrals and comparisons between clinic nurses/doctors and private doctors as well as between clinic nurses and clinic doctors of contents scores and proportions of diagnostic agreement and appropriate referrals (via referral letter audit)	• All letters were legible; origins: 150 from private doctors, 181 from Soweto clinics, 21 from other clinics and 7 from hospitals; the main problem reported in referral letters was “pregnancy problems” (88%); 20.3% of patients had diagnoses from the GOPD that differed from those of referring doctors/clinics • Only 11% of referring private doctors mentioned what treatment they had given patients before sending them to hospital; Soweto clinic nurses included significantly more information in their letters than clinic doctors ($p<.01$) • Mean letter scores (out of a maximum 10): clinic nurses/doctors – 6.78; private doctors – 3.98; clinic nurses – 6.63; clinic doctors – 7.32; clinic doctors had a significantly higher mean letter contents score than private doctors ($p<.01$); proportions of diagnostic agreement: clinic nurses/doctors – 70%; private doctors – 64%; clinic nurses – 75%; clinic doctors – 71%; proportions of appropriate referrals: clinic nurses/doctors – 66%; private doctors – 71%; clinic nurses – 78%; clinic doctors – 65%

Nkyekyer K, 2000, Ghana	To determine the major sources of, and indications for, referral of patients during the labour and delivery periods; to assess the adequacy of various aspects of the referral mechanisms	Quantitative analytic cross-sectional study, 396 patient referrals	Hospital labour ward	Contents of patient-held medical records provided by referring facilities (via patient-held record audit)	• Almost all women who attended antenatal clinics had their attendance cards with them • 3 items relating to time (time woman reported to the facility, T1, time decision was taken to refer, T2, and time woman actually left for Korle Bu Teaching Hospital, T3) were noted; T1 was indicated in 263 (66.4%) of referrals; T2 in 52 (13.1%) and T3 in 46 (11.6%) • With regard to the number of 'time' items indicated in each referral, 108 (27.3%) referrals had none, 220 (55.6%) had one, 64 (16.2%) had two and only four (1.0%) had all three • Sixty-four women came with partographs, which was 16.7% of the 384 women referred in labour or the immediate postpartum; women referred from state-owned centres were significantly more likely to have partographs than those from privately owned centres ($p<.05$)
Dafallah S E *et al.,* 2005, Sudan	To analyse the documents used in the referral system in Wad Medani, Sudan	Quantitative descriptive cross-sectional study, 206 referral letters	Teaching hospital, paediatric hospital, dermatology hospital, ophthalmology hospital, obstetrics and gynaecology teaching hospital, dentistry hospital and oncology hospital	Legibility, contents and quality scores of referral documents (via referral document audit)	• Although relatively better recording rates 135/206 (65.5%) appeared on the component of "provisional diagnosis" the situation with all other components was different, such as 197/206 (95.6%) absent recording on the part of the central nervous system functions test • 83% of the letters were illegible (scoring less than 5) while 12.1% (scoring 5–7) were fair and the remaining 4.9% were good (scoring more than 7) • Referral documents to dermatology, ophthalmology, obstetrics and gynaecology and dentistry hospitals all scored poor and were illegible; the documents from private clinics were the most deficient with 85.2% illegibility • Most of the referral documents 101/206 (49%) were written on pages, 69/206 (33.5%) were on slips and 8 (3.9%) were written on discarded paper whose other side had writing on it; cards were used only for 28 (13.6%) of cases

Orimadegun A E *et al.,* 2008, Nigeria	To examine the amount and quality of information conveyed by general practitioners to other specialists when referring patients to the children emergency unit of the University College Hospital, Ibadan, Nigeria	Quantitative descriptive cross-sectional study, 974 referral letters	Hospital paediatric emergency unit	Contents of referral letters (via referral letter audit)	• 6.7% of letters had no deducible identity of the writer; the highest rate of unsigned letters occurred among traditional birth attendants • A significant proportion of letters lacked adequate information on the address of the writer (32.5%), patient's age (50.2%), history of the presenting complaints (36.6%), medical history (86.1%), examination findings (47.9%), investigation findings (78.3%), therapy/interventions given (57.2%), expectations of referral (95.6%), diagnosis (38.6%) and reason/s for referral (23.9%) • Of the 674 referral letters written by physicians, 34.0% and 25.5% had no names and signatures on them, respectively; all letters written by traditional birth attendants and non-health workers included their name
Alexander T *et al.,* 2009, South Africa	To quantify the volume of Traumatic Brain Injury (TBI) in a busy regional hospital with geographically remote specialised neurosurgical services; to assess the quality of the care rendered at the regional hospital to patients with TBI	Quantitative descriptive cross-sectional study, 150 patients	Hospital emergency department	Contents of referral letters (via referral letter audit)	• Patient history was recorded in all the referral letters reviewed; the Glasgow Coma Scale in 88%; a management plan in 75%; associated localising signs in 50%; the condition of the pupils in 13% • None of the referrals contained a recorded assessment of the integrity of the cervical spine
Struwig W *et al.,* 2009, South Africa	To evaluate the quality of referrals to secondary-level outpatient psychiatric services rendered by	Quantitative descriptive cross-sectional study, 263 referral letters	Hospital psychiatric outpatient department	Legibility, contents and quality scores of referral documents	• The majority of referral letters contained name of referring professional (94.3%), signature (97.3%), qualifications (94.2%), referring institution (91.6%), patient name (98.8%); the minority of letters contained the following: practitioner contact

	the Department of Psychiatry, University of the Free State			(via referral document audit)	telephone number (31.1%) and patient contact details (42.9%) • The medical/psychiatric history contents of referral letters were as follows: medical history (25.0%), psychiatric history (30.7%), previous psychiatric consultations (6.0%), current medication (16.7%), mental status exam (50.9%), outcome of physical exam (18.2%), special investigations results (15.2%), previous treatment approaches (42.2%), provisional diagnosis (61.16%), DSM/ICD diagnosis (6.5%) and indication for referral (90.1%) • The mean overall score of all the referral letters was 12.7 (out of a possible maximum score of 24)

Abate B *et al.,* 2010, Ethiopia	To assess information use in patient's referral system, current referral process, and problems associated with documentation at Tikur Anbessa Specialised Hospital, Addis Ababa, Ethiopia	Mixed-methods descriptive cross-sectional study, 1600 referral papers; 385 patients and 12 physicians	Hospital internal medicine, gynaecology/obstetrics, paediatrics and surgery departments	Legibility and contents of referral papers (via referral paper audit); patient reports of experiences and satisfaction regarding referral (via questionnaires); physician reports of referral information use (via in-depth interviews)	• Patient socio-demographic information documented on referral papers: name – 99.5%, sex – 88.6%, age – 88.8%, address 35.5%, occupation 10.2%, date 93.7% and time – 8.3% • Clinical information documented on referral papers: chief complaint – 61.9%, clinical finding – 86.4%, investigation – 41.9%, diagnosis – 91.9%, treatment – 39.2%, status of health professional – 36.2%, name of referring professional – 53.3%, signature of referring professional – 95.9%, presence of feedback slip – 82.9% and presence of stamp – 89.8% • Legibility of referral papers: easy to read – 45.1%, moderate – 30.4% and difficult to read – 24.5% • Referral system from patients' point of view: 77.9% knew the reason for their referral; 21% did not know the reason for their referral; 27.4% said they were very satisfied with referral information, 12.9% were dissatisfied and 18.5% were very dissatisfied • Referral information use and communication at tertiary health level: the majority of physicians reported that they do not use the information sent from health centres; a new assessment about referred patients is always taken due to inadequate referral papers; although the majority of physicians agreed on the need to send referral feedback slips their reasons varied; most reported that communication with other hospitals only happens during emergencies most by using personal telephones; sometimes referral papers get sent to the wrong department, which is mainly due to shortage of staff

Ibiyemi O *et al.,* 2012, Nigeria	To assess the quality and content of information conveyed by healthcare practitioners when referring patients to the Dental Center, University College Hospital, a teaching hospital in Ibadan, Southwestern Nigeria	Quantitative descriptive cross-sectional study, 134 referral letters	Hospital dental centre	Completeness of the following items of information: name and signature of referring practitioner, dates of referral, reasons for referral, patient demographics, medical and dental history, examination findings, investigations done, diagnosis and treatment given (via referral letter audit)	• Of the 91 referral letters written by medical doctors, 44.0% and 25.3% had no names and signatures on them, respectively; about 27.0% of the 41 referral letters written by dental surgeons had no name while 4.0% of these letters had no signatures on them; the two letters written by trained nurses had their names • The most frequently stated reason for writing referral was lack of appropriate facilities for treatment (29.9%); other reasons include lack of expertise needed for patient's care (22.4%); patient's request for it (20.1%) and worsening of patient's condition (7.5%); twenty-seven letters (20.1%) did not include any reason for referral • The majority of referral letters contained adequate information on patient's name (97.2%), patient's gender (84.3%), address (66.4%), provisional diagnosis (62.2%) and reasons for referral (77.4%); a notable proportion of referral letters lacked adequate and vital information on the past medical history (98.2%), investigations done (86.4%), past dental history (80.8), treatment given (70.6%), patient's age (60.2%) and examination findings (57.5%)
Gyedu A *et al.,* 2015, Ghana	To assess the quality of referrals for surgery to a tertiary hospital in Ghana and identify ways to improve access to timely care	Quantitative analytic cross-sectional study, 643 referral documents	Hospital surgical department	Contents of referral documents (via referral document audit)	• None of the referral documents recorded all of the essential information; the median number of missing items was 4 (range 1–7); clinicians who did not use a structured form missed 5 or more essential items 50% of the time, compared with 17% when the form was used and 8% when a non-official, but structured form was used; however, even with the use of any structured form, 1 or 2 items were not recorded for 10% of referrals and up to 3 items were not recorded for 45% of referrals; referrals that used a structured form recorded more items than those that did not (p=0.001) • Most referrals were either from teaching (45%) or government district hospitals and clinics (26%); though patient's age, working diagnosis and reason

					for referral were the most commonly recorded items at all facilities, they too were often missing (5–34% of referrals); though patient's medical history or treatment received for the condition being referred were only recorded for 39–58% of referrals, this was markedly more often than the patient's surgical history or respective treatment or diagnostic evaluation prior to referral (2–5%); there was no evidence for a difference between facility type and number of missing items (p=0.10) • Most referrals were from physicians (66%); however, physician or medical assistants wrote 14% referrals and providers that did not record their profession (18%) wrote more referrals than nurses or midwives (2%); assistants (96%) and nurses or midwives (93%) recorded a working diagnosis more often than physicians (75%); the proportion of referrals with recorded surgical history/respective treatment and diagnostic evaluation prior to referral did not vary by clinician type; there was weak evidence for a difference between clinician type and number of missing items (p=0.06)
Vargas I *et al.,* 2015, Brazil and Colombia	To analyse the use of mechanisms for coordination between healthcare levels and the implications for healthcare from the perspective of health personnel in the healthcare networks of Colombia and Brazil	Qualitative study, 234 participants (112 health workers; 66 healthcare administrators; 42 provider managers; 14 insurers)	4 networks of health services in Colombia, 4 networks of health services in Brazil	Views on the use and effectiveness of mechanisms for information transfer across care levels (via interviews)	• In both countries, informants frequently report limitations in the use of the referral and counter-referral forms, such as the absence of basic clinical information; in Colombia, the main problems highlighted were insufficient information recorded on medication and diagnostic tests in the referral form and on the clinical management required in the counter-referral form; most informants consider that the transfer of clinical information to primary care is better following hospital discharge • Most health professionals believe that the shared electronic record mechanism improves information transfer, but also point out pitfalls: they do not include information on hospital care and some external specialists, together with the insufficient

					recording from specialists; as a consequence of deficiencies in the transfer of clinical information, the majority of professionals highlight the need to obtain information from the patients, which can generate errors
Abdulraheem M A *et al.,* 2016, Nigeria	To describe the communication, pre- and intra-transport care, and transport facilities available to referred neonates in Ibadan and their association with immediate morbidity in order to determine areas of inadequacy and propose methods of improvement	Quantitative descriptive cross-sectional study, 401 neonatal transfers	Hospital paediatric emergency department	Type and content of referral information (via referral letter audit)	• 65% of babies had referral letters • Only 51% of the referral letters had complete information; the caregivers could not produce the letters immediately in 5.3% of cases • One baby came with the prototype referral letter for Primary health centres
Esan O *et al.,* 2016, Nigeria	To investigate the quality of referral letters to a department of psychiatry in a Nigerian teaching hospital	Quantitative descriptive cross-sectional study, 284 referral letters	Hospital psychiatry department	Contents of referral letters (via referral letter audit)	• The minority (<30%) of the referral letters had information on description of relevant collateral history (26.8%), past medical history (20.1%), relevant clinical findings (19.7%), current medication list (16.5%), relevant psychosocial history (12.0%), outline of management to date (11.3%), results of investigations to date (3.2%), allergies (1.1%) and past surgical history (0.4%) • The majority (>50%) of the referral letters had information on initial statement identifying the reason for referral (94.7%), patient demographics (93.3%), description of chief complaint (85.9%), provisional diagnosis/clinical impression (75.0%), a statement of what was expected from the referral (70.1%) and description of associated symptoms (55.3%)

Janati A *et al.,* 2017, Iran	To identify features and gaps of GPs' referral letter-writing skills by assessing quality of the referral sheets written by GPs working in the villages of Sarab city, East Azerbaijan Province, Northwest Iran	Quantitative descriptive cross-sectional study, 400 referral letters	Hospital cardiology and gynaecology departments	Legibility and contents of referral letters (via referral letter audit)	• Legibility of referral letters was 73% and no writing-style items had been followed in the referral forms that were evaluated • Referral letters sent to gynaecologists: the majority included patient's name (100%), reason for referral (71.1%), description of chief complaint (92.3%), description of associated symptoms (86.5%), past medical history (88.8%), past surgical history (94.7%), current medications (75.0%), allergies (59.1%), relevant clinical findings (55.7%), and provisional diagnosis/clinical impression (53.3%); the minority included patient's age (44.7%), relevant collateral history (27.9%) and investigation results to date (35.5%); none (0.0%) included national ID No., patient contact details, GP contact details, receiving specialist name, relevant psychosocial history, outline of management to date or statement of what is expected from the referral • Referral letters sent to cardiologists: the majority included patients' name (100%); the minority included patient's age (29.7%), reason for referral (14.0%), description of chief complaint (18.2%), description of associated symptoms (26.9%), relevant collateral history (10.4%), past medical history (10.9%), past surgical history (25.0%), current medications (7.2%), relevant clinical findings (4.1%), investigation results to date (2.0%) and provisional diagnosis/clinical impression (5.2%); none (0.0%) included national ID No., patient contact details, GP contact details, receiving specialist name, relevant psychosocial history, allergies, outline of management to date or statement of what is expected from the referral

Vargas I *et al.,* 2017, Brazil and Colombia	To determine the level of continuity of care perceived by users and to explore influencing factors in two areas of countries with different health systems: Colombia and Brazil	Quantitative descriptive cross-sectional study, 4330 patients (2163 in Colombia; 2167 in Brazil)	Health networks within two municipalities of Colombia and Brazil	Perceptions of informational continuity of care between providers (via surveys)	• Continuity of clinical information was the lowest rated type of continuity in both countries • The percentage of users who perceived a good level of transfer of clinical information was higher in Colombia (67.6%) than in Brazil (56.3%). • In Colombia, there were more users (64.1%) who considered that their specialists were aware of the primary care doctor's recommendations (always or often) than those who considered that the GP was aware of the specialist's instructions (58.3%) or discussed their specialist visits with them (61.2%) • In Brazil, 50.4% of users felt that their GP was aware of instructions given to them by the specialist, 49.1% of users felt that the specialist was aware of instructions given b the GP and 51.5% of users reported that after see the specialise, their GP discusses the visit with them.
Vasquez M L *et al.,* 2017, Argentina; Brazil; Colombia; Mexico	To determine the level of clinical coordination between Primary Care and Secondary Care experienced by doctors and to explore influencing factors in public healthcare networks of Argentina, Brazil, Chile, Colombia, Mexico and Uruguay	Quantitative descriptive cross-sectional study, 2139 doctors (350 in Argentina; 381 in Brazil; 363 in Colombia; 365 in Mexico; 332 in Uruguay)	Two public health networks in Argentina, Brazil, Colombia and Mexico	Reports of doctors' experience of coordination of information between levels of care (via questionnaires)	• The majority of doctors from each country reported that the information they receive is always/often required for the care of the patient: Argentina (74.4%), Brazil (76.1%), Colombia (70.9%), Mexico (66.5%) • The majority of doctors from each country also reported that they take the exchanged information into account when caring for the patient: Argentina (75.9%), Brazil (78.1%), Colombia (78.2%), Mexico (62.0%)

S4. Interventional studies data extraction sheet

Hospital shift-change						
Author, year, low/middle-income country	**Objective/s**	**Study design, sample size**	**Study healthcare setting/s**	**Intervention/s evaluated**	**Outcome measure/s**	**Summary of results**
Kassean H K *et al.,* 2005, Mauritius	To implement a new system of bedside handover	Quantitative descriptive prospective study, 10 handovers and 40 patients	Hospital gynaecological ward	A new system of bedside handover that puts patients central to the process of managing care and addresses some of the shortcomings of the traditional handover system	Compliance with newly developed bedside handover criteria (via observations); patient perceptions of the new handover method (via questionnaires)	• Analysis of results of the observational data on 10 handovers showed that the following 5 criteria were met at 100%: outgoing and incoming nurses meet in the office to get a report on confidential matters; outgoing and incoming nurses then move on to the patient's bedside; nurses introduce themselves to the patient and initiate handover from patient's him/herself in the first instance; patient's progress is reviewed as per care plan; any other queries from patient is dealt with • The following 6th criteria was met at 90%: session with patient is concluded satisfactorily • Analysis of the results of 40 patient questionnaires showed that a 96% overall satisfaction level was achieved • The result was evaluated at a full staff meeting and the ward manager and colleagues recognised the change; despite unlearning of the old practice two nurses still displayed some difficulties with the new handover as they were always eager to report everything themselves rather than allowing the patients to have a say; after a reassessment of the situation, accurate feedback was given to them;

						with the group support, they became used to the new system by observing their colleagues in action during the handover and doing it in turn; after a couple of sessions they became fully conversant with the new system
Younan L A *et al.,* 2013, Lebanon	To evaluate a quality improvement project using a multifaceted intervention to improve the quality of nursing intershift handoffs	Quantitative pre-post interventional study, 180 patient handoffs (90 pre-intervention and 90 post-intervention); 42 nurse questionnaires (19 pre-training and 23 post-training)	Hospital medical, surgical and cardiac units	Best-fit interventions implemented: standardised intershift handoff tool, nurse training sessions on effective intershift handoff communication and reorganisation of processes to reduce interruptions during nursing intershift handoff	Frequency of information omissions during handoffs (via audiotape with checklist); frequency of Interruptions during handoffs (via observations); nurses' knowledge of handoff criteria (via questionnaires)	• Information omissions: in the pre-intervention sample, there was a mean of 4.96 omissions per patient handoff across the 3 participating units, with the percentage of omission varying from 10% to 50% per criterion. For the 90 patient handoff checklists in the post-intervention sample, the mean number of omissions decreased to 2.29 ($p<.001$) and the percentage of omissions showed a significant decrease for 18 of the 36 criteria, including, for example, risk for fall (from 24% to 8%), pain status (from 10% to 1%) and home medication (from 38% to 9%) • Interruptions: baseline observations were conducted for 42 intershift reports with a mean of 2.17 interruptions per report; reasons for interruptions included patient calls (27%), physician rounds (25%), phone calls (24%) and side talks between nurses (16%); for

						the 42 post-intervention intershift reports, the mean number of interruptions decreased to 1.26 (p=.008) and interruptions due to physician rounds decreased significantly – from 25% to 4% (p=.001) – as did interruptions due to side talks between nurses – from 16% to 4% (p=.033); interruptions due to patient calls (27% pre-intervention to 56% post-intervention) and phone calls (25% pre-intervention to 30% post-intervention) increased • Nurses knowledge of handoff criteria: the two criteria that were listed pre-training by nurses most often were abnormal laboratory (90%) and abnormal radiology (74%) results, decreasing post-training to 48% (p =.004) and 30% (p =.005); among the other criteria that were listed more often post- versus pre-training were isolation precautions (0% versus 35%, p=.000), level of consciousness (0% versus 35%, p=.000), fall risk (5%, versus 35%, p=.020), and pressure ulcer risk (5% versus 35%, p=.020); before the training, nurses generally focused on the physician's role and what physicians need to know, whereas after the training their responses suggested a greater appreciation of their own contribution to patient safety.

Shuang M *et al.,* 2015, China	To explore the application effect of Situation, Background, Assessment, Recommendation (SBAR) communication mode in neurosurgery nursing handover class	Quantitative non-randomised controlled trial, intervention: 198 patients and 21 nurses; control: 213 patients and 21 nurses	Hospital neurosurgery ward	Situation, Background, Assessment and Recommendation (SBAR) handover tool	Handover problem incidence rates (via handover record audits); nurse and patient satisfaction levels (via questionnaires)	• The nurses in the study group were higher than the control group in terms of satisfaction (very satisfied – control = 42 vs. intervention = 57; $\chi^2 = 5.92$; $p<0.05$) • The incidence of handover problems was lower than that of the control group (problem – control = 72 vs. intervention =29; $\chi^2 = 20.32$; $p<0.01$) • Patients in the study group were higher than the control group in terms of satisfaction (very satisfied – control = 90 vs. intervention = 98; $\chi^2 = 4.59$; $p<0.05$) • All differences were statistically significant ($p<0.05$)
Duhan D *et al.,* 2016, India	To compare before and after practices and work-related concerns of staff nurses regarding shift handover; to determine the association of level of shift handover practices with selected variables; to determine the level of acceptability of shift handover guidelines among staff nurses	Quantitative pre-post interventional study, 30 nurses	Hospital neurology, surgery and respiratory intensive care units	Shift handover guidelines	Handover practice scores (via observations with checklists); views of work-related concerns regarding shift handover derived from a structured scale; views on acceptability of shift handover guidelines (via surveys)	• Following the implementation of handover guidelines, staff nurses mean practice score on the observation shift handover practice checklist increased significantly from 22.27 to 79.33 ($p<.001$) • The highest significant gain was seen in the areas of general ward handover (100%), documentation (100%), nursing care (98.33%) and plan up for progress (98.33%) • Following the implementation of guidelines, staff nurses work-related concern regarding shift handover self-reporting rating scale reduced significantly from 35.80 to 21.83 ($p<.001$); work-related concerns were reduced in all 3 aspects of shift handover (nursing, patient and institutional) • Most nurses (80%) accepted guidelines moderately, followed by high acceptability (20%)

Zou X J *et al.,* 2016, China	To evaluate the effectiveness of a standardised nursing handoff form (NHF)	Quantitative pre-post interventional study, pre-intervention: 1963 admissions; post-intervention: 1970 admissions	Hospital medical unit	Standardised nursing handoff form	Rates of nursing handoff-related and non-handoff-related errors (via observations, voluntary nurse reports and record audit)	• Implementation of the NHF was associated with a reduction in overall nursing error rates from 9.2 to 5.7 per 100 admissions (p<.001); the total nursing errors decreased from 180 to 112 • Overall, all handoff-related errors significantly decreased with an overall score reduction of 2.7 to 0.3 (p<.001) – handoff-related errors included: delayed/omission of medication/tests, pressure ulcer, inappropriate care and falls • All non-handoff-related nursing error rates decreased, but not significantly – non-handoff-related errors included: procedural, documentation, management, knowledge/skill and medication
Jain S *et al.,* 2017, India	To measure the compliance of handover communication; to make the transfer of patient data transparent and well documented; to increase the compliance of handover communication in the hospital	Quantitative pre-post interventional study, pre-intervention: 60 shifts; post-intervention: 60 shifts	Hospital medical and orthopaedic wards, intensive care units and executive rooms/suites	Revised handover communication form, instructions to staff to fill the form and a new digitised handover form reporting system	Levels of compliance with handover communication protocols (via handover form audit and surveys)	• The study revealed that there was low compliance with handover communication protocols; the reluctance to participate actively or involve the patient in handover arose principally from lack of awareness and limited training in handover skills • Improvement was observed after the implementation of a revised handover form and training on handover communication; completion of handover communication was improved and the target of 75% was achieved • The handover communication form was filled on a daily basis including Situation, Background, Assessment, Recommendation (SBAR) and a system of digitalised daily reporting of handover communication forms to the Medical Superintendent was implemented

						• Handover communication completed: compliance went from 20 % to 75% • Handover communication completed on a daily basis: compliance went from 10% to 33% • Handover communication completed using the format: compliance went from 7% to 50% • Handover communication form completed: compliance went from 19% to 40% • Handover communication data filled correctly: compliance went from 20% to 47% • HCPs willingness to fill handover form: went from 23% to 58% • Overall compliance with handover communication process: went from 20% to 75%
Sarvestani R S *et al.,* 2017, Iran	To understand the challenges of nursing handover; to develop a new nursing handover program in paediatric wards in Iran through action research	Mixed-methods pre-post interventional study, 13 nurses and 2 assistants	Hospital paediatric ward	Participants and facilitators designed new structured oral reports and bedside handover protocols and facilitators prepared an educational course for nurses about principles of a standardised nursing handover, ethical and legal issues, family-centred care, time management and communication skills	Challenges of nursing handover (via observations and interviews); development of operational plans and actions for improvement (via focus group and reflection sessions); nurses perceptions of the new handover program (via questionnaires); cost of handover (calculated by combining the number of nurses with the amount of time each nurse spent for the report process)	• Two themes were established with regard to nursing handover challenges: non-holistic approach and poor management during nursing handover • Reflection on actions in two cycles resulted in designing and implementing action plans for change, learning in both participants and facilitators, and improvement in nurses' satisfaction with the new nursing handover program; quantitative data showed a significant decrease in time and cost of nursing handover

Transfers within hospitals						
Author, year, low/middle-income country	**Objective/s**	**Study design, sample size**	**Study healthcare setting/s**	**Intervention/s evaluated**	**Outcome measure/s**	**Summary of results**
Zhihong F *et al.,* 2015, China	To explore application effect of SBAR (Status, Background, Assessment and Recommendation) communication mode in the emergency department and ICU patient transfer	Quantitative non-randomised controlled trial, control group: 100 patient transfers; intervention group: 100 patient transfers	Hospital emergency department and intensive care unit	SBAR handover tool	Level of doctor and nurse satisfaction with the following aspects of handover methods: comprehensiveness of content, the focus of the disease, the management of the pipeline, the writing standard, the language expression, and the length of time (via questionnaires)	• Compared to the control group, more doctors and nurses in the SBAR intervention group were satisfied with handover content (90 vs. 94; p<0.01), disease focus (89 vs. 91; p<0.01), writing standards (90 vs.97; p<0.01), language expression (91 vs. 99; p<0.01) process management (91 vs. 95; p<0.01) and time spent on handover (93 vs. 99; p<0.01).

Yang J G *et al.,* 2016, China	To implement a postoperative handover protocol in the neurosurgical intensive care unit (NICU) of a tertiary teaching hospital	Quantitative pre-post interventional study, pre-intervention: 56 handovers; post-intervention: 112 handovers	Hospital intensive care unit	Structured postoperative handover protocol	Handover attendance, pre-NICU admission preparations, rate of information item report, post-handover discussion, teamwork rating, rate of ventilator weaning within six hours of NICU admission and ventilation duration per patient (via observations and checklists)	• The anaesthetists, the operating room nurses, the ICU nurses and the ICU resident physicians were all present at the bedside handover as required both pre- and post-intervention; Following the implementation of the handover protocol, surgeon presence increased significantly ($p<.05$) from 77–95%; surgeons' presence at bedside reports improved the transfer of surgical information • Multiple aspects of the handover processes were significantly improved, including pre-NICU admission preparation, bedside communication and post-handover discussion; the median teamwork score significantly improved from 3–5, as did scores for all 5 components of teamwork - leadership, communication, cooperation, coordination, situational awareness • The rate of 6-hour weaning increased from 70–82% (non-significant); mechanical ventilation duration per patient decreased significantly from 5.1-3.3 hours • 3 months after intervention, rate of surgeon presence, communication during bedside handover, team performance and patient ventilation duration were either sustained or further improved

Xu W *et al.,* 2018, China	To implement a quality improvement project to reduce postoperative adverse respiratory events in the post-anaesthesia care unit (PACU)	Quantitative pre-post interventional study, PACU respiratory complications samples – pre-intervention: 12,597 cases; post-intervention: not reported; average PACU recovery time sample – pre-intervention: 300 patient records; post-intervention: 300 patient records per month	Paediatric hospital post-anaesthesia care unit	Standardised handoff protocol, handoff checklist and staff handoff checklist training	Percentage of patients in PACU having respiratory complications (via medical record review and PACU staff reports); average PACU recovery time (via medical record review)	• The baseline incidence of respiratory complications in the PACU was 2.8%; hypopnea was the most frequent respiratory adverse event (n=207) followed by laryngospasm (n=79) • The percentage of respiratory events began to decrease with the standardisation of care and a significant change occurred after the implementation of the revised handoff process and improvement in trained PACU staff resources • The goal of 30% reduction was achieved in October 2017; the median line showed a significant shift from 2.8% to 1.4% • The average PACU time during the quality improvement project increased by a small extent from 35 to 37 minutes; this was not a significant change and represented common cause variation
Hospital discharge						
Author, year, low/middle-income country	**Objective/s**	**Study design, sample size**	**Study healthcare setting/s**	**Intervention/s evaluated**	**Outcome measure/s**	**Summary of results**

Marin M J S *et al.,* 2000, Brazil	To evaluate the satisfaction of the elderly with the care provided after the implementation of discharge planning, as well as the perception about continuity in care at home and the guidelines that they consider most important	Qualitative study, 50 patients and/or caretakers	Hospital women's medical unit	Specific discharge guidelines and planning for elderly patients	Number of reports and quotes regarding satisfaction with discharge planning and views on important guidelines (via interviews)	• Satisfaction with discharge planning: the majority of patients expressed satisfaction with the attention received from staff; feeling more secure after receiving the guidelines (94%); 92% said the guidelines were suitable for their level of ability – some stated they needed help from their carer; 47 (94%) stated the guidelines were clear and comprehensible; all felt it necessary to receive discharge guidelines • Views on important guidelines: diet and physical activity were cited by 10 (20%); medication information, skin lesion care and prevention of falls were each cited by 7 patients (14%); the following orientations were also considered as important: skin care, hygiene, prevention of pressure ulcers and bed care

Naidu D V N *et al.,* 2008, India	To evaluate the practice of providing a standardised pre-formatted discharge summary to patients in the Emergency Department	Quantitative descriptive cross-sectional study, 200 patient discharge summaries	Hospital emergency department	Standardised pre-formatted discharge summaries	Receipt of discharge summary and legibility and completeness of the following information: name, date of birth, sex, medical record number, date of visit, postal code and clinical details (via a discharge summary audit)	• All patients (100%) received a discharge summary; legibility of the 3 critical sections, namely diagnosis, prescription and discharge instructions, were 66%, 76% and 65%, respectively • Name of patient, sex, date of visit, diagnosis, prescription and discharge instructions were written in more than 80% of summaries; in the prescription, dosage and duration were written in more than 90%, but documentation of the indication was very poor at 20%; the diagnosis was written in an abbreviated form in 27%; the patient's signature was obtained after explaining discharge instructions in 80% • Investigation results and follow-up advice were not documented in 85% and 93%, respectively; doctors did not sign the discharge summary in 11%; date of birth was not entered at all and postal code was entered in just 2 summaries

Akkuzu G *et al.,* 2009, Turkey	To determine the appropriateness of a teaching program that combined educational sessions with a brochure designed for our patient population	Quantitative analytic cross-sectional study, 33 patients and 33 carers	Hospital medical, surgery, gynaecology, gynaecologic oncology, neurology, cardiovascular, general surgery and urology units	Education sessions and brochures designed to help prevent pressure ulcers for patients/carers	Satisfaction with the language, contents, adequacy, beneficial status and usefulness of information in the brochure as well as recommendations and general feedback (via questionnaires)	• Satisfaction: the majority of patients and caregivers (54.5%-81.8%) rated all elements of the brochure as “adequate” (as opposed to “partially adequate” or “inadequate”) • Recommendations: a minority of carers (6.1%) wanted more information about air mattresses; no patients desired additional information • General feedback: 5 caregivers thought that the number of illustrations was inadequate and 3 patients thought that pictures should be presented in colour • A significant relationship ($p<.05$) was found between patients’ satisfaction with language used in the brochure and education level
Ozcan H *et al.,* 2010, Turkey	To assess the information level of patients following discharge training given by nurses following open heart surgery	Quantitative pre-post interventional study, 50 patients	Hospital cardiovascular surgery department	Discharge training for patients	Information (i.e. awareness) levels (via pre and post-intervention tests)	• The comparison of results of the post-test conducted 1 month after training showed that the awareness level of patients was significantly higher ($p<.05$) • Decreased information scores in patients aged 60 or more years old and the increased information score in married patients was found to be statistically significant ($p<.05$)

Matozinhos F *et al.,* 2011, Brazil	To apply and evaluate the methodology previously developed for puerperal women hospital discharge in the Joint Housing of a public health institution of Belo Horizonte	Quantitative pre-post interventional study, 73 patients and 19 companions	Hospital maternity unit	Discharge education for patients	Frequency of negative/positive words reported when discussing perceptions of the following aspects of post-discharge care: self-care, breastfeeding and caring for the newborn (via free-association interviews with data collection forms)	• During the pre-test, 9 (12.32%) women associated breastfeeding, breastfeeding the newborn and self-care with the words "do not know" or "nothing" and 14 (19.17%) associated those terms with negative words, such as "fear" and "worry" • Following the implementation of discharge orientations containing post-discharge care advice, all associated words were positives and 25 (34.24%) associated with words that inductors addressed during orientation – for example: "correct handle", "feeding" and "6 months"
Eshah N F, 2012, Jordan	To identify the effectiveness of pre-discharge education on Acute Coronary Syndrome patients' lifestyles	Quantitative non-randomised controlled trial, 104 patients (52 in control group; 52 in intervention group)	Hospital inpatient ward/s	Pre-discharge education for patients	Mean scores on self-reported perceptions of adopting the following health-promoting behaviours in daily life: health responsibility, physical activity, nutrition, interpersonal relations, spiritual growth and stress management (via surveys)	• The results showed no significant differences in demographic variables between the two groups at baseline; additionally, the baseline data on each participant groups' adoption of a healthy lifestyle showed no significant differences between the two groups at baseline • Following the provision of the intervention program, results showed that the participants from the experimental group scored significantly higher on the following 3 components of healthy lifestyle: health responsibility, nutrition and interpersonal relations

Perera K Y S *et al.,* 2012, Sri Lanka	To test the hypothesis that including discharge summaries in the patients' native language improves their knowledge of illness and prescribed medications	Quantitative randomised controlled trial, 130 patients (65 in control group; 65 in intervention group)	Hospital medical units	Native language discharge summaries for patients	Scores of knowledge on diagnosis and prescribed medications and reports of methods of acquiring knowledge and opinions regarding usefulness of the discharge summary (via questionnaires)	• At the time of discharge, the mean scores for knowledge on diagnosis, and of prescribed medication were not significantly different between the two groups; • At 2-week follow-up, compared to the control group the intervention group had significantly higher mean scores for both knowledge of diagnosis (6.58 vs. 8.02; $p<0.01$) and prescribed medications (12.56 vs. 54.48; $p<0.01$). • The increase in the score for knowledge on diagnosis or prescribed drugs was significantly influenced only by whether supplementary discharge summary was given or not ($p<.001$); • The number of patients acquiring knowledge by reading the discharge summary was significantly higher in intervention group for both knowledge of diagnosis (3 vs. 53; $p<0.01$) and prescribed medications (4 vs. 52; $p<0.01$) • Among patients, 124 (95.4%) felt that information in their native language was important for the following reasons: (a) they could read and understand about the disease and treatment by themselves (69.2%); (b) it served as a reference document to recall instructions given to them in hospital (23.8%); and (c) it allowed them to raise awareness of the disease among other household members (20.8%)

Chen Y *et al.,* 2015, China	To examine the effect of an educational intervention on parental readiness for premature infant discharge from neonatal intensive care units (NICU)	Quantitative non-randomised controlled trial, 126 parents (63 in intervention group; 63 in control group)	2 hospital neonatal intensive care units	Pre-discharge education for parents	Self-reported parental readiness for hospital discharge (via a structured scale); perceptions of quality of discharge teaching (via surveys)	• No significant differences were found between the intervention and control groups with regard to hospitalisation variables (i.e. type of hospital), parent characteristics (i.e. gender, age, education level and place of residence) and infant characteristics (i.e. age, gestational age, birth weight, weight of discharge and mode of delivery). Nevertheless, infants in the intervention group showed significantly longer NICU stays than those in the control group • Results showed that the mean total and subscale scores of the Readiness for Hospital Discharge Scale (RHDS) in the intervention group were significantly higher than the corresponding mean scores in the control group: RHDS total score (p<.001), parent personal status (p=.04), child personal status (p=.01), coping ability (p=.01) and knowledge (p<.001); no significant difference was found for the expected support subscale (p=.89) between the two groups • Similarly, the mean scores of total Quality of Discharge Teaching Scale, delivery subscale and content received subscale in the intervention group were significantly higher than the corresponding mean scores in the control group (all p<.001) • 11 variables presenting hospitalisation factors, parent characteristics and infant characteristics were simultaneously entered into a regression equation model (Model 1, R2=.057) and results indicated that no factor was a significant predictor of RHDS score (p=.806); then,

						Model 2 (R2=.454) was computed by adding quality of discharge education (i.e. content received and delivery subscales) into Model 1; quality of discharge education could explain 39.7% (R2=.397) of variance on the RHDS
Chen Y *et al.,* 2016, China	To improve current compliance with evidence-based recommendations regarding discharge planning for Heart Failure (HF) patients; to increase nursing staff's knowledge and skills regarding discharge planning for HF patients; to formalise local practice in the discharge planning for HF patients	Quantitative pre-post best practice interventional study, baseline: 30 patients; follow-up: 21 patients	Hospital coronary care unit	Strategies to improvement implemented: health worker education and training, Chinese discharge checklist, worksheets and informational materials to support staff during discharge planning, guidelines, assigned nurses and performance monitoring for follow-up contact	Compliance with completion of discharge checklist, patient education and scheduling a follow-up visit (via medical record audit); compliance with completeness of discharge education and conducting follow-up telephone/home-visits (via nurse interviews)	• Phase 1 baseline audit: most patients had been provided a structured education (93%) and were given a schedule for an outpatient clinic visit (93%) prior to discharge; compliance rate for completeness of discharge education was only 7%; compliance rates were lowest for completion of discharge checklist and conducting follow-up telephone/home-visits (0%) • Phase 2 barriers to best practice: nurses lacked knowledge on discharge planning; absence of a Chinese HF discharge checklist; formalised discharge planning increased nurses' workload; nurses lacked motivation to make follow-up contact • Phase 3 follow-up audit: among the 21 patients, the compliance rates for use of discharge checklist, structured patient education, completeness of patient education and outpatient clinic visit scheduled reached 100%; compliance rate for follow-up calls/visits reached 76%

Day C B *et al.,* 2016, Brazil	To evaluate the Integrated Care Transitions Project between the emergency department (ED) of a university hospital and primary health care (PHC) services in a large city in Southern Brazil	Qualitative study, 14 health professionals (7 from ED and 7 from PHC)	Hospital emergency department and municipal primary health centres	Integration initiative between hospital emergency departments and primary healthcare services – communication was established through written and telephone contact between care settings when patients were discharged	Themes developed (via interviews containing questions about the process of referring patients to PHC services, the experience of contacting colleagues by phone, the communication with another level of service and the strengths and difficulties of this process)	• Theme: learning about each other's work setting – referring patients from the ED to PHC services was a new process; ED providers reported being surprised by the capacity for resolution of issues in PHC; they felt PHC teams were committed and had good knowledge of the referred patient; for PHC professionals, communication with the ED enabled them to know the clinical status of the patient and what treatment was prescribed, improving continuity of care • Theme: integration and communication – the referral procedure was considered a mechanism that facilitated communication between health teams, promoting integration between health services; information was reciprocally exchanged, allowing dialogue and integration; the transition of care was conceived as key to strengthening the health system; on the other hand, a lack of communication was considered a disadvantage in the provision of care; for PHC professionals, the contact promoted by the ED was considered to be rare; nevertheless, this contact was valued; PHC professionals suggested the use of information technologies to foster communication between services • Theme: benefits for the patient – the contact between levels of care enabled the identification of patients' needs at the point of discharge; data related to the stay in ED offered a basis for adequate planning for continuity of care in PHC; contact allowed for obtaining immediate information about the

						necessities of care and to search for complementary services/resources; it was also possible to prioritise cases; good communication was perceived by PHC to produce patient-centred care; the referral mechanism was considered an additional tool to provide care planning, better care in the community and it accelerated assistance for patients
Staveski S L *et al.,* 2016, India	To compare nurses' home care knowledge and their medical record documentation before and after the discharge programme's implementation; to compare the effect of the discharge programme on parental knowledge of home care requirements before and after	Quantitative pre-post interventional study (with 2 participant cohorts), 63 nurses (cohort 1: 45; cohort 2: 18); 68 parent patients (cohort 1: 31; cohort 2: 38); 195 child medical records (cohort 1: 90; cohort 2: 105)	Paediatric hospital cardiac surgery unit	Discharge training for nurses and discharge education and educational materials for parents	Parent mastery scores (via tests); nurse mastery scores (via tests); contents of discharge documentation (via nursing record audit); proportion of children with surgical-site infections, length of stay from cardiac procedure to discharge and cost of primary hospitalisation and readmission (via patient record review)	• Nurses had a high-level baseline home care knowledge that increased immediately after the discharge programme's implementation (T1=24.4 ± 2.89; T2=27.4 ± 1.55; p<.005; 30 point scale), but decreased to near baseline (T3=23.8 ± 3.4; ns) 4 months after the programme's implementation • Parent knowledge scores increased from 1.76 ± 1.4 for Cohort 1 to 3.68 ± 0.852 for Cohort 2 (p<.005; 0–4 scale) after the discharge programme's implementation • Nurse discharge documentation increased by 56% after the programme's implementation • The medical records of 195 children in Cohorts 1 and 2 were examined for baseline characteristics and presence of surgical-site infections; there were no differences in baseline demographic and clinical characteristics between

	the discharge programme's implementation; to compare child surgical outcomes before and after the structured discharge programme's implementation					Cohorts 1 and 2; surgical-site infections decreased from 27% in Cohort 1 to 2% in Cohort 2 ($p<.05$) after the programme's implementation; there was no significant difference in the length of hospitalisation from cardiac procedure to discharge between cohorts or in the cost of primary hospitalisation and readmission
Staveski S L *et al.,* 2016, India	To describe parental readiness for hospital discharge and uncertainty during illness before and after the parent education discharge instruction programme's implementation; to evaluate the association between parental discharge	Quantitative pre-post interventional study, 68 parents and 63 nurses	Paediatric hospital cardiac surgery unit	Discharge training for nurses and discharge education and educational materials for parents	Parent mastery scores (via tests); self-reported parental readiness for hospital discharge (via surveys); self-reported parent perceptions of uncertainty (via surveys); nurses perceptions of parental readiness for hospital discharge (via surveys)	• After the discharge programme implementation, parents had less uncertainty (M=93.3, SD=10.7 versus M=83.6, SD=4.9, p=.001) and ambiguity (M=40.8, SD=6.8 versus M=33.4, SD=3.7, p=.001) about their child's illness; however, they rated themselves as being less able to cope with the transition to home (M=24.3, SD=4.1 versus M=23.1, SD=2.2, p=.001) and as having less support at home than that required (M=31.5, SD=9.9 versus M=30.9, SD=3.2, p=.001) • For nurses, total Readiness for Hospital Discharge Scale-nurse scores were higher in the pre-implementation groups (M=225.5, SD=27.7) compared with

	knowledge and their perceptions of uncertainty and readiness for hospital discharge before and after the discharge programme's implementation; to describe nurses' perception of parents' readiness for hospital discharge before and after the discharge programme's implementation; to compare the differences between parents' and nurses' perception of parental readiness for hospital discharge before and after the discharge programme's implementation					post-implementation (M=201, SD=9.4, p<0.05); subscale analysis revealed higher scores in all subscales in the pre-implementation group • Pre-implementation group showed no significant correlation between total Parent Mastery Test and Parent Perception of Uncertainty Scale scores (rho=0.059, p=0.78). On the other hand, post-implementation had a moderate inverse correlation between total Parent Mastery Test and total Parent Perception of Uncertainty Scale scores (rho=−0.45, p=0.005) and had a moderate inverse correlation in two subscales (ambiguity rho=−0.45 and unpredictability rho=−0.325, p<0.05); there was no significant correlation between clarity and information subscales • There were no significant correlations between total Parent Mastery Test and Readiness for Hospital Discharge Scale-parent scores in pre-implementation group, whereas for post-implementation there was a moderate inverse correlation between total knowledge and total Readiness for Hospital Discharge Scale scores (rho=−0.45, p=.005); subscale analysis revealed a moderate inverse correlation with expected support and total Parent Mastery Test scores (rho=−0.49) and coping and total Parent Mastery Test scores (rho=−0.48) in parents after receiving the parent education discharge instruction programme (all p<.005); there was a weak inverse correlation in parent status and total

						Parent Mastery Test scores (rho=−0.37, p=.023); there was no significant correlation in the information subscale and total Parent Mastery Test scores or child personal status and total Parent Mastery Test scores • There was no significant difference in mean total Readiness for Hospital Discharge Scale between nurses and parents between the pre- and post-implementation groups; however, subscale analysis in the post-implementation group revealed that nurses perceived parents to have higher mean knowledge scores (M=67.0, SD=6.0 versus M=64.9, SD=6.2, p=.021) and lower mean coping ability scores (M=22.3, SD=1.5 versus M=22.9, SD=2.1, p=.029); in addition, there was a strong positive correlation between parents' and nurses' perception of parental readiness for hospital discharge (rho=0.81, p=.001) in the post-implementation group
Cajanding R J, 2017, Philippines	To determine the effectiveness of a nurse-led structured discharge planning program on perceived functional status, cardiac self-efficacy, satisfaction and unexpected	Quantitative randomised controlled trial, 143 patients (68 in control group; 75 in intervention group)	Hospital cardiovascular-coronary care unit	Nurse-led structured discharge planning	Self-reported perceived functional status (via questionnaires); self-reported cardiac self-efficacy (via questionnaires); satisfaction (via questionnaires); frequency of unexpected hospital	• At baseline there were no significant differences in perceived functional status, cardiac self-efficacy or satisfaction scores between the control and intervention group • There were significant time, group and interaction effects of the intervention on participant's perceived functional status, cardiac self-efficacy and satisfaction scores • Participants in the intervention group had significant improvements in

	hospital revisits among patients being discharged with acute myocardial infarction (AMI)				revisits (via medical record review)	perceived functional status, cardiac self-efficacy and satisfaction scores compared to the control participants (p<.01) • The mean difference in perceived functional status scores between the control and the intervention groups was 8.59 ± 2.29 (95%CI 4.02-13.16; p<.01) • The mean difference in cardiac self-efficacy score was -5.61 ± -1.13 (95%CI -7.87 to -3.36; p<.01) and the mean difference in satisfaction scores was -17.33 ± 2.73 (95%CI -22.78 to 11.89; p<.01) • Participants in the intervention group had significantly fewer hospital revisits compared to the control group (p<.01; 95%CI: Odds ratio, 1.475-6.233; Risk ratio, 1.229-2.367)

Poveda V B *et al.,* 2018, Brazil	To improve local practice in nasoenteric feeding discharge planning for cancer patients in a cancer teaching hospital in Sao Paulo, Brazil	Quantitative pre-post best practice audit and interventional study; baseline: 9 patients; follow-up: 9 patients	Cancer hospital clinical and surgery wards	Strategies to improvement implemented: multimedia equipment, computers and educational sessions with nutritionists and nursing managers	Compliance with completion of multidisciplinary meeting to plan for patient discharge and providing discharge protocols (via record review); compliance with completion of patient/carer post-discharge care and medication training, infection and mouth care education, written discharge instructions and follow-up information (via patient/carer interviews)	• Phase 1 baseline audit: compliance was low for the following: completion of multidisciplinary meeting (0%), post-discharge care training (22%), medication training (22%) and infection and mouth care training (22%); compliance was 100% for the following: written discharge instructions, discharge protocols and follow-up information • Phase 2 barriers: ethical approval and persuading a range of healthcare professionals to take part in the project; poor quality of medical records regarding nasoenteric feeding information being provided to patients; limited enrolment of patients/caregivers for training sessions • Phase 3 follow-up audit: multidisciplinary discussions, including those on nasoenteric feeding, were either not reported in the medical records or not conducted (0%); the strategy to improve caregiver enrolment on the training program resulted in a 45% increase in compliance for the following criteria: post-discharge care training, medication training and infection and mouth care training (from 22% to 67% each); the high compliance (100%) for the following criteria was sustained: written discharge instructions, discharge protocols and follow-up information
Referrals between healthcare facilities						
Author, year, low/middle-income country	**Objective/s**	**Study design, sample size**	**Study healthcare setting/s**	**Intervention/s evaluated**	**Outcome measure/s**	**Summary of results**

Couper I D *et al.,* 1996, South Africa	To assess whether the introduction of a pro forma letter improves the quality of referral letters, improves the quality of replies, and improves the reply rate; to assess whether a relationship exists between the quality of referral letters and the quality of replies	Quantitative pre-post interventional study, 254 referral letters (112 pre-intervention; 142 post-intervention)	Hospital outpatient department	Structured pro forma referral letters	Legibility and scores for referral and reply letter contents (via referral document audit)	• With regard to referral letters, presenting problem and diagnosis were already generally given to the pro forma letter and did not change significantly after its introduction; the management and reason for referral were mentioned significantly more often after the introduction of the pro forma letter ($p<.01$) • When the scores of referral letters before and after the introduction of the pro forma letter were compared, there was a significant increase in the mean contents score (max score = 4) from 2.9 to 3.4 ($p<.01$) • The introduction of the pro forma letter did not have a significant effect on the quality of reply letters; there was a suggestion that the quality of referral letters, regardless of whether a pro forma letter was used, does influence the rate of reply, but this trend was not statistically significant
Campbell L, 2001, South Africa	To determine optimal standards for discharge referral of inpatients with AIDS to an Integrated Community-based Home Care (ICHC) programme; to review current practice in relation to optimal standards; to identify changes	Mixed-methods pre-post interventional study, sample size not reported	Health district (hospital inpatient ward/s, hospice and patient homes)	Action plan implemented: training all nurses in charge of wards on the role of the ICHC, referral criteria and catchment area, referral forms faxed and placed in a designated file, nurses were requested to contact the ICHC team when the patient was ready for discharge to avoid delay, written referral	Hospital representative and ICHC team establishment of optimal standards for referral (via focus group discussions); contents of referral forms compared to standards (via referral form review); hospital nurse and ICHC team views on the referral system in relation to the standards (via interviews); identification of issues	• Standards were set regarding the following aspects of care: patient, hospital staff and ICHC team education, contacting the inpatient unit, who should complete referrals, which patients should be referred, what documentation should be completed, who decides upon patient acceptance/rejection, time taken to review patients and methods of returning patient home • Review of referral forms indicated that the referral system was not meeting the standards; issues identified during interviews: referrals had to be screened by a hospital/ICHC co-ordinator; there

	needed in practice standards, to implement changes, and to re-measure practice after intervention; to use this audit as an opportunity to draw up a programme for staff update and training and to enhance knowledge of AIDS sufferers and their families; to make recommendations to the Department of Health (DOH) on guidelines for referral			criteria and a map were produced and placed in each ward, appropriate discharge referral forms were designed by nurses and ICHC team, a patient information pamphlet on the role of the ICHC was produced and an in-service training programme was drawn up for the ICHC team	and establishment of an interventional plan of action to improve practices (via health team discussions); hospital staff and ICHC team views on functioning of discharge referral system after intervention implementation (via focus group discussions)	were problems with communication between the hospital and ICHC team; there was no standardised means of communication; the ICHC team occasionally had inappropriate referrals; patients sometimes had to wait up to a week before being reviewed and taken home; referral documentation used had been designed for cancer patients, so important data fields were missing/inappropriate; there were no written criteria for referral, nor a map indicating the ICHC team catchment area; some patients seemed unaware of the function of the ICHC programme; a few members of the ICHC team wanted to be updated on AIDs patient care • Review: 12 patients had been referred; all had been appropriately referred by doctors and screened by the nurse in charge of the ward; all had adequate documentation and the ICHC team received a faxed copy of the referral form for each client; nurses felt that patients and their families were more aware of the role of the ICHC and that the patient pamphlet was useful; an in-service training programme had been initiated for the ICHC team; the only standard not met was that the clients were not taken home within 3 days of referral

Pedrana A *et al.,* 2019, Indonesia	To determine whether the Sijari Expanding Maternal and Neonatal Survival (EMAS) program was associated with improved effectiveness of the referral system to facilitate timely and effective management of pregnant women and newborns with complications	Quantitative pre-post interventional study, 180 maternal referral cases	6 health districts (13 hospitals and 24 community health centres)	Automated referral exchange system – a digital communication mechanism called SijariEMAS; enables community health workers and midwives to send a 2-way message (via phone/call centre, SMS or mobile/web application) to a central server prior to referral that would automatically route that referral to the most appropriate hospital using a pre-specific algorithm. The selected hospital could then choose to accept or reject the case depending on the capacity/capabilities. In addition, community health staff could receive messages through the system from the referral hospital about how to stabilise and prepare the patient prior to referral. The SijariEMAS system is supported	Hospital emergency readiness and staff preparedness and appropriate management of complications at the community health facilities (CHFs) prior to referral (via direct clinical observations with checklist); communication and advanced notification between the CHF and the hospitals prior to referral, preparation and transportation of the referral case between CHFs and hospitals, provision of a back referral from the hospitals to the CHFs and timeliness and efficiency of the referral from the CHFs to the hospital (via medical record and referral document review and interviews)	• Compared to pregnant women who were referred without using SijariEMAS, those who were referred using SijariEMAS, had consistently higher levels of advanced notification (35.6% vs. 91.6%; p<0.01) key information (22.9% vs. 70.4%; p<.01) provided to hospitals by CHFs • Compared to pregnant women who were referred without using SijariEMAS, pregnant women who were referred using SijariEMAS were also more likely to have been transported to the hospital in ambulance (60.6% vs. 88.7%; p<0.01), accompanied by a health worker (70.2% vs. 90.1%; p<0.01), had their health insurance checked prior to referral (49.0% vs. 88.7%; p<0.01), and had a referral slip (86.2% vs. 90.1%; p<0.01). • Compared to when SijariEMAS was not used, SijariEMAS provided a mechanism to support enhanced information exchange back to the CHFs following treatment at the hospital, with significantly higher use of back referral (35.9% vs. 66.2%; p<0.01) and levels of information provided about diagnosis sent back to the CHFs (39.8% vs. 59.2%; p<.05). There were no differences in levels of information provided about follow-up • Cases referred using SijariEMAS had consistently significantly (p<0.01) higher levels of stabilisation for pre-eclampsia/ eclampsia prior to referral to the hospital, including receipt of magnesium sulphate (45.6% vs. 81.4%; p<0.01), receipt of anti-hypertensives

				by a referral network memoranda of understanding (that strengthens linkages and formal referral networks) and formal referral performance standards and tools (which were introduced along with a comprehensive set of performance monitoring tools and implementation plans).		(44.1% vs. 66.1%; p=0.01) and protein in urine checked (69.1% vs. 89.8%; p<0.01). • Cases referred using SijariEMAS had significantly higher levels of hospital readiness, including proportions of hospital emergency staff coordination (55.8% vs. 87.3%; p<0.01), supplies/equipment arranged on a trolley (34.3% vs. 76.7%; p<0.01), and emergency staff roles clearly designated and in preparation to receive the referral (34.6% vs. 67.6%; p<0.01) • There was limited improvement to the appropriate stabilisation of postpartum haemorrhage cases, The time that CHF staff took between when the decision was made to refer a pregnant woman to when she actually departed the CHFs was similar among cases that used SijariEMAS compared with those that did not use SijariEMAS (approximately 30 minutes each); however, the elapsed time between the woman leaving the CHFs and arriving at hospital was slightly shorter among cases that used SijariEMAS compared with those that did not (75 minutes vs. 60 minutes), although this was not significant.
Transfers between healthcare facilities						
Author, year, low/middle-income country	**Objective/s**	**Study design, sample size**	**Study healthcare setting/s**	**Intervention/s evaluated**	**Outcome measure/s**	**Summary of results**

Armagan E *et al.,* 2001, Turkey	To determine the present problems in inter-hospital patient transfers in our area; to find out if there was an increase in compliance following the introduction of patient transfer rules and education for emergency caregivers in the province	Quantitative pre-post interventional study, 354 patients (174 pre-intervention; 180 post-intervention)	Hospital emergency department	Patient transfer rules and emergency caregiver education	Reason for transfer, presence of any risks for transfer (i.e. lack of airway support/no intravenous line/no cervical collar), presence of inter-hospital physician to physician communication, adequacy of medical records and availability of diagnostic tests/X-rays performed in the transferring hospital (via record review and patient clinical status upon arrival at hospital)	• Pre-intervention rates: adequate medical records – 31.6%, pre-transfer inter-hospital communication – 13.2%, diagnostic test results sent – 35.6%, adequate airway management – 35.4%, open intravenous line – 67.8%, cervical collar placement – 10.9%, bladder catheterisation – 28.3%, gastric catheterisation – 26.1% • Post-intervention rates: adequate medical records – 42.8%, pre-transfer inter-hospital communication – 14.5%, diagnostic test results sent – 40.0%, adequate airway management – 64.9%, open intravenous line – 76.7%, cervical collar placement – 27.8%, bladder catheterisation – 34.4%, gastric catheterisation – 29.5% • Whilst all compliance rates improved following the intervention, the compliance rates for the following aspects of inter-hospital transfer care improved significantly ($p<.05$): adequate medical records, adequate airway management, open intravenous line and cervical collar placement
Yegane S A F *et al.,* 2017, Iran	To audit the current clinical handover according to the Identify, Situation, Background, Assessment, and Recommendation (ISBAR) tool and survey the effect of training the ISBAR tool to Emergency	Quantitative pre-post interventional study, 300 patient handovers (150 pre-intervention; 150 post-intervention)	Hospital emergency department	ISBAR handover tool education for EMA and EMS staff	Completeness of ISBAR communications (via ISBAR tool audit)	• There were no significant differences regarding demographic data between the pre- and post-intervention groups; it was noticeable that all trauma patients were transferred to the hospital by ambulance in both the pre- and post-implementation phases • Identify: Presenting of the patient's name (10.7% vs. 81.3%; $p<0.01$) and age (34.0% vs. 81.3%; $p<0.01$) significantly increased after receiving education about the ISBAR tool. There was no difference in the prehospital

	Medicine Assistants (EMAs) and Emergency Medical Services (EMS) staff on improvement of the clinical handover of patients to the emergency department					team leader introducing themselves and the EMA introducing themselves. • Situation: presenting of reason for the emergency call (67.3% vs. 82.05; p<0.05) and the possible changes that occurred in the patient's condition in comparison to the scene (30.5 vs. 60.3%; p<0.01) significantly increased after receiving education about the ISBAR tool by the pre-hospital team leader. There was no difference in reporting of a summary of assessment and requirement. • Background: Presenting of the patient's history (9.3% vs. 81.3%; p<0.01), any home therapy (5.3% vs. 69.3%; p<0.01), and any allergies (0% vs. 69.3%; p<0.01) significantly increased after receiving education about the ISBAR tool by the pre-hospital team leader. • Assessment: presenting the brief synopsis of treatment (15.3% vs. 69.3%; p<0.01) significantly increased after receiving education about the ISBAR tool by the pre-hospital team leader. There was no difference in assessment of ABCDE and of vital signs. • Recommendation: the EMA summarised the information received from the team leader of the pre-hospital team (10.7% vs. 81.3%; p<0.01) and performed the ISBAR acronym in the correct order (0% vs. 65.3%; p<0.01) significantly more after receiving education about the ISBAR tool (p<.05)

S5. Summary of MMAT quality appraisal assessments for included studies

QUANTITATIVE DESCRIPTIVE STUDIES								
First author	**Year**	**Citation**	**1. Is the sampling strategy relevant to address the research question?**	**2. Is the sample representative of the target population?**	**3. Are the measurements appropriate?**	**4. Is the risk of nonresponse bias low?**	**5. Is the statistical analysis appropriate to answer the research question?**	**Score** **(optional notes)**
Lalani N S	2001	Nurses' role in patients' discharge planning at the Aga Khan University Hospital, Pakistan	Yes	Can't tell	Yes	Yes	Yes	**4**
Soysal D D	2004	Interhospital transport of pediatric patients requiring emergency care: current status in Turkey	Yes	Yes	Can't tell	Yes	Yes	**4 (**No explanation of how "adequacy of information" was measured and no results table to help provide further explanation)

Kumar S	2004	Assessment of quality of handwritten discharge tickets of breast cancer patients: the gaps are wide and need remedy	Yes	Yes	Yes	Yes	Yes	**5 (**Representativeness**:** all case sheets were evaluated from a 10-year period: also clear exclusion reasons given for those that were not evaluated)
Dafallah S E	2005	Analysis of documents used in referral system in Wad Medani, Sudan	Yes	Can't tell	Yes	Yes	Yes	**4**
Arotiba J T	2006	An audit of mediclal record-keeping in maxillofacial surgery at the University College Hospital, Ibadan using the CRABEL scoring system	Yes	Can't tell	Yes	Yes	Yes	**4**
Crandon I W	2008	Inter-hospital transfer of trauma patients in a developing country: A prospective descriptive study	Yes	Yes	Yes	Yes	Yes	**5**
Orimadegun A E	2008	Contents of referral letters to the children emergency unit of a teaching hospital, Southwest of Nigeria	Yes	Yes	Yes	Yes	Yes	**5**

Mishra A K	2009	Need for improvement of medical records	Yes	Yes	Yes	Yes	Yes	**5**
Alexander T	2009	An audit of the quality of care of traumatic brain injury at a busy regional hospital in South Africa	Yes	Yes	Yes	Yes	Yes	**5**
Ibiyemi O	2012	Quality and contents of referral letters from peripheral health centers to the dental center of a teaching hospital, southwestern Nigeria	Yes	Yes	Yes	Yes	Yes	**5 (**Representativeness: all referral letters from peripheral centres over a 1-year period were evaluated)
Esan O	2016	Referral letters to the psychiatrist in Nigeria: is communication adequate?	Yes	Yes	Yes	Yes	Yes	**5**
Janati A	2017	Assessing the quality of referral letters written by general practitioners: a cross-sectional study in rural Iran	Yes	Yes	Yes	Yes	Yes	**5**
Kassean H K	2005	Managing change in the nursing handover from traditional to bedside handover - a case study from Mauritius	Yes	Can't tell	Can't tell	Can't tell	Yes	**2**

Naidu D	2008	Pre-formatted written discharge summary - a step towards quality assurance in the emergency department	Yes	Can't tell	Yes	Yes	Yes	**4**
Farzi S	2017	Patient safety culture in intensive care units from the perspective of nurses: A cross-sectional study	Yes	Can't tell	Yes	Can't tell	Yes	**3**
Chongthawonsatid S	2017	Validity of principle diagnoses in discharge summaries of ICD-10 coding assessments based on national health data of Thailand	Yes	Can't tell	Yes	Yes	Yes	**4 (**Representativeness: **c**an't tell why randomly sampled 3%, and no information on total possible sample)
Arpi L	2017	The current status of patient safety in Argentina: Cross sectional study	Yes	Yes	Yes	Yes	Yes	**5**
Farzi S	2017	Perspectives of nurses toward the patient safety culture in neonatal intensive care units	Yes	Can't tell	Yes	Yes	Yes	**4**
Struwig W	2009	Quality of psychiatric referrals to secondary-level care	Yes	Yes	Yes	Yes	Yes	**5**

Siriwardenam E M	2017	Quality and safety of handover in intensive care	Yes	Can't tell	Yes	Can't tell	Yes	**3**
Abdulraheem M A	2016	Neonatal transport practices in Ibadan, Nigeria	Yes	Yes	Yes	Yes	Yes	**5**
Azim A	2013	Deficits in referral notes during inter-hospital transfers of critically ill patients: an observational study from a developing nation	Yes	Yes	Yes	Yes	Yes	**5 (**Representativeness: all referrals meeting inclusion criteria were included over a one-year period)
Flesch L D	2014	Translated: Hospital discharge of elderly patients: Needs and challenges of continuity of care	Yes	Can't tell	Yes	Can't tell	Yes	**3**
Giordani A T	2016	Demand of hospitalized surgical patients information: a descriptive and prospective study	Yes	Can't tell	Yes	No	Yes	**3**

Ortega A P	2016	Translated title: Communication and coordination of nursing in a high complexity health institution in Cartagena	Yes	Can't tell	Yes	Can't tell	Yes	**3**
Mata L R	2013	Nursing actions in the perioperative period and in preparing prostatectomy patients for discharge	Yes	Yes	Yes	Yes	Yes	**5**
Reda E	2007	Early instrument used in the patient's evaluation in a post-anaesthetic recover room - a matter of great concern: care continuity	Yes	Yes	Yes	Can't tell	Yes	**4**
Carvalho A R S	2008	Translated: Investigating the orientations offered to the patient in postoperative period of myocardial revascularisation	Yes	Can't tell	Yes	Can't tell	Yes	**3**
Perera D M P	2017	Opportunities for pharmacists to optimise quality use of medicines in a Sri Lankan hospital: an observational, prospective, cohort study	Yes	Yes	Yes	Can't tell	Yes	**4**

Non-randomised studies

NON-RANDOMISED STUDIES								
First author	**Year**	**Citation**	**1. Are the participants representative of the target population?**	**2. Are measurements appropriate regarding both the outcome and intervention (or exposure)?**	**3. Are there complete outcome data?**	**4. Are the confounders accounted for in the design and analysis?**	**5. During the study period, is the intervention administered (or exposure occurred) as intended?**	**Score**
Buchmann E	1993	Gynaecological referrals to Baragwanath Hospital	Yes	Yes	Yes	No	Yes	**4 (**Representativeness: all referral documents seen over a two month period were included)
Couper I D	1996	The quality and relationship of referral and reply letters	Yes	Yes	Yes	No	Yes	**4**
Nkyekyer K	2000	Peripartum referrals to Korle Bu teaching hospital, Ghana - a descriptive study	Yes	Yes	Yes	No	Yes	**4**
Topacoglu H	2004	Analysis of factors affecting satisfaction in the emergency	Can't tell	Yes	Yes	Yes	Yes	**4**

		department: A survey of 1019 patients						
Armagan E	2001	Compliance with protocols in transferring emergency patients to a tertiary care centre	Yes	Yes	Yes	No	Yes	**4**
Akinmoladun V I	2006	Interspeciality referrals: Evaluation of quality and pattern of referral letters to an oral and maxillofacial surgery clinic	Can't tell	Yes	Yes	No	Yes	**3**
Liu Y	2009	Perception of safety culture by nurses in hospitals in China	Can't tell	Yes	Yes	Yes	Yes	**4**
Younan L A	2013	Using "best-fit" interventions to improving nursing intershift handoff process at a medical centre in Lebanon	Yes	Yes	Can't tell	No	Yes	**3**
Eshah N F	2031	Predischarge education improves adherence to a healthy lifestyle among Jordanian patients with acute coronary syndrome	Can't tell	Yes	Yes	No	Yes	**3**
Melese T	2014	Assessment of client satisfaction in labor and delivery services at a maternity referral hospital in Ethiopia	Can't tell	Yes	Yes	Yes	Yes	**4**

Albuquerque D C	2015	Brazilian registry of heart failure - clinical aspects, care quality and hospitalisation outcomes	Can't tell	Yes	Can't tell	No	Yes	**2**
Gyedu A	2015	Quality of referrals for elective surgery at a tertiary care hospital in a developing country: an opportunity for improving timely access to and cost-effectiveness of surgical care	Yes	Yes	Yes	No	Yes	**4**
Chen, Y	2016	Discharge planning for heart failure patients in a tertiary hospital in Shanghai: a best practice implementation project	No	Yes	Can't tell	No	Yes	**2** (Representativeness: audit was conducted on a small sample of patient records over short periods)
Staveski S L	2016	Parent education discharge instruction program for care of children at home after cardiac surgery in Southern India	Can't tell	Yes	No	No	Yes	**2**

Staveski S L	2016	Nurse and parent perceptions associated with the Parent Education Discharge Instruction Programme in southern India	Can't tell	Yes	Yes	No	Yes	**3**
Chen Y	2015	Effect of an educational intervention on parental readiness for premature infant discharge from the neonatal intensive care units	Can't tell	Yes	No	Yes	Yes	**3**
Yegane S A F	2017	Clinical information transfer between EMS staff and emergency medicine assistants during handover of trauma patients	Can't tell	Can't tell	Yes	No	Yes	**2**
Vasquez M L	2017	Doctor's experience of coordination across care levels and associated factors: A cross-sectional study in public healthcare networks of six Latin American countries	Yes	Yes	Yes	Yes	Yes	**5**
Wang M	2017	How does patient safety culture in the surgical departments compare to the rest of the county hospitals in Xiaogan city of China?	Yes	Yes	Can't tell	Yes	Yes	**4**

Kumar P	2016	Need for a hands-on approach to hand-offs: A study of nursing handovers in an Indian Neurosciences Center	Yes	Yes	Yes	No	Yes	**4**
Asefzadeh S	2017	Patient safety culture and job stress among nurses in Mazandaran, Iran	Yes	Yes	Can't tell	No	Yes	**3**
Poveda V B	2018	Nasoenteric feeding discharge planning for cancer patients in a Brazilian teaching hospital: a best practice implementation project	No	Yes	Yes	No	Yes	**3** (Representativeness: Audit was conductedawith a sample of patients over short periods (convenience sample - limited))
Rajalatchumi A	2018	Perception of patient safety culture among health-care providers in a tertiary care hospital, South India	Yes	Yes	Can't tell	No	Yes	**3**
Wen D	2018	Physicians' perceptions of physician-nurse interactions and information needs in China	Can't tell	Yes	No	No	Yes	**2**
Uys L	2004	A survey of the quality of nursing care in several districts in South Africa	Can't tell	Yes	Yes	No	Yes	**3**

Yang J-G	2016	Improving the postoperative handover process in the intensive care unit of a tertiary teaching hospital	Yes	Yes	Yes	No	Yes	4
Top M	2015	Patient safety culture in a Turkish public hospital: A study of nurses' perceptions about patient safety	Can't tell	Yes	Can't tell	No	Yes	**2**
Khater W	2015	Nurses' perceptions of patient safety culture in Jordanian hospitals	Can't tell	Yes	Yes	Yes	Yes	**4**
Vargas I	2017	Patient perceptions of continuity of health care and associated factors. Cross-sectional study in municipalities of central Colombia and north-eastern Brazil	Yes	Yes	Yes	Yes	Yes	**5**
Kilic S P	2017	The approaches and attitudes of nurses on clinical handover	Can't tell	Yes	Yes	No	Yes	**3**
Goncalves M I	2016	Communication and patient safety in the change-of-shift nurses report in neonatal intensive care units	Yes	Yes	Yes	No	Yes	**4 (**With regard to non-response bias, whilst there is inclusion criteria no explanation has been give n for why not all nurses

								participated in the results, so can't rule out possibility of bias)
Zou X-J	2016	Rates of nursing errors and handoffs-related errors in a medical unit following implementation of a standardized nursing handoff form	Can't tell	Yes	Yes	No	Yes	**3**
Deek H	2016	Readmission rates and related factors in heart failure patients: A study in Lebanon	Yes	Yes	Yes	Yes	Yes	**5**
Zhihong F	2015	Application of descending step thinking importing SBAR model in patients handover in emergency department and ICU	Yes	Can't tell	Yes	Yes	Yes	**4**
Matozinhos F P	2011	Translated: Evaluation of hospital discharge guidelines and its application to puerperal women sharing a room in a public hospital in Belo Horizonte	Can't tell	Can't tell	Yes	No	Yes	**2**
Faydali S	2011	Translated: Determination of post-discharge knowledge	Yes	Yes	Yes	No	Yes	**4**

		levels of burns patients and their relatives						**(**With regard to non-response bias, we can't be sure as there is no mention of if/who may have refused to participate etc.)
Oczan H	2010	Information level of patients in discharge training given by nurses following open heart surgery	Can't tell	Yes	Yes	Yes	Yes	**4**
Akkuzu G	2009	Evaluation by patients and caregivers of the effectiveness of a brochure developed to prevent pressure ulcers	Yes	Yes	Yes	No	Yes	**4**
Wei M S Y	2015	Translated : Application of SBAR communication model in neurosurgical nursing shift	Can't tell	Can't tell	Yes	Yes	Yes	**3**
Hussein S F	2005	Trends in hospital-based management of acute asthma from a teaching hospital in South Asia	Yes	Yes	Yes	No	Yes	**3**
Sklebar I	2016	How to improve patient safety culture in Croatian hospitals?	Can't tell	Yes	Can't tell	No	Yes	**2**

Kumar P	2015	Who is more hands on with hand-offs? A comparative study of clinical handovers among doctors and nurses in a tertiary care center in India	Yes	Yes	Yes	No	Yes	**4**
Duhan D	2016	Effectiveness of shift handover guidelines on handing over practices and work related concerns among staff nurses in adult intensive care units	Can't tell	Can't tell	Yes	Can't tell	Yes	**2**
Jain S	2017	A study on standardised system of shift handover communication compliance	Can't tell	Can't tell	Can't tell	Can't tell	Yes	**1**
Cichowitz C	2018	Hospitalization and post-discharge care in South Africa: A critical event in the continuum of care	Can't tell	Yes	No	No	Yes	**2**
Ramraj T	2018	Completeness of patient-held records: observations of the road-to-health booklet from two national facility-based surveys at 6 weeks postpartum, South Africa	Yes	Yes	Yes	Yes	Yes	**5**

Pedrana A	2019	Assessing the effect of the expanding maternal and neonatal survival program on improving stabilisation and referral for maternal and newborn complications in Indonesia	Can't tell	Yes	Yes	No	Yes	**3**
Singh S	2018	An evaluation of the quality of discharge summaries from the general paediatric wards at Chris Hani Baragwanath Academic Hospital, Johannesburg, South Africa	Yes	Yes	Yes	No	Yes	**4**
Dutra M	2018	Handovers among staff intensivists: A study of information loss and clinical accuracy to anticipate events	Yes	Yes	Yes	No	Yes	**4**
Xu W	2018	A quality improvement project to reduce postoperative adverse respiratory events and increase safety in the post anesthesia care unit of a pediatric institution	Yes	Can't tell	Yes	No	Yes	**3**
Dreyer R	2019	Evaluation of factors and patterns influencing the 30-day readmission rate at a tertiary-level hospital in a resource-constrained	Yes	Can't tell	Yes	No	Yes	**3**

		setting in Cape Town, South Africa						

Randomised controlled trial studies

RANDOMISED CONTROLLED TRIAL STUDIES								
First author	**Year**	**Citation**	**1. Is randomization appropriately performed?**	**2. Are the groups comparable at baseline?**	**3. Are there complete outcome data?**	**4. Are outcome assessors blinded to the intervention provided?**	**5. Did the participants adhere to the assigned intervention?**	**Score**
Cajanding, R J	2017	Effects of a structured discharge planning program on perceived functional status, cardiac self-efficacy, patient satisfaction and unexpected hospital revisits among Filipino Cardiac Patients: A Randomised Control Study	Yes	Yes	No	Yes	Can't tell	**3** (Notable loss to follow-up. Not possible to tell whether patients carried on with intervention activities)
Perera, K Y	2012	Medium of Language in Discharge Summaries: Would the Use of Native Language Improve Patients' Knowledge of Their Illness and Medications	Yes	Yes	Yes	Yes	Yes	**5**

Qualitative studies

QUALITATIVE STUDIES								
First author	Year	Citation	**1. Is the qualitative approach appropriate to answer the research question?**	**2. Are the qualitative data collection methods adequate to address the research question?**	**3. Are the findings adequately derived from the data?**	**4. Is the interpretation of results sufficiently substantiated by data?**	**5. Is there coherence between qualitative data sources, collection, analysis and interpretation?**	**Score**
Kaye D K	2015	Gaps in continuity of care: Patients' perceptions of the quality of care during labor ward handover in Mulago hospital, Uganda	Yes	Yes	Yes	Yes	Yes	**5**
Sarvestani, R S	2015	Challenges of Nursing Handover: A Qualitative Study	Yes	Yes	Yes	Yes	Yes	**5**
Marin, MJS	2000	Translated: Assessment of the satisfaction of a group of elderly women and caretakers regarding discharge planning	Yes	Can't tell	Can't tell	Yes	Can't tell	**2** (Very little detail regarding data collection and analysis)

Day, C B	2016	Integrated care transitions: emergency to primary health care	Yes	Yes	Yes	Can't tell	Can't tell	**3 (**This paper is very concise and lacks important details, particularly regarding the results)
Vargas I	2015	Do existing mechanisms contribute to improvements in care coordination across levels of care in health services networks? Opinions of the health personnel in Colombia and Brazil	Yes	Yes	Yes	Yes	Yes	**5**
Saxena M	2018	Is quality of care during childbirth consistent from admission to discharge? A qualitative study of delivery care in Uttar Pradesh, India	Yes	Yes	Yes	Yes	Yes	**5**

Mixed-methods studies (Part 1)

		First author, year, citation				
		Mountford F P, 1973, An inquiry into the exchange of information between institutional and field health services	Abate B, 2010, Information use in patients' referral system at Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia	Campbell L, 2001, Audit of Referral of AIDS patients from hospital to an integrated community-based home care programme in Kwazulu-natal, South Africa	Teodoro W R, 2010, Translated: Analysis of the process of shift report at a unit of a pediatric hospital	Miasso A I, 2005, Translated: Administration of medicines: Final nursing orientation for hospital release
MIXED METHODS STUDIES	**1. Is there an adequate rationale for using a mixed methods design to address the research question?**	No	No	No	No	No
	2. Are the different components of the study effectively integrated to answer the research question?	Yes	Yes	Yes	Yes	Yes
	3. Are the outputs of the integration of qualitative and quantitative components adequately interpreted?	Yes	Yes	Yes	Yes	Yes
	4. Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?	Yes	Yes	Yes	Yes	Yes

	5. Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?	No	No	No	No	No
QUANTITATIVE DESCRIPTIVE STUDIES	**1. Is the sampling strategy relevant to address the research question?**	Yes	Yes	Yes	Yes	Yes
	2. Is the sample representative of the target population?	Can't tell	Yes	Can't tell	Can't tell	Can't tell
	3. Are the measurements appropriate?	Yes	Yes	Can't tell	Yes	Can't tell
	4. Is the risk of nonresponse bias low?	No	Can't tell	Can't tell	No	Can't tell
	5. Is the statistical analysis appropriate to answer the research question?	Yes	Yes	Can't tell	Yes	Yes
QUALITATIVE STUDIES	**1. Is the qualitative approach appropriate to answer the research question?**	Yes	Yes	Yes	Yes	Yes
	2. Are the qualitative data collection methods adequate to address the research question?	Can't tell	Can't tell	Can't tell	Yes	Yes
	3. Are the findings adequately derived from the data?	Can't tell	Can't tell	Can't tell	Can't tell	Can't tell
	4. Is the interpretation of results sufficiently substantiated by data?	No	No	No	No	No
	5. Is there coherence between qualitative data sources, collection, analysis and interpretation?	Can't tell	No	Can't tell	Can't tell	Can't tell
Score		**1**	**1**	**1**	**2**	**2**

Mixed-methods studies (Part 2)

		First author, year, citation	
		Arias-Botero J, 2017, Portrayal of the performance of the post-anesthesia care unit, based on the perception of the professional nursing staff	Sarvestani R, 2017, Empowering nurses through action research for developing a new nursing handover program in a pediatric ward in Iran
MIXED METHODS STUDIES	1. Is there an adequate rationale for using a mixed methods design to address the research question?	No	No
	2. Are the different components of the study effectively integrated to answer the research question?	Yes	Yes
	3. Are the outputs of the integration of qualitative and quantitative components adequately interpreted?	Yes	Yes
	4. Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?	Yes	Yes
	5. Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?	Yes	Yes
NON-RANDOMISED STUDIES	1. Are the participants representative of the target population?	Can't tell	Can't tell
	2. Are measurements appropriate regarding both the outcome and intervention (or exposure)?	Yes	Yes
	3. Are there complete outcome data?	Yes	Yes
	4. Are the confounders accounted for in the design and analysis?	No	No
	5. During the study period, is the intervention administered (or exposure occurred) as intended?	Yes	Yes

QUALITATIVE STUDIES	**1. Is the qualitative approach appropriate to answer the research question?**	Yes	Yes
	2. Are the qualitative data collection methods adequate to address the research question?	Yes	Yes
	3. Are the findings adequately derived from the data?	Yes	Yes
	4. Is the interpretation of results sufficiently substantiated by data?	No	No
	5. Is there coherence between qualitative data sources, collection, analysis and interpretation?	Can't tell	Can't tell
Score		**3**	**3**

Appendix 3. Investigating clinical handover and healthcare communication during chronic NCD outpatient care in Himachal Pradesh and Kerala states, India

S1 Additional information regarding the national healthcare structure in India

National context: Structure of public healthcare system

The basic structure of the public healthcare system in India is as follows [1]:

- National level: Ministry of Health and Family Welfare.
- State level: State Department of Health and Family welfare in each state.
- Regional level: covers 3 - 5 districts. Headed by State Directorate of Health.
- District level: Middle level management organisation serving as a link between the regional and state structures and the peripheral and PHC structures.
- Sub-divisional/Taluk level: Hospitals/hospitals with specialty care (Taluk headquarters hospitals). Healthcare services are rendered via the office of Assistant District Health and Family Welfare Officer.
- Community level: CHCs that cater for 80,000-120,000 population and PHCs that cover approximately 20,000 – 30,000 population (often upgrades of rural dispensaries).

Public healthcare across India

The quality of public healthcare across India varies notably between states and between urban and rural areas. Aside from some pockets of excellence in a select few states, the public sector is generally falling short of meeting the basic healthcare needs of the growing population. Some of the main reasons for this include: services being

too far away, a lack of trained personnel and supplies, and limited facility opening times that are often unreliable [2]. With regard to primary health centres, government estimates indicate that 10% are without a doctor, 37% are without a laboratory technician and 25% are without a pharmacist [3]. Issues with public health centres are particularly rife within poor communities, where facilities have been found to be closed more than half the time and lack basic medical supplies. Public facilities are the often the only source of qualified healthcare professionals in rural areas, which is where much of the poor live [2].

National context: Private healthcare

Public healthcare in India has lacked funding over a series of decades, resulting from a lack of prioritisation from economic planners. Therefore, the increasing prevalence of chronic, non-communicable diseases alongside unresolved challenges of infectious diseases has placed more strain on public health systems than what can feasibly be managed. The private healthcare sector has subsequently proliferated to meet rising needs, expectations and incomes and surveys indicate that private healthcare providers now dominate service provision. According to reports, public facilities provided just 20% of primary and community-level healthcare services, and 40% of hospital visits in 2004-05 (down from 25% and 60% respectively in 1986-87) [2]. At the higher end of the market the private sector has world class facilities that have grown substantially. As a result, hospital care is now an export sector for medical tourism that cares for approximately 200,000 foreign patients per year [4]. However, private healthcare providers are poorly regulated, with uneven quality across facilities. This is resulting in a large number of private facilities delivering services without appropriate equipment or expertise. Additionally, although visiting private providers is preferential

for many, it is common for high out-of –pocket costs to be incurred; more than 40% of all private hospital inpatients have to borrow money or sell assets in order to fund their care [5]. This means that many poorer patients are unable to access healthcare while others fall into poverty as a result of spending.

References

1. Care Continuum Alliance, India. India – Health Care System Structure and Organization. 2009. Available from: http://dmaa.pbworks.com/w/page/17960772/India%20-%20Health%20Care%20System%20Structure%20and%20Organization
2. Joumard I, Kumar A. Improving health outcomes and health care in India. Paris: Organisation for Economic Cooperation and Development (OECD) Working Papers, No. 1184, OECD Publishing. 2015. Available from: http://www.oecd-ilibrary.org/economics/improving-health-outcomes-and-health-care-in-india_5js7t9ptcr26-en
3. Ministry of Health and Family Welfare, Government of India. Rural Health Statistics in India. 2012. Available from: https://nrhm.gujarat.gov.in/images/pdf/publications/RHS_2012.pdf
4. Lunt N, Smith R, Exworthy M, Green S, Horsfall D, Mannion R. Medical Tourism: Treatments, Markets and Health System Implications: a Scoping Review. OECD Publishing. 2010. Available from: Paris http://www.oecd.org/els/health-systems/48723982.pdf
5. The World Bank - Health, Nutrition, Population Sector Unit India South Asian Region. Raising the sights: better health systems for India's poor. Available from: https://openknowledge.worldbank.org/handle/10986/14080

S2. Additional information regarding the study settings

Himachal Pradesh state, India

Himachal Pradesh is predominantly a rural state in northern India (only 10% of the population lives in urban regions). The average literacy rate is 83.3%, higher than the national average (74%), but rates are notably lower for women compared to men (76.6% vs. 90.8%, respectively) [6]. Private HCPs are less prevalent in Himachal Pradesh compared to other states and public healthcare utilisation remains relatively high [7]. Himachal Pradesh was also recently reported as being the highest spending large state with regard to public health spending per capita [2].

Kerala state, India

Kerala is a state in the south-west of India with a greater than national average urban-based population of 47.7%. It has the highest overall literacy rate in India (93.9%; men 96.1%, women 92.1) [8]. There are a relatively large number of government healthcare facilities in Kerala but the healthcare environment is becoming increasingly complex due to a growing popularity and presence of private healthcare providers, predominantly in urban settings [9]. Despite this, public health facilities in Kerala generally play their intended role of being the first point of care and proactively deliver essential services [2].

References

6. Census Organization of India. Himachal Pradesh population census data. 2011. Available from: http://www.census2011.co.in/census/state/himachal+pradesh.html
7. Planning Commission, Government of India. Himachal Pradesh Development Report. New Delhi: Academic Foundation; 2005.
8. Census Organization of India. Kerala population census data. 2011. Available from: http://www.census2011.co.in/census/state/kerala.html
9. Planning Commission, Government of India. Kerala Development Report. New Delhi: Academic Foundation; 2008.

S3. Sample size calculation for the quantitative study component

Sample size calculation

We aimed to collect survey data from 385 patients on the basis that this would provide confidence limits of 95% for a variable (such as the proportion of patients receiving complete healthcare information) with a prevalence of 50%, based on the following formula: $\mathbf{((1.96)^2 \times .5(.5))} / (.\mathbf{05})^2$.

Appendix 4. Investigating clinical handover and healthcare communication during chronic NCD outpatient care in Himachal Pradesh and Kerala states, India

S1. Additional information regarding the Indian healthcare system

1. National context: structure of public healthcare system

The basic structure of the public healthcare system in India is as follows:[1]

- National level: Ministry of Health and Family Welfare.
- State-level: State Department of Health and Family welfare in each state.
- Regional level: covers 3 - 5 districts. Headed by State Directorate of Health.
- District level: Middle-level management organisation serving as a link between the regional and state structures and the peripheral and PHC structures.
- Sub-divisional/Taluk level: Hospitals/hospitals with specialty care (Taluk headquarters hospitals). Healthcare services are rendered via the office of Assistant District Health and Family Welfare Officer.
- Community level: CHCs that cater for 80,000-120,000 population and PHCs that cover approximately 20,000 – 30,000 population.

2. Public healthcare in India

The quality of public healthcare across India varies notably between states and urban and rural areas. Whilst there are some examples of excellence in a select few states, generally the public sector is generally failing to meet the basic healthcare needs of the growing population. Services being too far away, a lack of trained personnel, deficient medical supplies and limited facility opening times are some of the principal reasons for current shortfalls.[2] Regarding primary health centres, government

estimates have indicated that up to 10% are without a doctor, 37% are without a laboratory technician and 25% are without a pharmacist.[3] These issues appear to be particularly prevalent within socioeconomically vulnerable areas, where facilities have been reported to lack essential medical supplies and are closed more than 50% of the time. In addition, public healthcare facilities are often the sole source of qualified healthcare professionals in rural areas, which is where many of the most socioeconomically vulnerable live.[2]

3. Private healthcare in India

Due to a lack of prioritisation from economic planners, public healthcare in India has lacked funding over multiple decades. Therefore, the increasing prevalence of chronic diseases, as well as ongoing challenges of infectious diseases, has placed an enormous strain on public health systems that cannot be feasibly managed. Subsequently, the private healthcare sector has proliferated to meet the rising needs, expectations and earnings of the growing population. So much so in fact, that surveys now show that private providers dominate healthcare service provision in India.[2]

At the top end of the market, the private healthcare sector has grown extensively and now has world-class facilities. Private hospital care has become an export sector for medical tourism that cares for around 200,000 international patients each year.[4] However, private healthcare providers lack regulation and quality remains inconsistent across facilities. In many cases private facilities deliver services without appropriate equipment or expertise and, although it is preferential for many to visit private providers, high out-of-pocket costs are often incurred. It has been reported that more than 40% of private hospital patients have to sell assets or borrow money to fund their

care.[5] This means that many patients of lower socioeconomic status remain unable to access such care, while others fall further into poverty as a result of expenses.

References

1. Care Continuum Alliance, India. India – Health Care System Structure and Organization. 2009. Available from: http://dmaa.pbworks.com/w/page/17960772/India%20-%20Health%20Care%20System%20Structure%20and%20Organization
2. Joumard I, Kumar A. Improving health outcomes and health care in India. Paris: Organisation for Economic Cooperation and Development (OECD) Working Papers, No. 1184, OECD Publishing. 2015. Available from: http://www.oecd-ilibrary.org/economics/improving-health-outcomes-and-health-care-in-india_5js7t9ptcr26-en
3. Ministry of Health and Family Welfare, Government of India. Rural Health Statistics in India. 2012. Available from: https://nrhm.gujarat.gov.in/images/pdf/publications/RHS_2012.pdf
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5. The World Bank - Health, Nutrition, Population Sector Unit India South Asian Region. Raising the sights: better health systems for India's poor. Available from: https://openknowledge.worldbank.org/handle/10986/14080

S2. Additional information regarding the study settings

Himachal Pradesh

Himachal Pradesh is principally a rural state in northern India. It has a population of 6.86 million people and the average literacy rate is 83.3%, which is higher than the national average (74%). However, rates remain notably lower for women compared to men (76.6% vs. 90.8%, respectively).[6] Private HCPs are less prevalent in Himachal Pradesh compared to many states and utilisation of public healthcare remains relatively high.[7] A recent study found that the availability of public health services in the state was deemed adequate as compared to standards of other hill states, but with an unequal distribution of resources across regions.[8]

Kerala

Kerala state is in the south-west of India. It has a population of 34.8 million people and a greater than national average urban-based population of 47.7%. It has the highest overall literacy rate of all the states in India (93.9%; men 96.1%, women 92.1).[9] There are a relatively large number of government healthcare facilities in Kerala but the healthcare environment has become increasingly complex due to the growing popularity and presence of private healthcare facilities, which are predominantly situated in urban settings. Despite this, public healthcare facilities in Kerala remain the first point of care for many patients and continue to deliver essential services.[10]

References

6. Government of India. Himachal Pradesh Population Census Data 2011 [Internet]. Available from: https://www.census2011.co.in/census/state/himachal+pradesh.html accessed 13/06/18 2017.
7. Government of India. Himachal Pradesh Development Report. New Delhi: Academic Foundation, 2005.
8. Suman.; Bhutani S. Availability of health services in Himachal Pradesh *International Journal of Advanced Research and Development* 2017;2(6):231-38.
9. Government of Kerala. Kerala Population Census Data 2011 [Internet]. Available from: https://www.census2011.co.in/census/state/kerala.html accessed 13/06/18.
10. Government of Kerala. Kerala Development Report. New Delhi: Academic Foundation, 2008.

Appendix 5. Investigating handover and healthcare communication during chronic NCD inpatient care in Himachal Pradesh and Kerala states, India

S1. Copy of previous handover research study questionnaire used as basis for current study questionnaire

PATIENT QUESTIONNAIRE
PRIMARY AND SECONDARY CARE INTEGRATION IN LOW AND MIDDLE INCOME COUNTRIES; A CASE STUDY OF CLINICAL HANDOVER IN TWO GOVERNMENT HOSPITALS IN NIGERIA

Instructions: please complete all. **Tick** the appropriate space that suits your best response to each question
All the information below will remain confidential and for the research project use only.

SECTION A: DEMOGRAPHICS

1. Age (years)

20-29 ……..
30-39 ……..
40-49 ……..
50-59 ……..
60-69 ……..
70 and older ……..
Don't know ……..

2. Sex-

Male ……..
Female ……..

3. Religion-

Christianity ……..
Islam ……..
Traditional ……..
Other ……..

4. Ethnicity-

Yoruba ……..
Hausa ……..
Igbo ……..

Others ……..

5. Highest level of education -

Literate but not completed primary school…….
Primary school completed…..…..
Secondary School completed …..…..
University completed…..…..
Vocational Studies completed…..…..
None ……..

6. Occupation-

Artisan/craftsman …..…..
Small Business (e.g. carpenter, plumber, petty trading) …..…..
Average business (e.g. own/rent a shop/shed) …..…..
Large business (e.g. own a company, employ staff/labour) …..…..
Junior civil servant (e.g. secretary, assistant) …..…..
Senior civil servant (e.g. team lead, director)
Primary/secondary school teacher …..…..
University lecturer …..…..
Other (E.g. farmer, street vendor, taxi driver, etc.) …..…..

7. Where do you live?

Kwara State. …..…..
FCT …..…..
Other (please specify) …..….

8. Marital status-

Single …..…..
Married …..…..
Divorced …..…..
Widow(er) …..…..

SECTION B: PAST MEDICAL HISTORY

9. What medical condition has brought you to hospital today?

Diabetes …..…..
Hypertension …..…..
Heart disease …..…..
Don't know …..…..
Other (Please explain) ……

10. Have you visited any other health centre/doctor/nurse/chemist before coming here?

Yes …..…..
No …..…..

11. If your answer to the last question 10 is yes, please specify- (You can choose more than one)

Local Government Health Centre ……..
Another general hospital ……..
Private hospital ……..
Private Doctor or nurse ……..
Traditional healer ……..
Religious healer ……..Other

12. For how long have you used this other health service before coming to this hospital (or at the same time as occasional visits to this hospital)?

Less than 6 months ……..
6months – 1year ……..
1year – 2years ……..
More than 2 years ……..
Don't know ……..

13. For how long have you used this current hospital?

Less than 6 months ……..
6months – 1year ……..
1year – 2years ……..
More than 2 years ……..
Don't know ……..

SECTION C: PREVIOUS CARE HISTORY

14. What has made you visit this hospital today instead of the health service you mentioned in question 11?

Cost is lower here ……..
This hospital is nearer to where I live ……..
The other clinic or someone else referred (sent) me here ……..
Employment reasons ……..
Quality of care is better here ……..
Personal reasons ……..
Other ……..

15. Do you have any document, notes or other pieces of paper from your previous health provider to this hospital?

Yes ……..
No …….. **[if your answer is 'No' please proceed to question 17]**

16. Do you have that note with you today?

Yes ……..
No ……..

17. If your answer to question 16 is No, please provide a reason-

Forgot it at home …..…..
Lost it …..…..
I've always had it but never used it …..…..
I've never been asked for it here …..…..
My children/spouse handle such documents, so I don't know …..…..

18. If your answer to question 15 was yes, please how did you get it- (please may I see it?)

I was given one without asking …..…..
I had to ask for a document …..…..
In this hospital I need one before I am can be attended to …..…..

19. Note for researcher: is the referral paper any of the following?

Picture card ……..
Letter ……..
Referral form ……..

20. Does it contain any of the following:

Past medical history ……..
Patient's symptoms ……..
Tests already performed ……..
Tests to be performed ……..
Differential diagnosis ……..Medication ……..

Thank you for your participation

PATIENT QUESTIONNAIRE (PART II)
TITLE OF RESEARCH PROJECT: PRIMARY AND SECONDARY CARE INTEGRATION IN LOW AND MIDDLE INCOME COUNTRIES; A CASE STUDY OF CLINICAL HANDOVER IN TWO GOVERNMENT HOSPITALS IN NIGERIA

Instructions: please answer all. Tick the appropriate space that suits your best response to each question. You may choose more than one option where possible

1. Do you plan to return to your previous care provider (nurse, doctor, etc) you visited before coming here if you had one?

Yes ……..
No ……..
Don't know ……..

2. If yes, how will you explain to them what was done for you here?

I told the doctor here to explain to my child/spouse ……..
I asked the doctor here to explain to me so I can tell the other doctors I may see ……..
The doctor here gave me a note to take back to my other health provider ……..
Don't know ……..

3. In your opinion does having a note make the care you received here better than other places you have visited?

Yes ……..
No ……..
Don't know ……..

4. If yes, why?

Because I don't know how to explain my condition and the note helps ……..
It helps me to get attended to faster ……..
I feel it's more professional ……..
I don't know ……..

5. If no, why?

I don't know ……..
Everyone receives the same standard of care regardless ……..
It's a waste of time ……..
Other (Please explain briefly)
……
……

6. Did the doctor explain your condition to you?

Yes ……..
No ……..
Don't know ……..

7. What were you asked to do after leaving here?

Come back ……..
Go to local hospital ……..
Get some new medication ……..
Continue with old medication ……..
Do some tests ……...

8. Did the doctor give you a **note to give your other doctor** or a **note to come back here**?

Yes ……..
No ……..
Don't know ……..

9. If yes please may I see it?

10. Note for researcher- is the referral paper any of the following?

Patient card/note ……..
Letter ……..
Referral form ……..

11. Does it contain any of the following:

Past medical history ……..
Patient's symptoms ……..
Tests already performed ……..
Tests to be performed ……..
Differential diagnosis ……..
Medication ……..

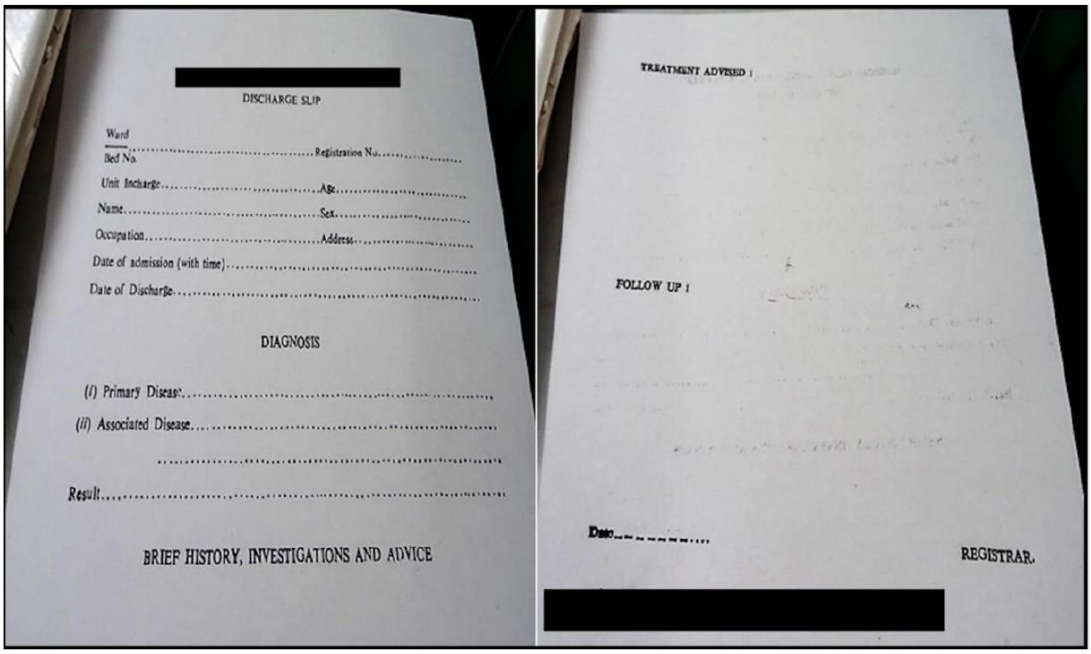
Thank you for your participation

S2. Baseline characteristics and adverse health outcomes by study site

Characteristic	Hospital 1 (n=308) Frequency (%)	Hospital 2 (n=64) Frequency (%)	Hospital 3 (n=174) Frequency (%)
Sex			
Male	190 (61.7)	12 (18.8)	103 (59.2)
Female	118 (38.3)	52 (81.3)	71 (40.8)
Age Group (Years)			
18–49	47 (15.3)	17 (26.6)	34 (19.5)
50–69	167 (54.2)	40 (62.5)	89 (51.1)
≥70	94 (30.5)	7 (10.9)	51 (29.3)
Level of Education			
Illiterate	37 (12.0)	4 (6.3)	50 (28.7)
Literate with partial or completed primary school education	167 (54.2)	34 (53.1)	57 (32.8)
Complete secondary school education	75 (24.4)	16 (25.0)	41 (23.6)
Complete higher school/vocational studies	28 (9.1)	10 (15.6)	14 (8.0)
University graduate or above	1 (0.3)	0 (0)	12 (6.9)
Employment Status			
Employed	86 (27.9)	17 (26.6)	61 (35.1)
Unemployed	220 (71.4)	47 (73.4)	102 (58.6)
Retired	0 (0)	0 (0)	11 (6.3)
No data*	2 (0.6)	0 (0)	0 (0)
Time Taken to Reach Hospital			
>1 hour	152 (49.4)	32 (50.0)	127 (73.0)
1-4 hours	152 (49.4)	32 (50.0)	46 (26.4)
>4 hours	3 (1.0)	0 (0)	1 (0.6)
No data*	1 (0.3)	0 (0)	0 (0)
Chronic NCDs†			
Diabetes	101 (32.8)	26 (40.6)	30 (17.2)
Cardiovascular Disease	154 (50)	17 (26.6)	47 (27.0)
Chronic Respiratory Disease	135 (43.8)	18 (28.1)	94 (54.0)
Hypertension	103 (33.4)	24 (37.5)	44 (25.3)
Number of Chronic NCDs (per patient)			
1	181 (58.8)	47 (73.4)	137 (78.7)
2	81 (26.3)	14 (21.9)	33 (19.0)
3	34 (11.0)	2 (3.1)	4 (2.3)
4	12 (3.9)	1 (1.6)	0 (0)
Adverse Health Outcomes at 5-week follow-up			
Death	1 (0.3)	0 (0)	18 (10.3)
Hospital Readmission	21 (6.8)	1 (1.6)	11 (6.3)
Self-reported deterioration of NCD/s	32 (10.4)	1 (1.6)	6 (3.4)
Adverse Health Outcomes at 18-week follow-up			
Death	6 (1.9)	0 (0)	19 (10.9)
Hospital Readmission	46 (14.9)	6 (9.4)	17 (9.8)
Self-reported deterioration of NCD/s	51 (16.6)	2 (3.1)	9 (5.2)

* No data = missing responses
† Please note that participants could select more than one answer for this question

S3. Exemplar picture of a structured discharge slip



[redacted]

DISCHARGE SLIP

Ward
Bed No. ..... Registration No. .....

Unit Incharge ..... Age .....

Name ..... Sex .....

Occupation ..... Address .....

Date of admission (with time) .....

Date of Discharge .....

DIAGNOSIS

(*i*) Primary Disease .....

(*ii*) Associated Disease .....

.....

Result .....

BRIEF HISTORY, INVESTIGATIONS AND ADVICE

TREATMENT ADVISED :

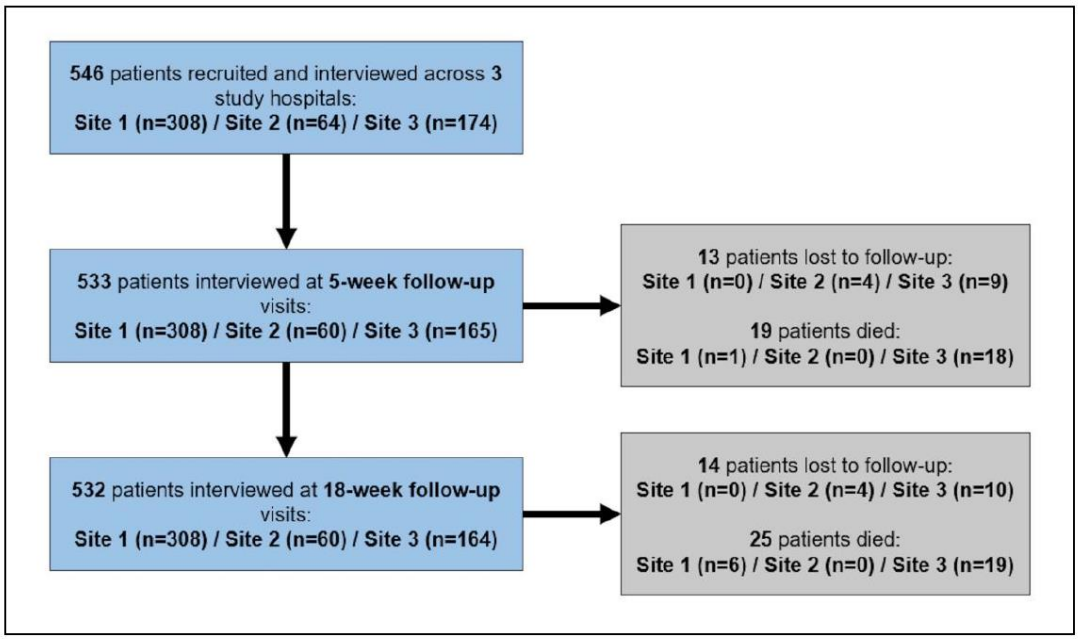
FOLLOW UP :

Date .....

REGISTRAR.

[redacted]

S4. Summary flowchart of participant inclusion and exclusion throughout the study



S5. Results of all unadjusted regression analyses

Death within 5 weeks of discharge	Unadjusted odds ratios			Death within 18 weeks of discharge	Unadjusted odds ratios		
	OR	95% CI	p-value		OR	95% CI	p-value
No. of items of key documents discharge information[*]				*No. of items of key documented discharge information*[*]			
0 to 2 items	4.26	1.64-11.05	0.003[§]	0 to 2 items	3.58	1.58-8.13	0.002[†]
No. of items of key verbal discharge information[§]				*No. of items of key verbal discharge information*[§]			
0 to 2 items	13.79	0.83-229.90	0.068	0 to 2 items	3.32	0.89-12.40	0.075
Hospital readmission within 5 weeks of discharge				**Hospital readmission within 18 weeks of discharge**			
No. of items of key documented discharge information[*]				*No. of items of key documented discharge information*[*]			
0 to 2 items	0.69	0.31-1.55	0.374	0 to 2 items	0.86	0.49-1.49	0.580
No. of items of key verbal discharge information[§]				*No. of items of key verbal discharge information*[§]			
0 to 2 items	0.78	0.37-1.66	0.518	0 to 2 items	0.77	0.45-1.34	0.364
Self-reported deterioration of NCD/s within 5 weeks of discharge				**Self-reported deterioration of NCD/s within 18 weeks of discharge**			
No. of items of key documented discharge information[*]				*No. of items of key documented discharge information*[*]			
0 to 2 items	1.33	0.68-2.58	0.406	0 to 2 items	1.50	0.87-2.58	0.145
No. of items of key verbal discharge information[§]				*No. of items of key verbal discharge information*[§]			
0 to 2 items	0.53	0.27-1.03	0.063	0 to 2 items	0.40	0.23-0.68	0.001[†]

* Odds ratios represent association with receipt of 0 to 2 items of key documented information on discharge notes

† Statistically significant at p<0.05

§ Odds ratios represent association with receipt of 0 to 2 items of key verbal information during discharge consultation

S6. Summary of goodness-of-fit test results for all adjusted multivariate analyses

Models with adverse health outcomes within 5 weeks of discharge*	p-value	**Models with adverse health outcomes within 18 weeks of discharge***	p-value
Death	<0.001	Death	0.001
Hospital readmission	0.646	Hospital readmission	0.658
Self-reported deterioration of NCD/s	0.128	Self-reported deterioration of NCD/s	0.009

*Adjusted for the following independent variables: sex, age group (18-49/50-69/70yrs+), education level (up to primary school-level/secondary school-level/higher school-level or more), employment status (unemployed/employed/retired), usual time taken to reach hospital (<1 hour/1-4 hours/>4 hours), number of chronic NCDs (1/2/3/4) and hospital site (1/2/3)

S7. Summary of results and goodness-of-fit test results for all sensitivity analyses.

During analysis, it became apparent that the number of hospital readmissions recorded in our patient population was likely to be incomplete. This is because no data was collected about the period after initial discharge until death for deceased patients. Anecdotal reports from Indian clinicians suggest that for chronic NCD patients, exacerbations before death would usually result in an admission - even in the case of a terminal patient. That given, our results appear to represent a lower bound on the proportion of patients readmitted. We therefore ran further regression analyses based on the assumption that all patients who died had also been readmitted. No significant associations were found and all adjusted point estimates regarding associations with low-quality verbal discharge information leaned in the direction of a decreased likelihood of hospital readmission within five and eighteen weeks follow-up. Conversely, all adjusted point estimates regarding associations with low-quality discharge notes leaned in the direction of an increased likelihood of hospital readmission within five and eighteen weeks follow-up. Such results define an upper bound on the proportion of patients readmitted.

Results of sensitivity analyses displaying associations between receiving low-quality discharge information and the likelihood of experiencing death or hospital readmission within five and eighteen weeks of discharge

Readmission or death within 5 weeks of discharge	Unadjusted odds ratios			Adjusted odds ratios*		
	OR	95% CI	p-value	OR	95% CI	p-value
No. of items of key documented discharge information†						
0 to 2 items	1.41	0.79-2.53	0.247	1.22	0.65-2.29	0.530
No. of items of key verbal discharge information§						
0 to 2 items	1.41	0.70-2.85	0.340	0.88	0.38-2.02	0.756
Readmission or death within 18 weeks of discharge						
No. of items of key documented discharge information†						
0 to 2 items	1.31	0.82-2.07	0.254	1.13	0.69-1.83	0.629
No. of items of key verbal discharge information§						
0 to 2 items	1.09	0.65-1.84	0.741	0.94	0.53-1.68	0.835

*Adjusted for the following independent variables: sex, age group (18-49/50-69/70yrs+), education level (up to primary school-level/secondary school-level/higher school-level or more), employment status (unemployed/employed/retired), usual time taken to reach hospital (<1 hour/1-4 hours/>4 hours), number of chronic NCDs (1/2/3/4) and hospital site (1/2/3)
† Odds ratios represent association with receipt of 0 to 2 items of key documented information on discharge notes
§ Odds ratios represent association with receipt of 0 to 2 items of key verbal information during discharge consultation

Results of goodness-of-fit tests for the adjusted sensitivity analyses

Model with adverse health outcomes within 5 weeks of discharge*	p-value	Model with adverse health outcomes within 18 weeks of discharge*	p-value
Death or Readmission	0.008	Death or Readmission	0.190

*Adjusted for the following independent variables: sex, age group (18-49/50-69/70yrs+), education level (up to primary school-level/secondary school-level/higher school-level or more), employment status (unemployed/employed/retired), usual time taken to reach hospital (<1 hour/1-4 hours/>4 hours), number of chronic NCDs (1/2/3/4) and hospital site (1/2/3).

Appendix 6. Healthcare provider training, procedures and protocols for handover communication in Himachal Pradesh and Kerala States, India: a cross-sectional study

S1. Further information regarding the Indian health system and study settings

Public and private healthcare in India

Nationally, Indian public healthcare is directed by the government's Ministry of Health and Family Welfare. In each state, public healthcare is managed by the state department of Health and Family Welfare, which has extensive autonomy in designing and delivering health programs. Figure 1 contains a summary of the structure of the public healthcare system in India according to Indian Public Health Standard Norms.[1]

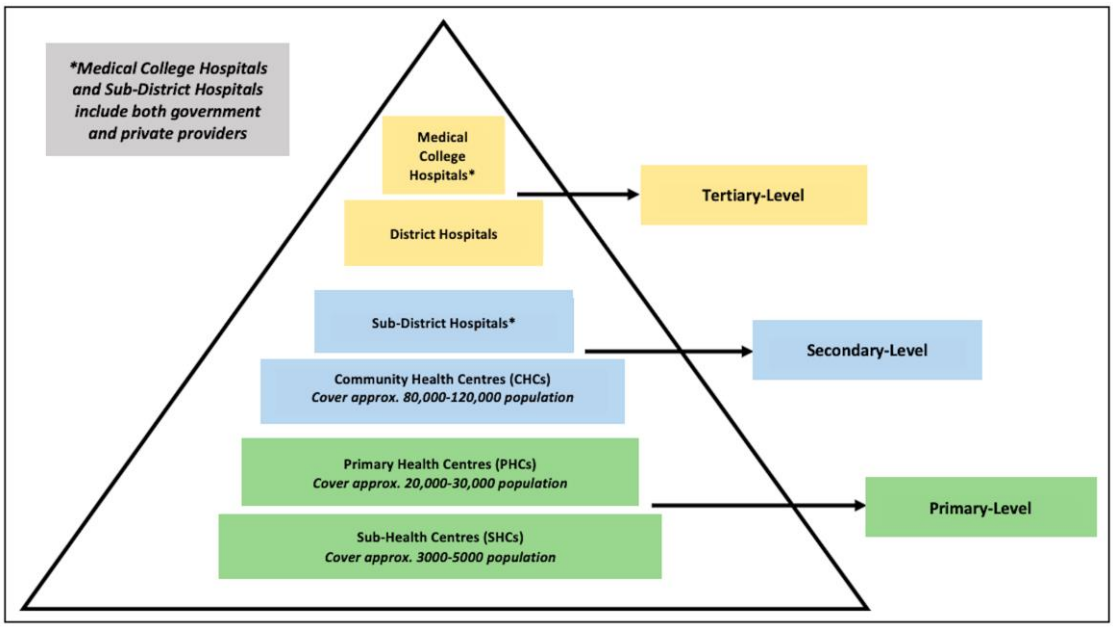


Figure 1. Structure of the Indian Public Healthcare System according to Indian Public Health Standard Norms

Public healthcare in India has lacked funding over several decades due to a lack of prioritisation from economic planners. Therefore, the increasing prevalence of chronic, NCDs alongside unresolved challenges of infectious diseases has placed more strain on public health systems than what can feasibly be managed.[2] Some of the shortfalls of public healthcare include services being too far away, a lack of trained HCPs, deficiencies in medical supplies and limited opening times.[3] In addition, notable proportions of public primary health centres (particularly in rural and socioeconomically vulnerable areas) have lacked key HCPs such as doctors, laboratory technicians and pharmacists.[3 4]

Given the plethora of issues being faced by public healthcare, the private healthcare sector has subsequently boomed to meet rising needs, expectations and incomes and private providers now dominate service provision.[5] At the top end of the market, the

private sector has world-class facilities. However, private healthcare providers are poorly regulated, which has resulted in uneven quality across facilities; many deliver services without the appropriate equipment and/or expertise.[6 7] In addition, visiting private providers frequently results in the substantial out-of-pocket costs for patients. This means that many socio-economically vulnerable patients are either unable to access healthcare or fall into financial hardship as a result of paying for private care.[5]

Overview of Himachal Pradesh and Kerala states, India

Himachal Pradesh is a predominantly rural and hilly state situated in the Himalayas in the north of India with a population of 6.86 million people. The average literacy rate (83%) is higher than the national average, but rates remain notably lower for women (76.6%) compared to men (90.8%).[8] According to the state Directorate of Health Services, there are 75 hospitals, 89 community health centres (CHCs), 538 primary health centres (PHCs) and 2083 sub-health centres (SHCs).[9] Despite the rise in the number of private HCPs across many states of India, public healthcare utilisation within the state of Himachal Pradesh remains relatively high.[10]

Kerala is situated on the south-west coast of India with a large urban-based population (48%) and a total population of 33.39 million people. It has the highest literacy rate in India (94)%, with similar rates between women (92%) and men (96%).[11] According to the state Directorate of Health Services, there are 139 hospitals, 232 CHCs, 848 PHCs and 5408 SHCs.[12] The healthcare environment across the state has become increasingly complex due to an increasing number of private healthcare providers, which are predominantly located in urban settings.[13] Despite this, public health facilities continue to deliver many essential services and act as the first point of care for many patients.[3]

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