

**OPPORTUNITIES FOR ENHANCING UNINTENTIONAL INJURY
PREVENTION IN CHILDREN AGED UNDER FIVE YEARS IN
MUSCAT, OMAN:
A MIXED METHODS STUDY**

by

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Abstract

Child law in Oman stresses the child's right to safety and health, and the Ministry of Health provides a sophisticated child health promotion programme. However, there is a relatively high rate of unintentional injuries among children under five years of age. There is currently limited information about Omani caregivers' awareness and practice of injury prevention and health promotion concerning child safety.

Aim: To explore the needs, challenges, and opportunities to enhance parents/caregivers' awareness and practice concerning unintentional child injury prevention at home in Muscat, Oman.

Methods: Phase one was a systematic review to identify effective health education methods for injury prevention and their effectiveness in caregiver knowledge, skills, and attitudes. The second phase was a convergent parallel mixed methods design in two parts underpinned by the socioecological model (SEM). A survey was developed to explore Omani caregivers' practice of child safety and the influencing factors with responses analysed descriptively. Semi-structured interviews were conducted with doctors and nurses working in primary healthcare centres in Muscat with data analysed using framework analysis based on the SEM. Quantitative and qualitative analysis was conducted separately with integration as the final step.

Findings: Complex multilevel factors influence caregiver awareness and child safety practices in Oman. There is a lack of caregiver knowledge concerning the benefits of some safety equipment, and some have a negative perception of the preventability of injury. Socio-economic factors such as big families, low income, and multiple caregivers are associated with inadequate supervision. Most caregivers had not participated in child safety education or parenting programmes.

Primary healthcare provides opportunities to integrate child safety within child health programmes, including regular visits to health centres. However, there are several challenges to the effective implementation of health education, including limited resources, time constraints and workload. Additional challenges relate to socio-economic status, neighbourhood safety, and willingness to attend health education sessions.

Conclusion: Caregiver safety education needs improvement. Ideally education will be tailored to account for different family and community contexts. Opportunistic delivery of safety information can be provided in waiting areas of primary health settings. Structured sessions should be delivered during appointments in health centres supplemented by online courses with interactive features through social media and webpages. Collaboration with other governmental sectors is necessary to empower working mothers and implement and enforce safety measures effectively.

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List of Abbreviations

AUD	Australian Dollar
CDC	Centers for Disease Control
DGHS	Directorate General of Health Services
DGSM	Directorate General for Specifications and Measurements
DMCH	Directorate of Maternal and Child Health
EMRO	Eastern Mediterranean Regional Office
EPI	Expanded Program on Immunisation
GBP	British Pound Sterling
GCC	The Gulf Cooperation Council
HBM	Health Belief Model
HCPs	Healthcare provider
IMCI	Integrated Management of Neonatal and Childhood Illness
KSA	Kingdom of Saudi Arabia
MOH	Ministry of Health
MMR	Mixed methods research
MOCI	Ministry of Commerce and Industry and Investment Promotion
NCMD	National Child Mortality Database in the UK
NCSI	National Centre for Statistics and Information
OMR	Omani Rial
PHC	Primary healthcare
PHCCs	Primary healthcare centres
PHCPs	Primary healthcare providers
RERAC	Research and Ethical and Review Approval Committee
RTA	Road traffic accidents
SEM	Socioecological model
SPSS	Statistical Package for the Social Sciences
TPB	Theory of planned behaviour
UAE	United Arab Emirates
UCI	Unintentional child injury

UK	United Kingdom
USA	United States of America
USD	US Dollars
WHO	World Health Organisation

Chapter 1 Introduction

This project used a mixed methods approach to explore the needs, challenges, and opportunities to enhance the awareness and practice of parents or caregivers in relation to unintentional injury prevention at home among children under five years of age in Muscat, Oman.

This chapter provides an overview of the definition of injury. The factors contributing to the problem of unintentional child injury (UCI) in the home globally are also outlined. Following this, an overview of the burden of child injuries at home both globally and nationally are explored; this identifies them as a public health concern. Context is provided by explaining socio-demographics, socioeconomics, and health system characteristics in Oman. Additionally, the chapter will highlight the structure and content of the thesis and the chapters.

1.1 Defining unintentional injury

The definition of unintentional injury varies between countries, settings, and according to individual perceptions. Many people conflate injury with 'accident', adding another layer of complexity to its interpretation (Davis and Pless, 2001; Langley and Brenner, 2004).

The definition of injury adopted by the World Health Organization (WHO) is based on that developed by Baker et al. (1992):

the physical damage that results when a human body is suddenly subjected to energy in amounts that exceed the threshold of physiological tolerance' where energy is 'mechanical, thermal, chemical or radiated (Peden, 2008: p1).

Unintentional injury, the focus of this thesis, pertains to incidents without intent to cause harm arising from unintended events or hazards in the home (Peden, 2008). In contrast, 'intentional injuries' result from acts of violence, maltreatment and abuse (WHO, 2020). However, intent cannot always be discerned.

The most common causes or mechanisms of unintentional injuries in children are falling from a height, exposure to mechanical forces, drowning, suffocation, burns, and poisoning (Peden, 2008; Adeloje et al., 2018) (Table 1-1). The degree of injury severity can vary, ranging from minor to major, and necessitating medical attention. The most frequently seen minor injuries are cuts and bruises, while head injuries and fractures of the arms and legs are among major injuries.

Table 1-1: Common causes of unintentional injuries in children under five years of age (Peden et al. 2008).

Causes/Mechanism	Description
Falls from height	Falls from furniture, stairs, playground equipment, or other elevated surfaces
Burns and scalds	Contact with hot surfaces, liquids, or flames
Exposure to mechanical forces	Injuries from falling objects, being struck by objects, crushing injuries, collisions, pinching or shearing
Poisoning	Ingestion of medications and household chemicals
Choking	Blocked airway because of placing small objects or pieces of food into the mouth
Submersion/Drowning	Can occur in bodies of water such as pools, lakes, or bathtubs
Cuts and bruises	Accidental cuts, bruises, or injuries from sharp objects or surfaces
Electrical injuries	Contact with electrical outlets, appliances, or cords

1.2 The global scale of the problem: prevalence

UCI in children under five years of age is a global public health challenge (Peden, 2008). Epidemiological studies show a high prevalence of childhood injuries worldwide (Sleet, 2018), with a decline in prevalence in some countries, such as the USA (Center for Disease Control, 2021) and UK (Jones et al., 2023). UCI causes death and lifelong disability to thousands of children around the world (Chandran et al., 2010; Hyder and David, 2012; Adeloje et al. 2018; Hogan et al., 2018; Sleet, 2018). The global UCI mortality rate among children under five was 32.7 per 100,000 population (Adeloje et al., 2018). Causes of injury-related deaths include falls (3.0 per 100,000), burns (2.7 per 100,000), and poisoning (1.7 per 100,000) (Adeloje et al., 2018).

Morbidity and mortality related to UCI exhibit significant variations between countries (Sethi et al., 2017). A spectrum of factors such as economic disparities, social structures, cultural norms, and geographical considerations intricately influence this diversity (Sleet, 2018). The incidence of fatal injuries is higher in low- and middle-income countries than in high-income countries that have more advanced healthcare systems (Sethi et al., 2017). The accuracy of published statistics in some countries is influenced by clinicians' and researchers' interpretations of injury classification in the International Classification of Diseases 11th Revision (ICD 11) (Adeloje et al., 2018). Developed countries such as the United States of America (USA) have achieved greater reliability in their statistics since 1990 due to the implementation of automated computer systems. However, the World Health Organization (WHO) identified an increase in the percentage distribution of mortality from injuries among children under five across all income groups globally (Peden et al., 2009).

Unintentional child injury is a leading cause of morbidity and mortality in high-income countries such as the United States and the United Kingdom, but there has been a decline in the last two decades (Center for Disease Control, 2012a; Zonfrillo et al., 2018). The UCI death rate in the USA was 11.0 per 100,000 population between 2000 and 2009 (Center for Disease Control, 2012b). Moreover, recent data from the USA (Center for Disease Control, 2021) indicates an 11% reduction in child unintentional injury-related death rates from 2012 to 2022 which is thought to be driven by safety promotion programmes (West et al., 2021). However, it is essential to highlight that injuries remain the primary cause of death for children and teens in the United States.

Similarly in the United Kingdom (UK), UCI is reported as one of the leading causes of child death and disability (Khanom et al., 2013; Royal College of Paediatrics and Child Health, 2020 [RCPCH]). According to a recent report from the National Child Mortality Database (NCMD) (Williams et al., 2023), traumatic death was high among children under five, with 22.9 deaths per million children. The report recorded 189 deaths between 2019 and 2023 due to traumatic injuries such as falls (n=31), alcohol poisoning (n=47) and choking or swallowing a foreign object (n=21). Approximately 370,000 children attended emergency departments due to unintentional injuries; and in 2018–2019, there were 45,661 hospital admissions in England and Wales (RCPCH, 2020). The rate of UCI in Wales was 16.1/1000 which is higher than England (12.8/1000) and Scotland (10.7/1000) (RCPCH, 2020).

While considering the prevalence of UCI in high-income countries, it is important to extend this examination to the WHO Eastern Mediterranean Region (EMRO), which contains the Sultanate of Oman as well as other countries in the Middle East, North Africa, and parts of South Asia. EMRO countries have published fewer studies on

unintentional child injury mortality and morbidity compared to other WHO regions (Adeloye et al., 2018). As with other WHO regions, UCI in EMRO countries is a leading cause of death and disability among children (Soori and Khodakarim, 2016; Al-Hajj et al., 2020a). However, this region includes countries with different socio-economic, geographical and political statuses as well as population sizes, such as Bahrain, Iran, Egypt, Pakistan, and the United Arab Emirates (UAE). Therefore, the rates within each country differ significantly (Soori and Khodakarim, 2016; Al-Hajj et al., 2020a), ranging between 41.6 per 100,000 in high-income countries, and 45.7 per 100,000 in low- and middle-income countries within the region. The most common cause of UCI-related death is drowning (6.8 per 100,000), burns (4.5 per 100,000), falls (2.9 per 100,000), and poisoning (1.6 per 100,000) (Soori and Khodakarim, 2016). In addition, a higher rate of injuries occurs among males than females (Soori and Khodakarim, 2016).

On a more localised scale, UCI prevalence is reported to be high in the neighbouring Gulf Cooperation Council (GCC) countries as well (Grivna et al., 2015; Abdulrahman, 2017; Alkhamis and Abdulkader, 2020; Albedewi et al., 2021). The GCC countries, (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the UAE), form a regional political and economic union in the Arabian Peninsula. Research studies conducted in GCC countries are fewer in number than in developed countries (Soori and Khodakarim, 2016) except in Saudi Arabia, where recently the published studies on UCI prevalence have increased. The studies conducted in GCC countries consider falls from height, burns, poisoning and drowning-related injuries to be the most prevalent among under-fives (Al Rumhi et al., 2020; Alkhamis and Abdulkader, 2020; Alansari et al., 2023) but their limited number underscores the importance of additional research and focused attention on UCI. This scarcity of data also emphasises the necessity to determine

whether there is a need to develop and enhance resources and interventions to mitigate and address the impact of UCI in this region.

In summary, UCI is a global challenge affecting both high and low-income countries, resulting in significant death and disability. However, the disparity in death rates is pronounced, with lower-income countries experiencing higher mortality.

1.3 The burden of unintentional child injury

The consequences of a child's injury on a family can be profound, across financial, emotional, socio-cultural, and healthcare dimensions (Dalal and Svanström, 2015; Peterson et al., 2021). Immediate financial strains include medical costs and the potential loss of parental income. Emotionally, the toll can be considerable, affecting the injured child, parents and siblings. Moreover, long-term care, therapy, and adjustments to daily life create sustained financial commitments. There may be additional educational costs, while legal action can introduce further complexity.

The financial impact of UCIs on healthcare systems is substantial (Kendrick et al., 2017; Dukleska et al., 2022). These expenses include the provision of emergency care, hospital admissions for acute treatment, and post-trauma rehabilitation, creating a significant burden on both medical resources and institutional budgets (Mitchell et al., 2018; Jones et al., 2023; Zonfrillo et al., 2018). The magnitude of these expenditures varies between countries, and the scarcity of studies addressing this aspect makes it challenging to estimate costs in many nations (Lao et al., 2012; Dalal and Svanström, 2015). This multifaceted perspective underscores the intricate challenges families face with a child's injury, emphasising the need for an understanding of the holistic impact across various sectors, including healthcare.

Most of the cost of UCI economic research studies and analyses have been conducted in the USA where is estimated to cost more than 15 billion US dollars per year (Center for Disease Control, 2020b; Peterson et al., 2021) to manage the consequences of 1.6 million injuries in children between birth and four years. Meanwhile, the UK spends £150 million per year to cover 100,000 annual admissions due to UCI (Patel et al., 2017). The mean cost of attending the Emergency Department (ED) in England is between 97 GBP and 178 GBP, while a one-day hospital admission can cost the NHS between 719 GBP and 1011 GBP (Kendrick et al., 2017). The lifetime cost of treatment and care for children disabled due to traumatic brain injury from a serious fall is estimated to be 4.89 GBP million per year (Public Health England, 2018). The total cost of child injury hospitalisations in Australia was reported to be 2.1 billion AUD annually, with an additional annual cost of 212 million AUD related to expenses associated with medical treatment, rehabilitation, and other healthcare costs for children who were hospitalised due to injuries (Mitchell et al., 2018). These figures indicate the scale of the economic burden resulting from UCI. This financial challenge emphasises the need to implement measures to reduce child injuries for individual wellbeing and to contribute to the financial sustainability of healthcare systems worldwide.

To address this, WHO made a recommendation to enhance injury prevention measures, strengthen safety regulations and to raise public awareness (Peden, 2008). Health promotion initiatives targeting child injuries have demonstrated effectiveness in the enhancement of caregiver safety practices and in reducing the risk of injury (Abbassinia et al., 2019). The implementation of the national home safety equipment scheme (Safe at Home) in England resulted in a 0.33% reduction in hospital

admissions for injury-related cases among children under five during the two years after the scheme ended and providing safety equipment in less advantaged areas led to even greater reductions in hospital admissions (Hill et al., 2022). These efforts not only contribute to the wellbeing of children but also play a pivotal role in alleviating the national financial burden associated with unintentional child injuries.

1.4 Factors contributing to early unintentional childhood injuries

Child injuries in the home are linked to multiple factors, including child attributes, the level of supervision, and the presence of potential hazards within the home environment. Caregiver awareness and understanding is a contributory factor. Most UCIs for children under five occur at home and adjacent surroundings as this is where they spend most of their time (Patel et al., 2017; Mehmood et al., 2018; Zeng et al., 2022). Children are impulsive and try to learn by discovering their surroundings without being aware of the potential dangers (Boyd and Bee, 2013), as they have limited cognitive comprehension of the consequences of their actions (Garzon, 2005). This makes them more at risk of sustaining fatal and non-fatal injuries (He et al., 2014, Chandran et al., 2010).

Fatality due to UCI exhibits age-specific variations (Patel et al., 2017). Infants under five years have higher rates of injury and is slightly higher in boys (Elbourne et al., 2021). Injuries in this age group account for two-thirds of UCI in the emergency department (Gong et al., 2021). Here some types of injuries are more prevalent in specific age groups; for instance, toddlers are at a higher risk of trip and slip injuries in addition to falls from a height as they begin to walk. At this stage, children need closer supervision but a longitudinal study in Canada by Morrongiello et al. (2021) noted that

the parental supervision of children declines with increasing child motor development leading to frequent preventable injuries among toddlers. Injuries decrease and stabilise throughout the school years, but a second peak in mortality emerges during adolescence, particularly among individuals aged 15 to 19 years, where more injuries occur outside the home (Elbourne et al., 2021).

Supervision is essential in the first two years of a child's life while the child is in the sensorimotor phase of development and during which they refine their senses to understand their environment (Berk, 2015). Due to their ongoing development, toddlers are particularly vulnerable and require attentive care from their parents (Peden et al., 2009). This period presents a crucial opportunity for children to learn about risk management through supervised engagement in risk-taking and risky play (Brussoni et al., 2015). Understanding these dynamics is essential for tailoring injury prevention strategies, taking account of the specific needs of children as they progress through various stages of development.

Parental attributes can contribute to the risk of childhood injury. Here, the socio-economic, environmental, and behavioural attributes of the parents and family influence the rate of home injuries (Baron-Epel and Ivancovsky, 2015). There is a significant correlation between the low socio-economic status of a family and child injuries in the home, shedding light on how economic factors, living conditions, and access to resources contribute to varying levels of risk within different socio-economic strata (Mahboob et al., 2021). Some studies suggest that low socio-economic status is associated with the parents' knowledge, attitudes, and practices relating to child safety (Barat et al., 2017; Mahboob et al., 2021; Peck et al., 2021). However, Sato et al. (2018), in a study in Japan, found no strong association between socio-economic

factors and the occurrence of UCI, recommending against targeting such factors in prevention strategies.

In addition, previous studies indicate that there is a significant correlation between maternal age, education level, employment status, and knowledge, skills and attitudes relating to UCI prevention (Akturk and Erci, 2016; Santagati et al., 2016; Al-Hajj et al., 2020b; Ghebreab et al., 2021). Studies have shown that younger mothers may have a higher likelihood of experiencing difficulties in child supervision and safety practices, thus potentially increasing the risk of child injuries (Akturk and Erci, 2016; Ghebreab et al., 2021). Additionally, mothers with lower educational attainment may have limited access to information about child safety measures and could face challenges in understanding and implementing preventive measures effectively (Santagati et al., 2016; Nour et al., 2018). Furthermore, maternal employment status can impact the time available for supervision and caregiving, potentially affecting the level of attention given to child safety (Al-Hajj et al., 2020b; Ghebreab et al., 2021). Therefore, addressing these factors through targeted interventions and educational programmes can reduce child injuries and promote overall child wellbeing.

The number of siblings and children living in one house is one of the social risk factors due to exposure to diverse activities, varying ages, supervision challenges, and resource-sharing dynamics (Akturk and Erci, 2016). Other factors are the number of members in the family and family income, as the likelihood of injury increases by 2.9 times when more than four members live in the same house (Brito et al., 2016). Inadequate supervision and its association with unintentional injuries among children was one of the commonly cited causal factors. For toddlers who are between one to three years old, one fifth of UCI occur when children are left unsupervised (Garzon et

al., 2007). Injuries can happen at any time, but studies have shown that there are certain times when the injury incidence rate is higher. Injuries were slightly higher in the afternoons and holidays (Zeng et al., 2022) due to factors such as decreased supervision and increased outdoor activities. This can vary based on individual circumstances and cultural practices.

There is a global movement to prevent UCI through programmes that target these contributing factors, in particular the promotion of awareness by caregivers' concerning preventive measures (Peden et al., 2009). Interventions, including child supervision and creating a safe home environment, are fundamental practices to reduce the risk of UCI (Schnitzer et al., 2015; Falcone Jr et al., 2016; Kendrick et al., 2016; Watson and Errington, 2016).

Overall, while various influencing factors have been identified by studies conducted worldwide, it should be noted that there are currently no studies specifically addressing the factors contributing to child injury in Oman. This highlights the need to investigate the influences that underlie this issue within the local context.

1.5 Approaches to injury prevention

Preventing early childhood injuries requires a comprehensive understanding of effective strategies to modify parental knowledge, attitudes, and behaviours towards child safety measures (Abbassinia et al., 2019; Siva and Tatebe, 2020). The incidence of unintentional child injury can be reduced through various methods including adequate supervision (Schnitzer et al., 2015) and environmental modifications (Bhatta et al., 2020). Preventive measures must help to protect children from injury and simultaneously allow children to engage in age-appropriate activities that promote their

cognitive, physical and social development (Brussoni et al., 2012; Watson and Errington, 2016). Perceptions of injury preventability among parents vary, as evidenced by studies such as those conducted by Vincenten et al. (2005); Ablewhite et al. (2015) and Barat et al. (2017). Children of parents who believe that injuries are inevitable may be more susceptible to accidents for instance (Santagati et al., 2016). It is important to note that this observation is based on specific studies and may not be universally applicable. Thus, the relationship between parents' beliefs about preventability and UCI requires careful consideration.

It is important that caregivers have knowledge of safety measures and positive attitudes and behaviour towards them. Parents of newborns or those expecting a baby need to be aware of how to protect their children from injuries. Focusing on knowledge, attitudes, and skills is essential for improving safety practice and reducing injuries. Here, knowledge provides the foundation for informed decision-making, attitudes shape behaviour, and skills translate knowledge into practical action. Together, they create a safer environment and promote a culture of safety. Hence, prevention must include an intervention that considers the importance of knowledge, attitudes, and behaviour enhancement (Amini et al., 2021).

Approaches to prevent or mitigate UCI can be broadly grouped into three categories, namely engineering, enforcement, and education (Patel et al., 2017). The preventive approach using engineering strategies primarily focuses on the modification of products and environmental factors to enhance safety for every individual. Enforcement methods involve establishing and implementation of laws, regulations, and standards to guarantee safety. Moreover, education and the development of skills are also crucial in preventing the occurrence of injuries (Machin et al., 2018; Temsah

et al., 2022). Despite the importance of all these approaches, for this project I will focus on education since it is an integral part of the role of healthcare professionals. Specifically, I will explore health education within primary healthcare centres (PHCCs). PHCCs offer a vital setting in the communities to provide health promotion including health education for well people, home visits and working with social services (Cross and Woodall, 2023).

1.6 Health education

Health education is defined by the WHO as

compris[ing] consciously constructed opportunities for learning involving some form of communication designed to improve health literacy, including improving knowledge, and developing life skills which are conducive to individual and community health (WHO, 1986).

This extends beyond sharing information, encompassing the empowerment of individuals to enhance their health by fostering motivation, skills, and confidence (Pueyo-Garrigues and Canga Armayor, 2023). Additionally, it entails conveying information about the impact of social, economic, and environmental factors on health and addressing individual risk factors, behaviours, and involvement with the healthcare system (WHO, 2012; Pueyo-Garrigues and Canga Armayor, 2023).

Health education interventions can potentially prevent various health issues by educating individuals about risk factors and prevention methods (Sassen, 2017). Health education is an approach suggested to equip parents with the necessary information and skills to create safe environments for their children (Peden et al., 2009;

Kendrick et al., 2012). This approach aims to motivate caregivers to apply safety measures (Kendrick et al., 2012; Watson and Errington, 2016; Patel et al., 2017). Health education is one of the essential options for improving knowledge, attitudes, and behaviours (Sassen, 2017; Aupia, 2021). By providing individuals and communities with the necessary knowledge and skills to make informed decisions about their health, health education plays a critical role in promoting and ensuring the overall health and wellbeing of individuals and communities alike (McKenzie et al., 2022).

However, health education has marginal benefits when it is provided for low-risk groups and resources might be better spent on those with a high risk (Crouch et al., 2011). There are costs associated with health education interventions. The targeted approach ensures the judicious allocation of resources, theoretically maximising the impact of health education interventions. This approach increases the likelihood of resources being used efficiently, contributing to the effectiveness and longevity of health education initiatives. High-income countries such as the UK and the USA have some targeted programmes for communities with high social and educational needs and these have shown a demonstrable impact on rates of injury (Setien et al., 2014; Duffee et al., 2017; Patel et al., 2017; Taylor et al., 2023).

Health education for prevention of UCI can take place in the community, at PHCCs, or at home (Habermehl et al., 2019, Silva et al., 2016) and may involve individual, group, or online training sessions. Decisions on settings should be made based on the initial assessment of community needs which identify the population, objectives, and available resources (WHO, 2012).

1.7 The role of primary health care providers in unintentional injury prevention

Primary Health Care Providers (PHCPs) have a responsibility and pivotal role in helping to educate parents about UCI prevention (Patel et al., 2017). They also have more opportunities to meet with families in health centres when the latter visit for their child's immunisation (Buchan, 2016). PHCPs can play a role in helping parents to find appropriate learning resources and promote improvements in attitudes and behaviours relating to safety measures. WHO urged PHCPs to consider injury prevention promotion in child health programmes (Peden et al., 2009).

In Oman, child health promotion is one of the primary healthcare (PHC) priorities and currently focuses on immunisation and infant nutrition (Ministry of Health, 2024 [MOH]). There is no documented evidence indicating the inclusion of child safety education within this programme. The frequent occurrence of UCI necessitates examining opportunities to place child safety and UCI prevention among health education priorities for child wellness. In addition, a study of parents' practices regarding safety measures and the factors influencing these practices would provide information to HCPs to facilitate their understanding of health education needs in the Omani context. Health professionals have a considerable role in educating and raising caregiver awareness of child safety in the caregiver (Machin et al., 2018; McDonald et al., 2018; Hanna et al., 2022) through health education; a health promotion approach using different strategies and models can enhance knowledge and attitudes (Glanz et al., 2008; McKenzie et al., 2022).

However, Kemppainen et al. (2013) have highlighted that while nurses actively engage in health promotion activities and educate patients in relation to health behaviours, there are barriers related to organisational culture that hinder the effectiveness of health education. It is important to note that organisational factors can also impact health communication practices in PHC. Therefore, these factors should be considered when developing health education. Issues and obstacles such as poor teamwork, poor implementation of evidence-based practice, and the need to enhance healthcare providers' knowledge were reported in Gulf Cooperation Council (GCC) countries, (Al-Alawi et al., 2019).

There is also variability among HCPs in health promotion approaches due to a lack of training. A study conducted in Sweden by Mahmud et al. (2013) shows that there can be a lack of agreement among health professionals regarding health promotion approaches. This causes variations in health communication practices. One of the factors that contributes to these differences is that HCPs often rely on their personal opinions when providing health education (Tomlinson and Sainsbury, 2004). In a qualitative study conducted by Alrimawi et al. (2023) in Ramallah, Palestine, 24 primary healthcare professionals were interviewed and identified various challenges in preventing UCI, including limited training, workload, and poor teamwork. These challenges caused variations in HCP practices regarding safety education, where the majority depended on their own personal decisions.

1.8 Study context

The Sultanate of Oman is located on the southeast coast of the Arabian Peninsula and is one of the member states of the GCC (Figure 1-1), a council of six countries that

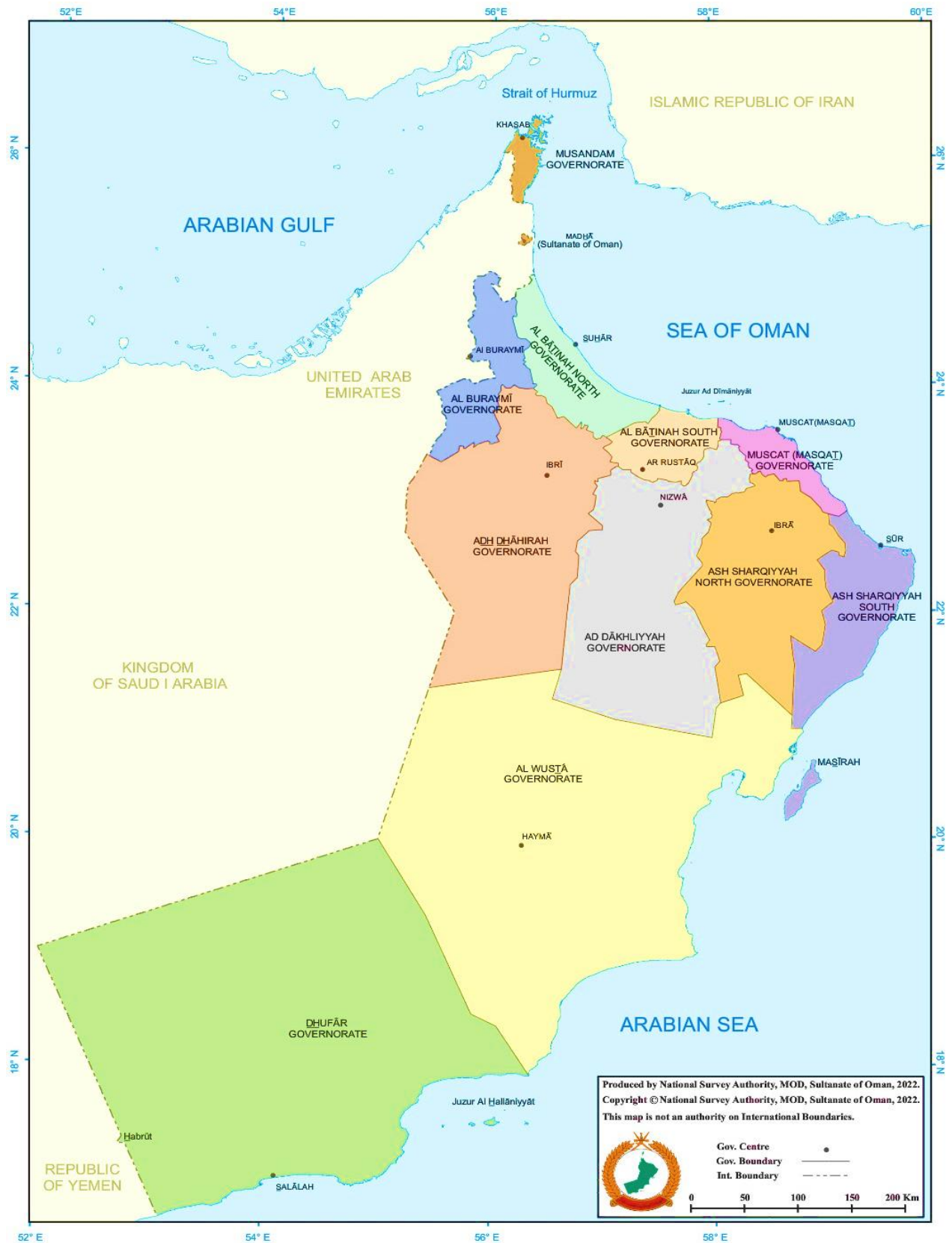


Figure 1-1: Map of Oman (Ministry of Education, 2024)

serves as a regional, intergovernmental, political, and economic entity. The six members of the GCC are Oman, Kuwait, the United Arab Emirates, the Kingdom of Saudi Arabia, Bahrain, and Qatar. Since the 20th century, the GCC countries' economies have experienced remarkable growth, which has improved health in the region significantly.

Oman has a border with the Kingdom of Saudi Arabia, the United Arab Emirates, and the Republic of Yemen. The country is classified as a high-income country with a gross domestic product per capita of 23,296.3 USD in 2023 (World Bank, 2024). Petroleum exports account for a significant proportion of the country's income. However, the government has been working to vary the economy and encourage tourism and farming as additional sources of income.

The Sultanate of Oman is known for its diverse cultural and linguistic background, which is largely attributed to its location on the Indian Ocean as well as the influx of migrants from the east coast of Africa, India, Pakistan, and other GCC countries. Arabic is the official language, but many other languages are spoken, including Swahili and Balochi. Most Omanis follow Islam as their religion. However, there is a significant proportion of the population who follow various other faiths. Despite this diversity, Omanis are committed to preserving their cultural identity and heritage. They are actively working towards the modernisation of their country, constructing modern cities and integrating technology. This balance between tradition and progress is a testament to the dynamic and inclusive nature of Omani society.

Oman has a varied geography featuring a high mountainous area, an extended coastal area, and a large desert. The country is divided into 11 governorates and 61 wilayat

(districts). The Sultanate of Oman is governed by a Sultan, who serves as the reigning monarch. The Sultan holds the highest executive authority and plays a pivotal role in the political and cultural affairs of the country. Oman has enjoyed remarkable political stability over the last five decades and maintains a neutral relationship with its neighbouring countries, fostering diplomatic ties and promoting regional harmony.

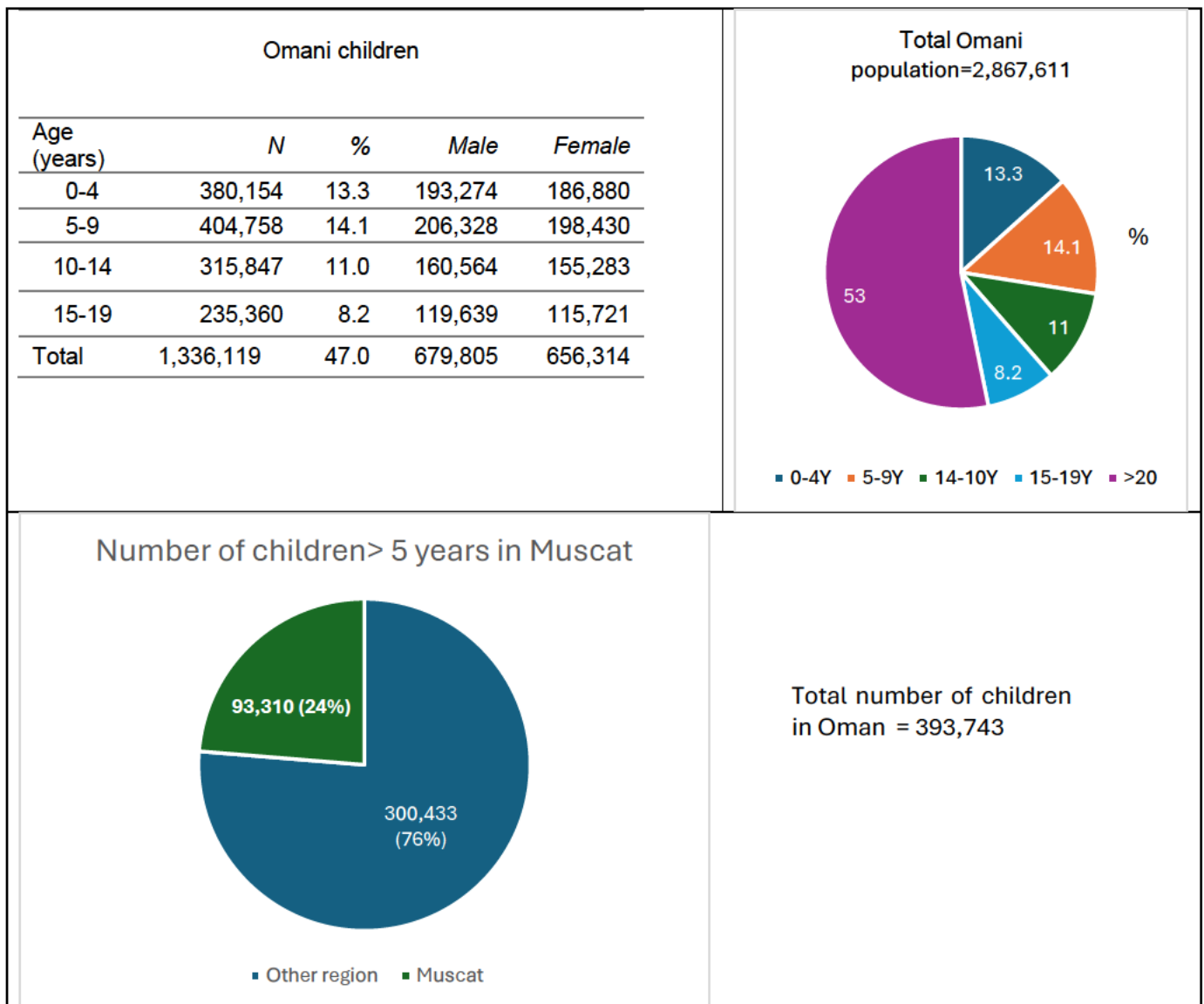
According to the latest census, Oman's population is four and a half million, and Omanis constitute 52 per cent of the total population (National Centre for Statistics and Information, 2022). Like many countries in the Gulf region, Oman has experienced an influx of migrant workers in the last five decades. These workers often come to work in the oil and gas industry, construction, logistics, and services. The high number of male migrant workers impacts the gender distribution reported in the census (Islam, 2020). Over two-thirds of all residents are concentrated in urban parts of the country, and about 29% of the population lives in Muscat.

The total number of children in Oman is 1,481,763, and 90% (1,336,119) are children of Omani parents. Children under 15 years of age constitute 38.4% of the population, while children under five constitute 13.3% of the population (Table 1-2) compared to 16.3% in 1995.

Muscat, the capital city of Oman and the central focus of our study, is situated along the coastline of the Arabian Peninsula (Figure 1-1). This city stands as a blend of tradition and modernity. The socio-economic status in Muscat exhibits significant variation, ranging from modern neighbourhoods to old and lower-income areas where residents encounter socio-economic challenges. Recognised for its notable advancements in healthcare services and socio-economic status while maintaining its

national and historical identity, Muscat provides a compelling setting for our research exploration. It consists of six wilayats (districts): Muscat, Muttrah, Al Amerat, Bawshar, Al Seeb and Qurayyat. Omani nationals constitute 42.2% of the Muscat population and there are approximately 95,079 children under five years of age in this city.

Table 1-2: Number of Omani children in age categories (National Centre for Statistics and Information, 2022)



1.9 Healthcare in Oman

The health service in Oman, established five decades ago in 1970, coincided with the era of the Omani renaissance with the leadership of his late majesty Sultan Qaboos (Al Salmi and Hannawi, 2018; Al Maqbali et al., 2019). Before that time, it lacked what is formally defined as a national healthcare system with the presence of a few missionary hospitals in the capital, Muscat (Al Dhawi et al., 2007; Alshishtawy, 2010). However, the Sultanate has paid a great deal of attention to the health sector over the past fifty years. The core health objective in the first three decades after 1970 was to employ different strategies to combat and eradicate communicable diseases that caused the death of hundreds of children (Department of Health Information and Statistics, 2022). These strategies were effective in eradicating communicable diseases with an immunisation programme. This has contributed to a large decline in childhood mortality caused by communicable diseases (Eltayib et al., 2023). In 1970, the infant mortality rate was recorded at 118 deaths per 1000 live births, whereas by 2021, this figure had dropped significantly to 8.1 infant deaths per 1000 live births (Islam, 2020; Eltayib et al., 2023). However, with modernisation and changes in lifestyle, other health issues emerged in the country, including non-communicable diseases and accidents (Mehmood et al., 2017).

Omani nationals and residents employed by the government have access to free universal healthcare provided by the Ministry of Health (MOH). There is an annual renewal fee for every individual of approximately 2 OMR (4 GBP) for healthcare registration and 0.2 OMR for each visit. Some categories are exempt from paying this registry fee, including use of emergency services, children under two years of age and

individuals receiving social benefits (MOH, 2023). Up to 45% of the population are non-Omani and work in the private sector. A mandatory health insurance system (Dhamani) was introduced in 2019 for private sector employees and non-Omani residents. Health insurance ensures individuals can access healthcare in private clinics and hospitals (Capital Market Authority, 2023).

The Directorate General of Health Affairs at the MOH is responsible for planning and implementing effective health policies within MOH institutions. The MOH manages healthcare in the Sultanate and provides funding and support for 90% of health services in the country. Funding is largely derived from oil and gas revenue. Some health services are managed and financed by other government agencies, such as the Armed Forces Hospital funded by the Ministry of Defence and Sultan Qaboos University Hospital, funded by the University Medical City, and there are private health institutions (Alshishtawy, 2010). Private hospitals and clinics accredited by the MOH operate in large cities and provide medical consultation and some aspects of specialised care. The private sector's contribution has increased recently, as evidenced by an increase in private health institutions. In 2010, there were seven private hospitals with 217 beds. Remarkably, by 2022, this number had surged to 35 hospitals, with a corresponding increase in hospital bed capacity up to 1519 beds (Department of Health Information and Statistics, 2022).

Health institutions in Oman are divided into primary, secondary, and tertiary levels (Figure 1-2). PHCCs are the first line to provide health services for outpatients, and in a secondary role are district hospitals that have facilities for inpatient care. Tertiary hospitals are referral hospitals that provide specialised healthcare.

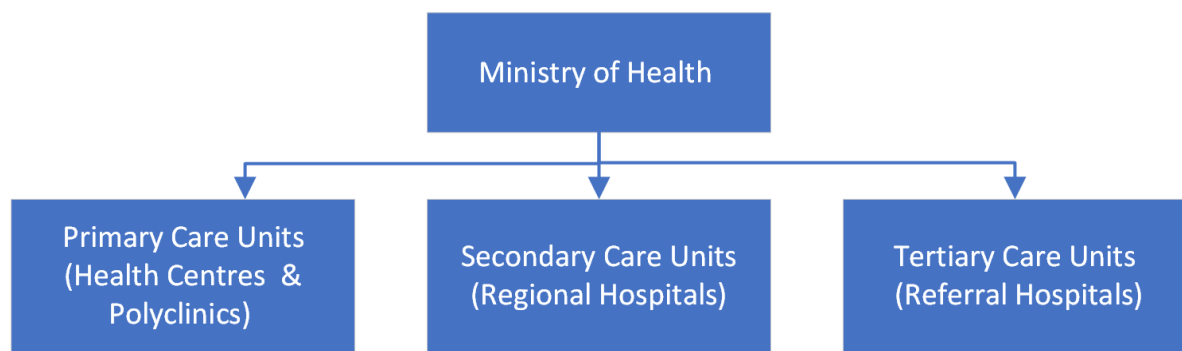


Figure 1-2: Healthcare institutions in the MOH, Oman

1.10 Primary healthcare in Oman

Primary Health Care Centres (PHCC) are the country's pillar of healthcare services in Oman. They play a leading role in carrying out many activities related to maternal health and childcare, treating non-communicable diseases, preventing diseases and promoting health (Al-Mahrezi and Al-Kiyumi, 2019). PHCCs were initially established in Oman to provide maternal care and child immunisation, but as the population's demands have grown, so has the function of the PHCC. Additionally, there has been an increased emphasis on non-communicable diseases (NCDs), which typically call for long-term care and monitoring. A comprehensive health service based on Primary Healthcare (PHC) and focused on curing, preventing, promoting, and rehabilitating are part of the national health policy (Alshishtawy, 2010). This system is akin to the PHC system in the UK, which is provided through the National Health Service (NHS), with general practitioners (GPs) serving as the first point of contact for healthcare needs. Both systems have similarities in diagnosing common illnesses, preventive care and referrals to specialists. However, the NHS is funded by taxation, and while most services are free at the point of use, some charges apply for certain services, with exemptions for specific groups (Roland et al., 2012).

The MOH places great importance on preventive care as a critical element of its primary health strategy. The focus is on promoting good health and preventing diseases through proactive measures such as regular screenings, vaccinations, and health education programmes. By prioritising early detection and intervention, Oman aims to reduce the incidence of chronic diseases and encourage healthier lifestyles among its citizens.

Over the last four decades, PHC extended to all regions in Oman. The total number of health centres in Oman is 206, and the number of general practitioners (GP) is 10.8 per 10,000 population (Department of Health Information and Statistics, 2022), most of whom are not qualified in family medicine. This ratio is less than the targeted ratio 3 qualified family physicians per 10 000 (Al-Mahrezi and Al-Kiyumi, 2019). The global GP ratio per population differs between developed and developing countries (Arya et al., 2017). For example, in the UK, the ratio is 32 per 10,000 population and services are provided through 6495 GP practices (Papanicolas et al., 2019).

PHCCs in Oman are strategically placed in urban and rural areas to ensure equitable access to healthcare services for all its citizens and residents (Al-Mahrezi and Al-Kiyumi, 2019). A team of healthcare professionals, including doctors, nurses, and allied health personnel staff these centres (Mohamed et al., 2018), which serve as the primary point of contact for individuals seeking medical assistance, offering a wide range of healthcare services to meet the community's diverse needs.

PHC in Oman has implemented a robust health informatics system, Al-Shifa HIS, that supports primary health services (Khan and Ismail, 2017). Al-Shifa HIS enables the efficient management of patient records and facilitates information sharing among

healthcare providers across all the MOH institutions with the aim of enhancing the overall quality of provided care. It helps to track health indicators, identify trends, and formulate evidence-based policies to address emerging health challenges. The six districts located in the Muscat Region include 35 health centres that have been strategically distributed across the various districts, ensuring widespread accessibility and comprehensive healthcare coverage for the community.

1.11 Child health in Oman

Child health in the Sultanate of Oman received recognition from the time of the establishment of the health system in the country in 1970. At that time, infectious diseases were the main cause of infant mortality. Public health offices were attached to all health institutions to immunise children and monitor their height, weight, and nutritional status. With the increase in the population and the need for primary health services, health centres were opened in all cities in Oman. Hence, the public health service was integrated with the PHC service.

The Department of Women and Child Health (DWCH) was established to provide accessible, equitable, and sustainable care to all mothers and children in order to ensure comprehensive health services to these vulnerable populations. The child health programmes in Oman are immunisation and the integrated early childhood development programme.

The MOH has implemented a robust immunisation programme that adheres to global standards. It aims to immunise children from infancy through to adolescence, safeguarding them from infectious diseases. In addition, the MOH actively promotes awareness campaigns to educate the community about the importance of

immunisation. The MOH has also implemented health initiatives to address child nutrition and early childhood development. Within this programme, steps were taken to promote breastfeeding by encouraging primigravida mothers to breastfeed their children. In addition, child growth and development are monitored for the first three years of life. The MOH places an emphasis on preventive healthcare and education (Alshishtawy, 2010), creating awareness among parents and caregivers about immunisation, nutrition, and other healthcare issues. It was within this preventive approach that the Management of Neonatal and Childhood Illness (IMCI) programme was implemented. This is a multidisciplinary program that involves training healthcare professionals with a focus on the enhancement of nutrition, immunisation and emergency care in PHC settings (Al Fannah, 2017). However, healthcare providers often need to be more responsive to the IMCI guidelines since they tend to rely on their own judgments and preferred approach to care (Al Fannah, 2017). Enforcement from government authorities is essential for the effective implementation of IMC (Al Araithi, 2017).

A child health booklet, commonly known in Oman as the Pink Card, is issued to all Oman-born children. This booklet serves as a core guideline for health promotion provided by the Ministry of Health (MOH) and includes the monitoring of child growth and development. A copy of the card is kept in the health centre where the child is registered for PHC and to refer to when following up. In comparison, other countries, such as the UK, have similar booklets but they are more comprehensive and offer more detailed information to parents.

After childbirth and before discharge to the home, nurses should provide health education that includes an immunisation schedule, feeding assessment, routine

checks, and preparation for the next visit in the following two weeks. Regular visits will continue in PHCCs for five years and most immunisations must be completed in the first 24 months. The child's health card has been updated twice to align with Omani children's growth and development needs. Prevention of child injury, one of the leading causes of mortality and morbidity in children, is included for discussion at every scheduled visit to the health centre for immunisation (Table 1-3). This is addressed along with other child health and developmental matters by a doctor or nurse. This raises concerns about its feasibility and effectiveness, considering parents' educational, social, and economic backgrounds.

Table 1-3: Child safety advice mentioned in the Pink Card for discussion with parents in PHCCs

Visit to PHCCs	Safety message in Pink Card to be given by HCPs	To be signed by
At 4 months (EPI nurse visit)	Never hold your baby while drinking hot liquid or cooking (p.7)	Nurse
At 6 months (doctor and EPI nurse visit)	Seat your baby in a car seat at the back of the car (p.9)	Doctor
At 9 months (EPI nurse visit)	Take measures to prevent accidents by placing barriers on staircases (p.11)	Nurse
At 12 months (doctor and EPI nurse visit)	Keep medicines and electric gadgets out of children's reach Keep the courtyard and the surroundings of your house clean Observe your child while feeding and playing to prevent choking (p.13)	Doctor
At 13 months (EPI nurse visit)	Ensure that the child is not exposed to substances containing lead, such as painted toys, old batteries, etc.	Nurse

Visit to PHCCs	Safety message in Pink Card to be given by HCPs	To be signed by
	Protect stairways with barriers to prevent falls and accidents; make barriers for ponds to prevent drowning (p.15)	

1.12 Unintentional child injury in Oman

In the Sultanate of Oman, UCI is one of the leading causes of childhood deaths, hospital visits and admissions (Mehmood et al., 2018; Al Rumhi et al., 2020). The total number of deaths due to injury to children under five years from 2019–2022 was 63 (1.6 per 10000 children > 5Y); 48 were dead on arrival at the hospital. Within the same period, 189 deaths were reported in the UK (0.5 per 10000 children > 5Y) (Williams et al., 2023).

The Annual Health Report by the MOH (Department of Health Information and Statistics, 2022) highlighted that 27.1% of the total morbidity due to injuries reported to MOH institutions was in those aged under ten years. Children under five experienced the highest incidence of injuries, accounting for 16.4%. Figure 1-3 shows the number of admission cases in 2021 for children due to external causes of ‘exposure to mechanical forces’, which includes objects falling onto the child and injuries due to fingers getting caught in doors or hinges. The figure also shows injuries related to slips or trips and contact with heat and hot surfaces. It compares the number between three age groups of children, indicating the highest number among children between the ages of one and four years.

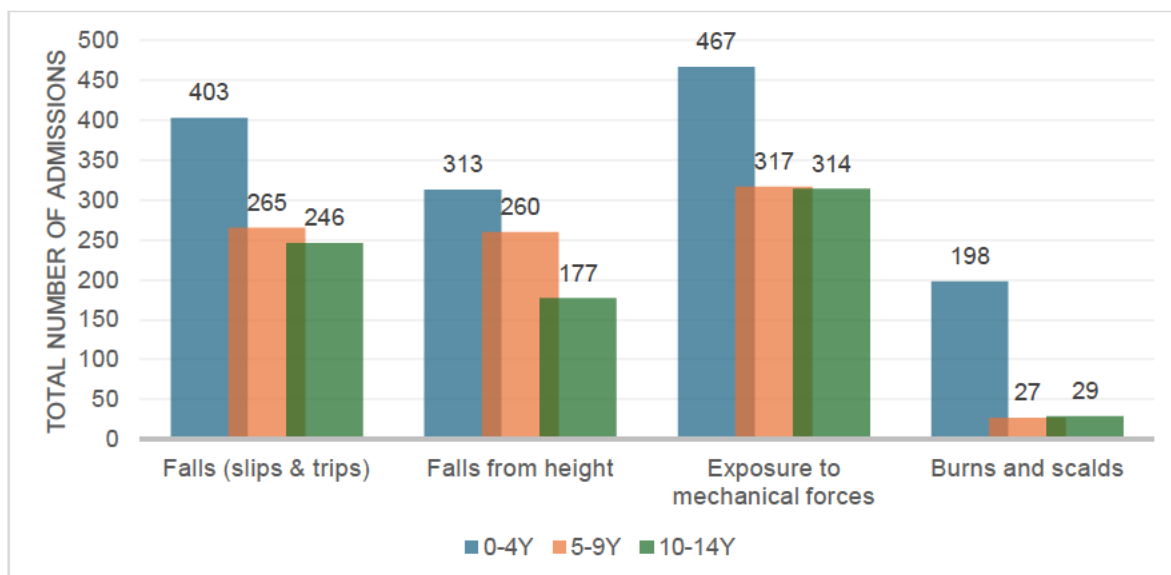


Figure 1-3: Four types of external causes of admission in three age groups in 2021 (data extracted from the Annual health report 2021) (Department of Health Information and Statistics, 2021)

The Annual Health Report published by the Omani MOH recorded 1347 hospital admissions among children under five due to UCI in 2018 (Department of Health Information and Statistics, 2018) and 1601 in 2021 (Department of Health Information and Statistics, 2021) showing an increase of 16%. Admissions due to trips and slips were reported to be the highest cause of hospital admissions, constituting 42% of total fall cases leading to hospital admissions in 2018. Notably, several hospital admissions related to falls were reported in the annual health report as ‘unspecified falls’ where n=209 cases needed hospital admission in 2021. Injuries related to exposure to mechanical forces – for example, collisions with playground equipment, being struck by a falling object and suffering an injury related to closing doors, such as finger injuries constituted the highest causes for outpatient visits (3393) and admissions (467) in 2021. The report showed that injuries due to exposure to mechanical forces were higher among children from birth to four years compared to other age categories.

Table 1-4 shows the number of outpatient visits and hospital stays for children under five for three different years. These numbers represent only cases in MOH institutions. Cases relating to private clinics or other government hospitals (e.g., military hospitals) are not available, this being indicative of a lack of national surveillance.

Overall, these figures indicate that the mortality and morbidity of UCI among children under five in Oman is likely to be high, resulting in a burden on the MOH. This underscores the importance of targeted interventions such as public health awareness campaigns and educational programmes for parents.

Table 1-4: Outpatient* visits and hospital admissions of children under five years due to an external cause in 2013, 2018 and 2021

External causes of morbidity	2013			2018			2021		
	*Outpatient	Admission	Death	Outpatient	Admission	Death	Outpatient	Admission	Death
Falls (trips and slips)	5548	141		7202	461	1	4936	403	
Falls from heights	2340	126		1960	8		23	313	
Unspecified falls	11436	479		7260	357		3540	209	1
Exposure to mechanical forces	4312	318		4003	580	1	3393	467	1
Contact with heat and hot surfaces	884	147	2	1065	278	1	849	198	
Poisoning	273	191		209	2	1	263	197	
Submersion	43	12	1	27	19		24	23	
Death on arrival to hospital (causes other than falls)			12			12			2

*Outpatient refers to a patient receiving medical treatment or care without being admitted to a hospital (*Data extracted from Annual Health Report 2013, 2018, 2021) (Department of Health Information and Statistics, 2018, Department of Health Information and Statistics, 2021, Department of Health Information and Statistics, 2013)

1.13 Studies conducted in Oman

There are four hospital-based studies providing figures for child injuries in Oman (Al-Balushi et al., 2012; Al-Shaqsi et al., 2016; Mehmood et al., 2018; Al Rumhi et al., 2020). Only two studies were undertaken in a paediatric population (Mehmood et al., 2018; Al Rumhi et al., 2020). The other two studies looked at injuries and trauma in Oman across all ages and involved information about child injuries (Al-Balushi et al., 2012; Al-Shaqsi et al., 2016; Mehmood et al., 2018; Al Rumhi et al., 2020). These studies provide background information about the size of the problem in Oman. All four studies were cross-sectional prevalence studies. It was not possible to infer causal relationships between variables as only limited information about causal factors and prevention interventions was available. However, the studies establish the need to raise awareness about prevention.

The studies were conducted in selected hospitals (the majority in Muscat) and relied on information from the hospital registry. While they provide insights into the prevalence of UCI, it is important to note their limitations. The selected hospital setting may introduce selection bias, limiting generalisability to the broader population or other healthcare settings. Moreover, reliance on hospital records raises concerns about data accuracy and completeness. Consequently, caution is advised when interpreting the findings, and further research with diverse samples and longitudinal designs would provide a greater understanding of the prevalence of UCI. These papers did not provide information regarding the deaths that occurred before arrival at the healthcare facilities. Therefore, the analysis focuses specifically on injuries and traumas that resulted in patients seeking medical attention at the healthcare facilities included in the

study. These studies give background information that highlights UCI as a significant cause of child morbidity and mortality. Therefore, they justify enhancing UCI preventive approaches within the Omani context by identifying factors, practices, and preventive approaches.

Al Rumhi et al. (2020) conducted a registry-based retrospective study to identify the prevalence, cause, severity, and outcome of UCI. This was undertaken in a large multispecialty tertiary educational hospital in Muscat, Oman over a six-month period. The study participants were children under 18 years of age who visited the emergency department with home accidents. A checklist was used to collect data from hospital records regarding the type of accident, cause, severity, and outcome. The findings showed that 7.7% of all children who visited the Emergency Unit arrived with a complaint of injury. The ratio of injured males was higher than females (1.7:1), which is similar to other international studies (Soori and Khodakarim, 2016; Bhuvaneswari et al., 2018). Injuries were highest in children between one and three years (27.8%) followed by children three to six years of age (24.8%). Falling (it is not clear if it was a fall from a height or a slip) was the most common cause of non-fatal injury (53%). Severe injuries included head injuries, burns, fractures, poisoning, and suffocation or choking. Of all the head injuries, 36% were diagnosed as severe. A head injury refers to trauma or damage to the head, including the scalp, skull, or brain, with varying severity levels, from mild injuries such as a concussion to more severe cases involving significant brain damage. A relatively small proportion (5.4%) of the injured children were admitted to the hospital for between two and eleven days.

Another registry-based retrospective study was conducted by Mehmood et al. (2018) in two tertiary hospitals (Khawla and Nizwa) to describe the epidemiology and risk

factors of child injury in Oman. The data collection methods – a checklist and a duration of six months – were similar to the methods used by Al Rumhi et al. (2020). Data including the socio-demographic details, education level, external cause of injury, health assessment and management was collected. The study revealed that of the children under 15 years admitted to hospitals for injuries, 59% (473) were under the age of five and 66% of admitted children were male. Child injuries constituted 30% (n=795) of injury cases across all ages admitted to the hospitals. Two-thirds occurred due to injuries at home (74.7%, n=593), and the rest happened in other places such as streets, farms, and schools. Exposure to mechanical forces such as a closing door (20.1%, n= 160), falls (mechanism not specified) (11.1%, n=88), and burns (9.2%, n=73) were the most common home injuries, which is similar to the observations in the Annual Health Report, highlighting the need to explore causal factors and preventive measures. Burns were the third leading cause of injury among girls. The study also looked at the outcomes, which identified head injury due to a fall as the most common anatomical injury, followed by upper extremities injury caused by exposure to a mechanical force. These findings are similar to Al Rumhi et al. (2020), which indicated that head injury was the most serious injury complication requiring hospitalisation. More than 40% required surgery; this could be because Khawla Hospital, one of the study's hospitals, is a referral trauma hospital, and most of the cases from all over the country were referred to this hospital for surgical management.

Al-Balushi et al. (2012) conducted a cross-sectional study to analyse the injury profile (rate, type, and causes) in one PHCC in Muscat, Oman. The findings showed that children under 12 years constituted 41.7% of the total injuries presented to the health centre, with 42% of injuries occurring at home. Falls in children under 12 were the most

common injury cases seen in the health centre, which constituted 20% (n=414) of the total falls in children and adults. The mechanism of the falls was not mentioned in the paper. The study by Al-Shaqsi et al. (2016) explored the epidemiology of burns in Oman and included all the burns cases from four tertiary burns units in Oman. It showed that children under five were the most affected category (67% n=79) of all those admitted with burns in Oman. Moreover, the average stay in the hospital declined from 25 to 15 days in 2010 due to changes in the protocol of treatment and admission.

Overall, the studies conducted in Oman indicated that injury is prevalent among Omani children and the highest injury rate is among children under five. However, all the studies focused on prevalence, and a dearth of studies looked at injury prevention or safety promotion. The high prevalence of UCI in Oman highlights the need for effective interventions to address this issue. One possible intervention could be to provide health education that empowers Omani caregivers to be more active in protecting their children from injuries. They can be empowered to enhance their use of safety measures such as adequate supervision. This could potentially lead to a reduction in the incidence of child injury and promote child safety in Oman.

1.14 Reflection on the researcher's interest

My interest in child safety and the prevention of child injuries has developed throughout my career as a paediatric nurse. I worked for ten years in a tertiary trauma hospital in Muscat, Oman and spent time caring for trauma children and their families in the emergency room, burns unit, neurology ward and intensive care unit (ICU). This experience allowed me to understand the impact of these incidents on the child and family and health services.

I developed a sense of professional and social responsibility to prevent the recurrence of these injuries by identifying available opportunities to educate the community about preventive measures. In my view, primary prevention is the most effective way to address health issues such as injuries. Oman's child health programme offers a health promotion activity through local health centres all over the country, and this provides an ideal platform to promote child safety.

Given my commitment to this cause, it is important for me to raise awareness about child safety in the community. I believe that by educating parents, caregivers, and other stakeholders about the risks associated with UCI, it is possible to create a safer environment for children. Ultimately, my goal is to make a meaningful contribution to this important issue and help ensure that children in Oman can grow up healthily and happily and be protected from preventable injuries.

1.15 Research aims and objectives

1.15.1 Aim

The aim of the study is to explore the needs, challenges, and opportunities to enhance parents/caregivers' awareness and practices in relation to unintentional child injury prevention at home in Muscat, Oman.

1.15.2 Objectives

1. To identify appropriate health education strategies to promote child safety practices within the Omani context through a systematic review, survey of caregivers and interviews with healthcare professionals.

2. To explore Omani caregivers' knowledge, practice and attitudes towards preventing unintentional child injury through a survey.
3. To identify factors that influence Omani caregivers' practice of considering child safety measures in their homes through a survey.
4. To explore the perceptions of HCPs regarding how parents prevented and managed UCI by interview.
5. To identify through interviews opportunities and challenges for considering child safety education within the priorities of child health programmes in Oman from HCPs perspective.
6. To provide recommendations for MOH, Oman for enhancing child safety education in primary healthcare based on the identified opportunities, challenges, and influencing factors, integrating the perspectives of healthcare providers and parents through integration and interpretation of the study findings.

1.16 Research methods

This study employed mixed methods and was conducted in two phases. The first phase was a systematic review which looked at the potential of health education to change caregiver knowledge, attitudes, and behaviours towards child safety practice. It also explored health education methods that can be employed to make effective changes in caregiver practice. Cochrane guidelines were employed to structure the review. The second phase was mixed methods research guided by the socioecological model (SEM) (McLeroy et al., 1988). The first part of this was a quantitative survey to

assess caregiver practice regarding safety measures, and the second part was a qualitative interview with HCPs about child safety education in primary healthcare.

1.17 Structure of the thesis

The thesis comprises seven chapters: Introduction and background, Systematic review, Methodology, Methods, Findings, Discussion, and Conclusion (Figure 1-4). The following sections outline the focus of each chapter.

Chapter 1 introduces the research problem and provides a justification for the study. It looks at the prevalence of injury and its impact on society, as well as defining injury for the purpose of this project. The aim of this study is to provide a better understanding of the context within which these injuries occur and to justify the need for further research in this area.

Chapter 2 presents a systematic review of the effectiveness of health education for parents. My focus is on how this education can modify their knowledge, attitudes, and behaviours towards child safety. Additionally, I consider the methods used to increase community awareness of health-related issues. The findings of this review are revealing and shed light on the importance of health education in promoting the practice of safety measures.

Chapter 3 begins with a discussion grounded in the theoretical framework adapted to address the research question. The socioecological (SEM) model (McLeroy et al., 1988) was used in shaping the research methodology in this thesis. Pragmatism was the paradigm adopted to investigate UCI prevention from various perspectives and in a flexible manner. This choice provides a foundation for understanding the study's

theoretical and methodological framework while offering insights into the researcher's journey. Additionally, as the researcher, I reflect in this chapter on my research journey during this PhD study.

Chapter 4 provides a discussion about the choice of the mixed-methods research design employed to address the research questions. It starts with a discussion concerning the quantitative part and is followed by the qualitative section. Each part examines the sampling strategy, sample size determination and the recruitment process. Additionally, this chapter details the data collection methods used while addressing ethical considerations, including participant anonymity and informed consent procedures.

Chapter 5 presents the findings from the survey and the semi-structured interviews. This chapter includes three sections. First section 5.1 presents the findings from the caregivers' survey, including respondents' socio-demographics, household characteristics, history of injuries, supervision, hospital visits, perception of preventability, safety practices, and sources of child safety knowledge. The findings are presented according to SEM levels. Responses to open-ended questions were also presented and aligned with relevant variables addressed by closed-ended responses. The second section, 5.2, presents the findings from the semi-structured interviews with healthcare professionals, which were organised first by presenting the participants' demographic data, followed by the themes and subthemes presented according to SEM five levels and supported by relevant quotes. Finally, in section 5.3, the survey and interview findings are integrated and presented in a table, facilitating a holistic understanding of the research findings.

Chapter 6 presents a discussion of the findings from the study, considering both the literature and the Omani context. It provides a concise analysis highlighting the relevance of the findings within the specific Omani context, contributing to a deeper understanding of the subject matter. The chapter concludes by highlighting the study's limitations and delving into the practical and research implications of the revealed insights. By addressing these limitations and elucidating the broader applications of the findings, the chapter aims to contribute valuable knowledge to both academic and practical realms, bridging the gap between theory and application.

Chapter 7 concludes the thesis, summarising key recommendations for future research and practice improvement. It addresses explicitly enhancing injury prevention approaches within the Omani context and provides actionable insights to contribute to ongoing efforts in this domain.

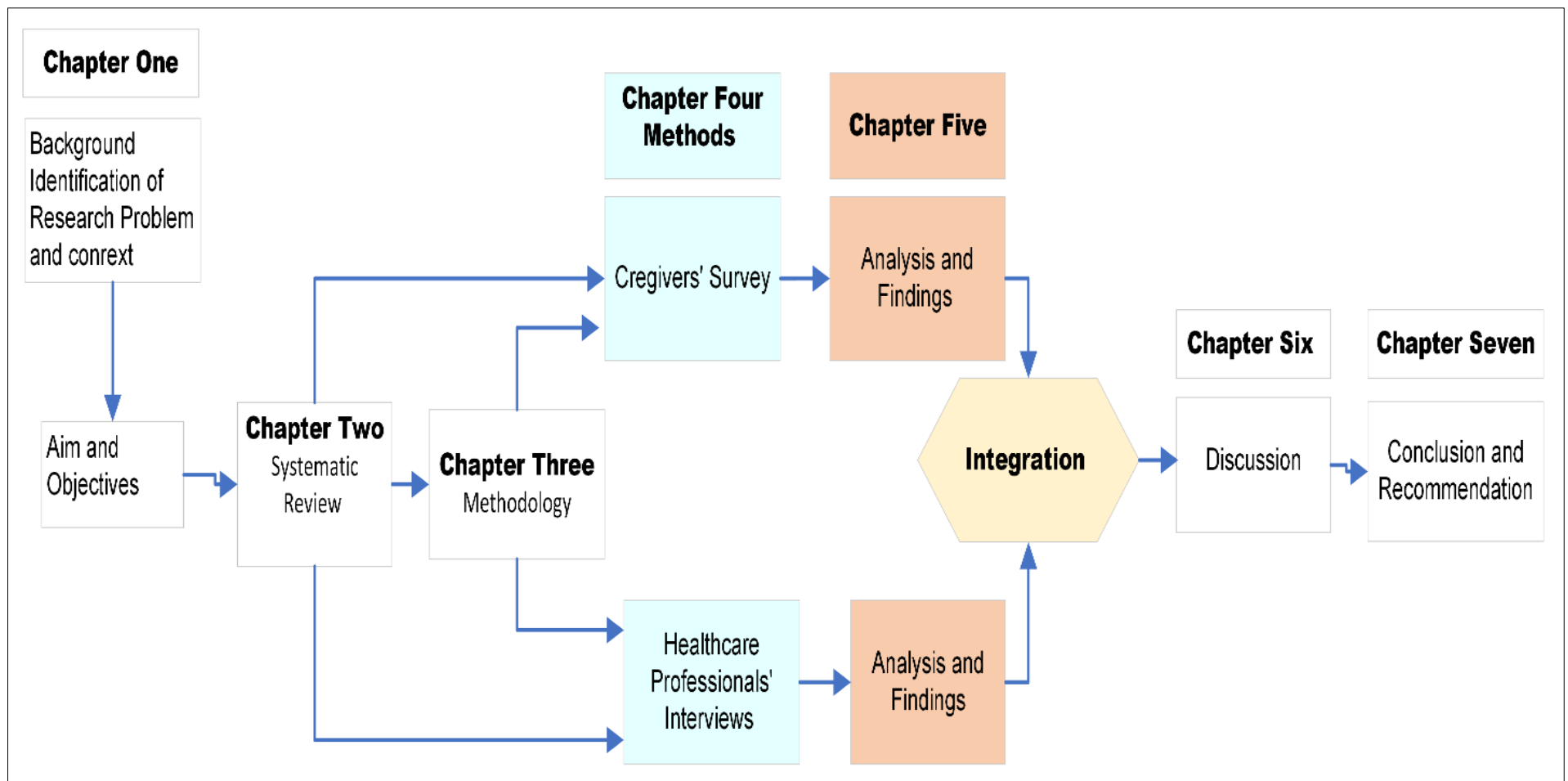


Figure 1-4: Thesis structure

1.18 Significance of the study

The significance of this study lies in its potential to inform, improve, and enhance interventions that can effectively prevent UCI among children in Oman. Given the high prevalence of UCI in Oman and the associated burden, it is essential to identify and develop constructive interventions that can address this issue effectively. Through an in-depth exploration of the needs, opportunities, and challenges of child safety education, this study can provide valuable insights into the feasibility of conducting child safety education in PHCCs across Oman. Furthermore, by utilising the socioecological model (SEM) to better understand the various factors that influence caregivers' practice of safety measures, this study can serve as a valuable resource for future research in this area. Additionally, it can contribute to the existing literature on injury prevention in the context of Oman, providing an even greater understanding of the challenges and opportunities involved in creating effective interventions that can save the lives of young children.

1.19 Summary

This chapter has set the foundation for this thesis by providing an introduction to the current study research context, the researcher's rationale and motivation, and the subsequent chapters of the thesis. Unintentional child accidents and subsequent injuries are introduced as a disturbing public issue worldwide. The factors contributing to injury in early childhood are presented, together with approaches to injury prevention. The factors emerging from the international literature involve interrelated socio-economic, environmental, and behavioural factors. Unintentional child injury can be prevented using multilevel interventions, such as including child supervision and

the adoption of a safe home environment by the family. An overview of Oman and the health system was presented, which shows injuries in children under five to be one of the most common causes of child mortality and morbidity in Oman. Time and resources are needed for treatment and rehabilitation, which places a social and economic burden on the family and healthcare services. The majority of UCIs among young children occur at or close to home as children spend most of their time there. However, studies concerning contributing factors and targeted interventions in Oman, indicate a need to explore the problem within the Omani context further.

Chapter 2 Systematic Review

2.1 Introduction

This chapter presents the literature review, providing a foundation for the subsequent chapters. It presents a systematic review of methods and findings that explore the methods and approaches used within unintentional child injury prevention (UCI) health education. It also evaluates the impact of these methods on enhancing caregivers' knowledge, attitudes, and behaviours towards adopting safety practices. Parts of this review have already been published (Al Mushaikh et al., 2022, Appendix A)0. The chapter begins with an introduction, providing background information about the focus of the review and highlighting the existing gaps within current practices. It is then followed by a description of the methods employed in the study which used PRISMA guidelines including review aim and objectives, search strategy, data extraction, risk of bias, and results. Finally, the chapter presents the findings and discusses the limitations of the review.

2.2 Background

The previous chapter addressed the significant issue of unintentional injury in children under five years old on a global scale. It explored the specific characteristics and challenges parents and families face, both globally and within the local context of Oman. Children in this age group are vulnerable due to their developmental stage, limited motor skills, and a lack of understanding of potential dangers. Creation of a safe home environment and adequate supervision are key interventions to minimise the risk of sustaining injury. As mentioned in Chapter one, educational interventions for parents

and families have emerged as pivotal. They play a crucial role in the multifaceted approach to enhance parents' practice of child supervision and environment modification (Peden et al., 2009; Patel et al., 2017).

Notably, countries like the UK, USA and European countries have devised extensive educational initiatives and programmes to address this matter and to empower parents to take a more active role in their child's safety (Kendrick et al., 2017; Center for Disease Control, 2021; Jullien, 2021). The studies discussed in the section 1.13 recommended for a safety education programme to raise awareness of UCI prevention (Mehmood et al., 2018; Al Rumhi et al., 2020). However, there is limited research evidence about child safety education in Oman.

Context-related educational initiatives that respond to Omani community needs should be identified to guide focused decisions and interventions. Healthcare providers need evidence that evaluates the different approaches so that they can choose suitable methods for their context. Understanding the diverse methods that can be employed in delivering health education interventions is vital for optimising their effectiveness. The spectrum of delivery strategies is vast, from traditional education methods to innovative technology-driven approaches. The various modalities used in health education interventions, including their strengths, limitations, and potential for scalability need to be explored to identify evidence-based health initiatives.

This review provided valuable insight in identifying different approaches and challenges that may limit the success of educational initiatives. The findings were valuable for contextualising this research project's findings and providing insightful recommendations for further action. This review served as a comprehensive

investigation into the strategies used to deliver child safety messages and the effectiveness of health education in enhancing child safety knowledge, attitudes, and practice.

2.3 Review aim

By consolidating and critically appraising existing evidence, the aim of this review is twofold:

- 1) To identify the effect of health education in modifying parental knowledge, attitudes, and behaviour relating to safety measures and child injury prevention.
- 2) To examine the methods used to undertake and evaluate health education, including frameworks, settings, length of the intervention, tools, and assessments.

Expressed using the PICO framework:

Population: Parents/caregivers of children under six years of age

Intervention: Educational intervention targeting parents and family

Comparison: No intervention

Outcome: Enhancement in knowledge, attitudes and practice in preventing UCIs and reduction in the number UCIs.

Combining these two aims provided a comprehensive view that enables both a thorough study of the many types of interventions used in the reviewed studies and an assessment of the interventions' efficacy. The findings of the review provided a fundamental basis for the project as they clarified questions regarding the efficacy of health education as an intervention and provided evidence supporting context-related

educational programmes for child safety and injury prevention by healthcare practitioners.

2.3.1 Review questions

- 1) Is health education an effective intervention to enhance and modify carers' knowledge, attitudes, and behaviours towards UCI prevention measures?
- 2) What methods of evaluation are being used to determine the effectiveness of health education to enhance caregivers' attitudes and behaviours?
- 3) What health education methods are being used to educate parents and carers about the prevention of UCI?
- 4) How do these methods and approaches impact the outcomes of child injury prevention programmes?
- 5) What are the challenges that affect the positive outcome of health education?

2.4 Methods

2.4.1 Design

Opting for a systematic review as the approach to investigate the impact of health education on caregivers' knowledge, attitudes, and behaviour is a practical choice with various compelling advantages. Systematic reviews are characterised by a rigorous and transparent approach that ensures a comprehensive and unbiased synthesis of existing evidence (Egger et al., 2022). Given the importance of health education in influencing parental knowledge, attitudes, and behaviour, a systematic review offers the ability to systematically identify, assess, and consolidate a wide range of relevant studies within the focus of the aim of the review (Zipkin, 2023). This approach

minimises the risk of selection bias and enhances the reliability of the findings, making them more robust and generalisable (Boutron et al., 2019).

In addition, this systematic review provides an ideal platform not only to assess effectiveness but also to consider the various educational approaches and methods utilised in its delivery. By systematically collecting and analysing data from studies that investigate different educational approaches and methods, this review can illuminate which strategies are most effective in enhancing parental outcomes. This approach allows for the identification of best practices and the synthesis of evidence-based recommendations (Portney, 2020) that can guide future health education programmes. Furthermore, the systematic review's structured methodology ensures the critical evaluation of study quality, ensuring that conclusions regarding educational strategies are grounded in solid empirical research.

A systematic review provides a structured framework for addressing specific research questions, enabling a clear and objective assessment of the effectiveness of health education interventions on parents. It offers a systematic and replicable methodology for searching and selecting relevant studies, critically appraising their quality, and synthesising the results, thereby reducing the potential for researcher bias. Therefore, by adopting a systematic review approach, the study will contribute to the existing body of knowledge by providing a comprehensive and evidence-based understanding of how health education impacts parents' knowledge, attitudes, and behaviour. This rigorous methodology not only enhances the credibility of the research but also facilitates evidence-based decision-making in healthcare and policy settings related to the recommendations and implementation of education programmes. Ultimately, a

systematic review is an invaluable tool for advancing the understanding of the subject matter and informing strategies to improve parental health education programmes.

2.4.2 Review process

The review was reported according to the PRISMA guidelines (Page et al., 2021) and conducted according to the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins et al., 2008). The protocol was registered in the International Prospective Register of Systematic Reviews (PROSPERO 2020 CRD42020200183). The PRISMA checklist, consisting of 27 items, guaranteed transparency and thoroughness in structuring and reporting the process of the systematic review. PRISMA guidelines are widely adopted in the field of systematic reviews and meta-analyses. They help to enhance the transparency and rigour of the review synthesis. The guidelines encompass various aspects of the review process, from defining the research question and search strategy to data extraction and synthesis. By adhering to PRISMA guidelines, researchers ensure that their systematic reviews are conducted with methodological rigour, making the findings more reliable and informative for decision-makers. The PRISMA guidelines have become a cornerstone for evidence-based research, fostering the highest standards in conducting and disseminating systematic reviews across disciplines.

2.4.3 Information sources

An initial search was conducted to identify relevant keywords using various methods such as indexed terms, text words, and controlled vocabularies in each database. For instance, Medical Subject Headings (MeSH) were employed in MEDLINE and Cochrane, while a subject heading for CINAHL was utilised. A systematic search was

undertaken in September 2020 and updated in June 2022 and January 2023 using CINAHL Plus, MEDLINE (Ovid), Cochrane Library, PsycINFO (Ovid), ProQuest Central, ERIC, SCOPUS and Embase (Ovid). Furthermore, the reference lists of all eligible papers were manually examined to identify additional research reports of relevance. Various search operators were employed to broaden the search scope, including truncation, stemming, wildcards, exact phrase searching, and word adjacency proximity strategies. Keywords were combined or excluded for advanced search using Boolean operators such as 'and', 'or', and 'not'. An example search was undertaken in Medline (Ovid) and is presented in Table 2-1.

Table 2-1: Example search using Medline (OVID)

Medline (OVID) search terms:

1. unintentional, child, injury/
 2. unintentional, child, accidents/
 3. unintentional, child, home injury/
 4. "unintentional child injury"
 5. "child home accidents"
 6. "child home injury"
 7. (unintentional adj3 child injur*).ab,ti
 8. (unintentional adj4 child injur*).ab,ti.
 9. (unintentional adj5 child injur*) ab,ti.
 10. (child adj3 accident*).ab,ti.
 11. (child adj4 accident*) ab,ti.
 12. (child adj5 accident*) ab,ti.
 13. injury or unintentional injury or domestic injury or home injury or home o accident or trauma or preventable injury.
 14. injur* or unintentional injur* or domestic injur* or home injury* or home accident* or trauma or preventable injur*
 15. children or pediatric or child or childhood
 16. child* or p?diatric
 17. "health education"
 18. (heath adj3 education).ab, ti
 19. (health adj4 education).ab,ti.
 20. health education or heath awareness or health teaching or child safety education
 21. 1or 2 or 3 &15 & 19.
 22. 5 or 6 & 17
 - 23.17 &18
 24. 13&16&19
-

In a systematic review, the inclusion criteria play a key role in determining which studies can be included, thus shaping the review’s scope, and ensuring its quality. They act as an essential filter, ensuring that only the most relevant and high-quality research is considered for analysis (Egger et al., 2022). Inclusion criteria were established by specifying the key attributes aligned with the review question, such as study designs, populations, interventions, outcomes, and time frames, which should align with the systematic review’s research question and objectives. The criteria for selecting studies to include in this review are described in Table 2-2.

Table 2-2: Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
<i>Population:</i> Children under six years of age to ensure relevance to review question. <i>Intervention:</i> Strategies addressing unintentional injury prevention through health education. <i>Outcomes:</i> Studies reporting the impact of health education on enhancing parents’ knowledge, attitudes, and practice of safety measures. Inclusion of randomised and non-randomised interventional studies. Published after 2010 to ensure inclusion of recent research to ensure up-to-date evaluation.	Non-interventional studies. Research not centred on children from birth to six years. Research unrelated to health education or unintentional child injury, safety practice Incomplete texts to ensure integrity and rigour. Not in English or Arabic as they are beyond the reviewer’s language capability

The criteria were selected to specifically focus on interventions relevant to parents or caregivers of children under five. The aim is to avoid the influence of additional factors that could have confounded the results and made them less relevant to the targeted population. However, it must be considered that the decision on identifying eligible

criteria may involve a degree of subjectivity (Egger et al., 2022), and therefore the screening process was done by two observers to enhance objectivity and minimise potential bias.

2.4.4 Assessment of risk of bias

Assessment of the methodological quality of eligible studies is crucial as it ensures the reliability of the evidence, underpinning the robustness and validity of any research findings or conclusions (Egger et al., 2022). The methodological quality of the studies was determined by evaluating the bias risk for each study, which involves evaluation of rigour and methodological quality. Bias refers to a discrepancy in truth, outcomes, or deductions that can impact the internal validity by either underestimating or overestimating the effect (Whiting et al., 2017; Boutron et al., 2019; Zipkin, 2023). By assessing risk of bias involving randomisation, blinding, sample size, data analysis and selective reporting, study reliability can be determined (Viswanathan et al., 2018). The Risk Of Bias In Non-randomized Studies (ROBINS-I) tool was used for non-randomised studies of interventions (Sterne et al., 2016) and the Risk of Bias (RoB2) tool for randomised studies was used to appraise the level of bias (low-medium-high) as they are rigorous tools. Each study was assessed independently by myself and BD (a fellow doctoral student) for risk of bias using ROBINS-I and RoB2. The results of assessment from the two reviewers were collated and discussion was used to achieve consensus. Additional reviewers (JT & AS, doctoral supervisors) were available to mediate should consensus not be achieved but this was not needed.

2.4.5 Data extraction

Data extraction is a vital step in systematic reviews where key information from selected studies is systematically extracted following predefined criteria to address the review question and objectives (Boland et al., 2017). The Cochrane data collection tool (Li et al., 2019) was utilised to collect data from the studies meeting inclusion criteria. The tool ensures standardised and comprehensive extraction of relevant study characteristics and outcomes. An Excel spreadsheet (Microsoft Corporation, 2021) was used to record and organise the extracted data. The data extraction form included two parts: first, the study information necessary to document the study's eligibility for inclusion; second, to collect details about the type of evidence, researchers, study purposes, design, participants, settings, context, interventions, outcome measures, outcomes, and results.

2.4.6 Data synthesis

There was heterogeneity in the outcome measures used in the studies that prevented meta-analysis. Therefore, analysis and synthesis were undertaken and reported following the Synthesis Without Meta-analysis (SWiM) reporting guidelines (Campbell et al., 2020). This guidance has been developed to provide a robust reporting method for synthesis when meta-analysis is not possible and can be used as an extension to PRISMA. This method incorporates nine reporting elements to ensure that authors adequately explain the rationale for grouping studies, the selection of a standardised metric, and the implementation of transformation methods. It also requires a clear description of synthesis methods, prioritisation of studies in generating results and drawing conclusions, exploration of heterogeneity, assessment of the certainty of

findings, explanation of data presentation methods, and comprehensive reporting of results and limitations (Campbell et al., 2020; Egger et al., 2022).

In the review, the analysis was organised by categorising different aspects: the approach used for delivering health education, the application of health psychology models, and the outcomes related to knowledge, attitudes, and behaviour as defined by the authors. Means and standard deviations were extracted when possible. In one case the overall mean and standard deviation for knowledge, attitudes, and behaviours were created from the individual items reported in the results (Ihalahewage et al., 2018) using Excel (Microsoft Corporation, 2021). The percentage change in knowledge, attitude, and behaviours using the formula $[(\text{post-measure} - \text{pre-measure}) / \text{pre-measure}] * 100$ was also calculated. The findings for the outcomes of knowledge, attitude and behaviours for each study were tabulated and then presented as a narrative summary and identification of notable examples such as the greatest and least change that happened. These results are considered in terms of the approach to the development of the intervention, the method of delivery of the intervention and the context including cultural factors.

2.5 Results

Four hundred and fifty-four research papers were retrieved (Figure 2-1) and exported to reference management software (EndnoteTM 20, Clarivate), where 77 duplicates were removed. A total of 377 papers were exported for inclusion–exclusion screenings to the Rayyan online systematic review platform (Ouzzani et al., 2016). Two reviewers (MJ/BD) independently screened the papers by title and abstract, which resulted in identification of 28 papers. Full-text screening led to a final total of 12 articles in the

first search in 2020 and an additional two studies added in 2023. Scrutiny of reference lists identified a further three papers. The total number of studies included in the analysis was 17.

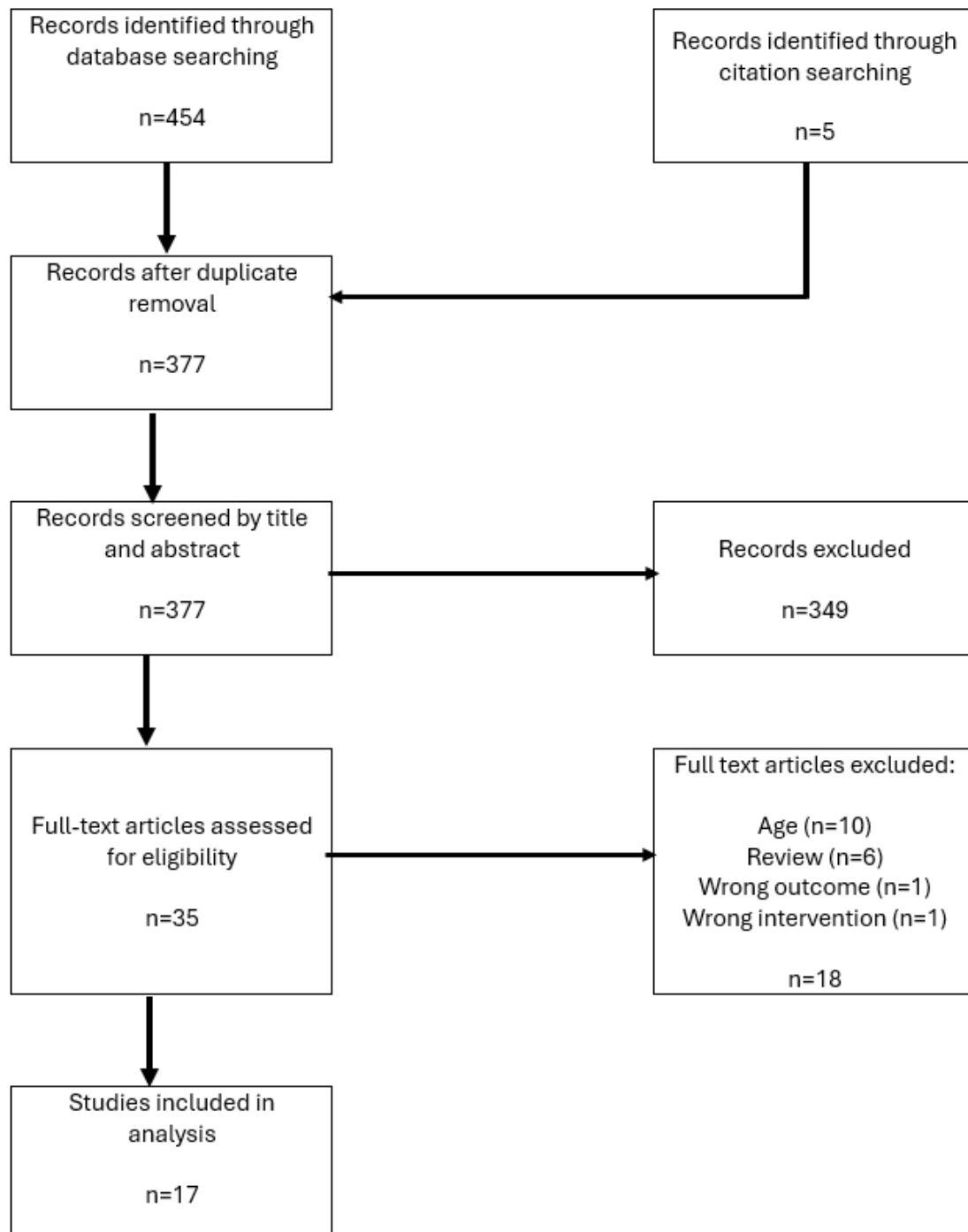


Figure 2-1: Prisma flowchart of search process (Page et al., 2021)

All papers were published in English between 2010 and 2022 (Table 2-3) and the studies were conducted in Iran (n=5), the United States of America (n=3), Turkey (n=1), Egypt (n=1), Sri Lanka (n=1), Brazil (n=1), Pakistan (n=2), China (n=2) and Japan (1). There was a mix of urban and rural settings, and most of the studies focused on participants coming from low-income communities with interventions delivered in the community where this population reside (El Seifi et al., 2018; Ihalahewage et al., 2018; Kahriman and Karadeniz 2018; Furman et al., 2020). The implementation of educational programmes in low-income communities was designed to enhance the accessibility of safety information within local communities. The consideration of socio-economic challenges faced by disadvantaged individuals, along with potential outreach initiatives, emerged as key findings in empowering them to make informed health decisions.

The participants' demographics in the reviewed studies revealed a homogeneous composition. The interventions were delivered to families, caregivers, or parents depending on the settings where the intervention was conducted, that is community outreach versus hospital-based programmes. In some studies, the gender of the caregiver(s) or parent(s) who participated in the programme was not mentioned (Setien et al., 2014; Ihalahewage et al., 2018; Habermehl et al., 2019; Ning et al., 2019; Furman et al., 2020). However, nine studies recruited only mothers (Cheraghi et al., 2014; Fardazar et al., 2016; Silva et al., 2016; Afshari et al., 2017; El Seifi et al., 2018; Kahriman and Karadeniz, 2018; Nouman et al., 2019; Amini et al., 2021; Moridi et al., 2021).

Table 2-3: Summary of studies included in the systematic review

Author, year and country	Design and population	Sample and setting	Outcome measure(s)	Study duration/ follow-up (Drop out from follow-up %)	Findings summary
Afshari et al. (2017) Twiserkan, Iran	Pre- and post-intervention study	Mothers of children under 5 years Intervention group n=36 Control group n=36 <i>Settings:</i> Health house ¹ Rural	Tool: Pre-/post-test three-part questionnaires: Part 1: Sociodemographic factors Part 2: Injury history Part 3 (based on Predisposing, Reinforcing, and Enabling Constructs in Educational Diagnosis and Evaluation model (PRECEDE) Knowledge: 14 MCQ Attitudes: 15 Likert scale range from very much agree to – not at all agree) Behaviour: 30 Q (YES-NO). Validation <i>Validity:</i> Pilot study on 30 mothers <i>Reliability:</i> Alpha coefficient used to measure reliability	2 months (0%)	Effective in improving mothers' awareness of injury prevention
Amini et al. (2021) Hamadan, Iran	Pre- and post-intervention study	Mothers with toddlers Intervention n=58	Tools:	2 months (No data given)	Training using the theory of planned behaviour (TPB) is

Author, year and country	Design and population	Sample and setting	Outcome measure(s)	Study duration/ follow-up (Drop out from follow-up %)	Findings summary
		Control n=58 <i>Setting:</i> Comprehensive health centres ² Urban	<i>Awareness</i> assessed using 23 items – 2-point score (correct – incorrect answer) <i>Behaviour:</i> <i>Perceived behaviour:</i> Assessed using 10 items – a 4-point scale ranging from 1 (little control) to 4 (complete control) <i>Behaviour intention:</i> 9 items – 4-point scale ranging from 1 (strongly disagree) to 4 (strongly agree) <i>Attitude:</i> Measured using 16 items, a 4-point scale ranging from 1 (strongly disagree) to 4 (strongly agree)		effective in making changes in mothers' behaviour relating to prevention of UCI
Cheraghi et al. (2014)	Randomised controlled trial	Mothers of children <5 years Intervention n= 60 Control n= 60	<i>Tool:</i> three parts questionnaires: Part 1: sociodemographic Part 2: mother knowledge (15) MCQ + 20 Yes/No questions + 23 Q based on the Health Belief Model designed using a	Two months (0%)	Education health programmes based on HBM can be used to promote safety in children aged <5 years

Author, year and country	Design and population	Sample and setting	Outcome measure(s)	Study duration/ follow-up (Drop out from follow-up %)	Findings summary
		Settings: Local health centre ² Urban	6-point Likert scale (agree to disagree) Validation: Validity assessed by experts Reliability was measured using Cronbach's alpha coefficients of 0.84		
El Seifi et al. (2018) Zagazig district – Egypt	Pre-post-test design	Mothers with at least one child <5 years n=244 Settings: Home visit Rural	<i>Measurement:</i> Pre- and post-test self-administered questionnaire adopted from questionnaire used in previous studies Part 1: sociodemographic characteristics Part 2: Knowledge measured with 25 Y/N/Don't know questions Attitudes: 11 3-point Likert scale questions (agree-neutral-disagree). Validation <i>Validity:</i> Pilot study done on 24 participants <i>Reliability:</i> Questionnaire reliability was measured in	Two months (no data given)	Health education improves knowledge and attitudes of home injury

Author, year and country	Design and population	Sample and setting	Outcome measure(s)	Study duration/ follow-up (Drop out from follow-up %)	Findings summary
			previous studies with a Cronbach's α coefficient equal to 0.82 & 0.85 for knowledge and attitude respectively.		
Fardazar et al. (2016)	Interventional	Mothers of children <5 years	<i>Tool:</i> A questionnaire designed by the researcher	Two months (no data given)	Health education guided by Motivation Protection Theory can improve injury prevention behaviours among mothers
Joibar City, Iran		Control n=95 Interventional n=95 Settings: Two Health centres ² Urban	<i>Knowledge:</i> 23 questions based on Motivation Protection Theory. <i>Behaviour:</i> 15 questions <i>Validation:</i> Validity checked using the content analysis method <i>Reliability:</i> Checked using Cronbach's alpha		
Feng et al. (2023)	Randomised controlled trial	Parents of children 0–3 years Control (X2): Intervention (X2): Settings: Online – WeChat	Parameters of social network analysis: Density, distance, centrality (point, betweenness, closeness), cohesion subgroups and effect size	March 2019 to February 2020	The intervention group showed enhanced communication, closer interactions, and increased parental involvement

Author, year and country	Design and population	Sample and setting	Outcome measure(s)	Study duration/ follow-up (Drop out from follow-up %)	Findings summary
Furman et al. (2020) Pittsburgh, USA	Interventional	Parents or guardians aged over 18 of children <18 years n=50 Setting: community events open to the public. Low-income neighbourhoods. Urban	Tool: Questionnaire modified from an assessment tool used to evaluate home safety knowledge at a hospital at the University of Pittsburgh, USA It included: 12 Q: Demographics 5 Q: MCQ home safety knowledge 17 Q: Home safety behaviour	1: 4 weeks (42%) 2: 6 months (40%)	Education programme through Mobile Safety Centre improves mothers' knowledge and behaviour
Habermehl et al. (2019) Cleveland, Ohio, USA	Interventional	Caregivers of children aged 1–4 years n=200 Setting: Waiting area in paediatric primary care clinic Urban	Tool: Survey administered post-intervention The first part immediately after intervention: demographic data, session satisfaction, and information they would like to learn). Second part: to evaluate changes made at home	Two weeks (16%)	93% of participants made safety changes at home
Honda et al. (2022) Tokyo, Japan	Interventional	Pregnant mothers (First pregnancy)	Tool: Survey developed using protective motivation theory	Two years (48.1)	No difference in medically attended injuries

Author, year and country	Design and population	Sample and setting	Outcome measure(s)	Study duration/ follow-up (Drop out from follow-up %)	Findings summary
		I=40 C=28 <i>Setting:</i> Public health centre	and theory of planned behaviour = 4 Q Items developed based on ER doctors = 5 Q The survey was emailed two years after the intervention Validation: NA		No significant difference in home injuries, but it was slightly low in the intervention group Mothers on the intervention group more aware of child injury
Ihalahewage et al. (2018)	Quasi experimental	Families with children <5 years	<i>Tool:</i> Pre-/post-test questionnaire	Three months (0%)	One-third of caregivers reported an improvement in UCI prevention knowledge, practice, and attitudes
North central province, Sri Lanka	71 families Intervention group: 36 families	Control n=36 <i>Setting:</i> home visits Rural	<i>Knowledge:</i> Questionnaire Injury incidence: a history record index Household practice: a 30 Q Likert scale checklist (very attentive – not attentive at all)		
Kahriman and Karadeniz (2018) Turkey	A quasi-experimental group	Mothers of children <6 years n=300 <i>Setting:</i> Primary health centre	Measurement tools: Tool 1: 33-item questionnaire for sociodemographic factors Tool 2: Attitudes, 40 items 5-point Likert scale – The 0–6-year-old Children's Mothers' Identification	One month (No data given)	Training was effective to raise mothers' awareness of child safety at home

Author, year and country	Design and population	Sample and setting	Outcome measure(s)	Study duration/ follow-up (Drop out from follow-up %)	Findings summary
		Urban	Scale of Safety Precautions for the Prevention of Paediatric Injuries (Cinar, 1999) Cronbach's alpha 0.78 Tool 3: A checklist – the Risk Assessment Form for Paediatric Injuries (no author details, possibly Cinar)		
Khan et al. (2022) Karachi, Pakistan	Pre- and post-study design with short-term and long-term follow-up	N=312 participants in long term <i>Control group:</i> 145 (Neighbourhood One): Received only educational pamphlets Intervention group 167 Neighbourhood Two: Received in-home tutorial guide and pamphlets	<i>Outcome measured:</i> Reduction in home injury hazards for children under 5 years of age Observational checklist was administered to identify hazards by areas of the home	Follow-up: Short-term: November–December 2010 Long-term: November 2012–January 2013	Injury prevention tutorials supplemented with pamphlets can effectively decrease hazards and incidence of falls, drowning and poisoning for children under 5 years of age in low-resource settings
Moridi et al. (2021) Fasa City, Iran	Quasi-experimental	N=200 mothers of children under 5 years	<i>Tool:</i> Self-reported questionnaire, including demographic characteristics, injury prevention	Follow-up (phone tracking): One month following intervention.	Educational intervention based on the Health Belief Model had a

Author, year and country	Design and population	Sample and setting	Outcome measure(s)	Study duration/ follow-up (Drop out from follow-up %)	Findings summary
		<i>Control group:</i> Received 6 sessions through WhatsApp group <i>Intervention group:</i> Received an intervention as a package at the end of the study	questionnaire, and home safety checklist	Three months after the intervention	positive impact on injury prevention behaviours.
Ning et al. (2019) Changsha, China	RCT	Primary caregivers of children aged 3–6 years <i>Control:</i> n=1285 <i>Intervention:</i> n=1406 Setting: Home Urban	Scales adapted from the Injury Behaviour Checklist (IBC) (Morrongiello and House, 2004) The Worry Assessment and Risk Estimation (WARE) (Will et al., 2009) <i>Validation:</i> Test-retest reliability <i>Attitudes:</i> rs=0.69 <i>Behaviours:</i> rs=0.64	Three months (Intervention 23% Control 24%) Six months (Intervention 31%, Control 39%)	Health education using phone app significantly improved caregivers' safety behaviours. The intervention had no significant change in attitudes
Nouman et al. (2019) Lahore, Pakistan	Quasi-experimental (pre-/post-test)	71 mothers of children > 5 years. Setting: Community	Knowledge and practice questionnaire	The intervention was conducted over four weeks following pre-data collection	Health education significantly enhanced knowledge and safety practices among mothers of under-5

Author, year and country	Design and population	Sample and setting	Outcome measure(s)	Study duration/ follow-up (Drop out from follow-up %)	Findings summary
					children in the rural community
Setien et al. (2014) Hidalgo County, Texas, USA	Pre-/post-test intervention	Hispanic families with child aged 1–14years n=88 households <i>Setting:</i> Community centres. Urban	<i>Tool:</i> Self-administered True/False questionnaire Post-test: 10 questions	Two months (0%)	Changes in safety behaviours reported
Silva et al. (2016) Imperatriz, State of Maranhão, Brazil	Quasi-experimental intervention study Pre- and post-test – no comparison group	Mothers of children <5 years. n=155 <i>Setting:</i> Primary Care Centre ² Urban	<i>Tools:</i> self-administered pre- and post-test questionnaire MCQ for sociodemographic <i>Knowledge and attitudes:</i> Pre-/post Mortality Reduction by Accidents and Violence (Brazilian Ministry of Health 2001) Validation: Pilot study	Immediate (0%)	Significant changes in participants knowledge

¹A health house is a local centre shared by a small number of villages in rural Iran focused mainly on health promotion and illness prevention. These are the first point of contact with the Iranian health service for most people.

²Comprehensive health centres and/or local health centres affiliated with a university are primary care settings that manage greater complexity than a health house.

2.5.1 Risk of bias

The risk of bias was moderate to high in most studies (Table 2-4 and Table 2-5).

Table 2-4: Risk of bias summary for randomised controlled trials

	Randomisation	Selection	Missing data	Outcome measurement	Selection of results	Overall ROB
Cheraghi et al. (2014)	Mod	High	Low	Some	High	High
Ning et al. (2019)	Some concern	Low	Low	Low	Some concern	Some concern

The most significant issue was participant selection, raising questions about the generalisability and applicability of the findings to broader populations or settings. Two RCTs were included, one of which had no description of the randomisation process (Cheraghi et al., 2014) and the other used cluster randomisation with the unit being pre-schools (Ning et al., 2019).

In other studies, participants were recruited using convenience methods and often from a health centre. Convenience sampling in interventional studies may limit the generalisability of the findings due to potential selection bias, impacting the applicability of results to broader populations or settings (Boland et al., 2017).

Seven studies relied on parents' self-reports to assess knowledge, attitudes, and behaviour changes (Setien et al., 2014; Fardazar et al., 2016; Silva et al., 2016; El Seifi et al., 2018; Nouman et al., 2019; Furman et al., 2020; Moridi et al., 2021), potentially biasing outcome quality and overestimating the interventions' effect.

Table 2-5: Risk of bias summary for non-randomised intervention studies

	Confounding	Selection	Intervention classification	Deviation from intended intervention	Missing data	Outcome measurement	Selection of results	Overall
Afshari et al. (2017)	Low	Mod	Low	Low	Mod	Low	Mod	Mod
Amini et al. (2021)	Low	Mod	Low	Low	Low	Low	Low	Mod
El Seifi et al. (2018)	Low	Mod	Low	Low	Mod	Low	Mod	Mod
Fardazar et al. (2016)	Low	Mod	Low	Low	Low	Low	Low	Mod
Feng et al. (2023)	High	Mod	High	Low	NR	Mod	Mod	Mod to high
Furman et al. (2020)	Low	Mod	Low	Low	Low	Low	Low	Mod
Honda et al. (2022)	Mod	Low	Low	High	Low	Mod	Low	Mod
Ihalahewage et al. (2018)	Low	Mod	Low	Low	Low	Low	Low	Mod
Habermehl et al. (2019)	Low	Mod	Low	Low	Low	Low	Low	Mod
Kahrman and Karadeniz (2018)	Low	Mod	Low	Low	Low	Low	Low	Mod
Khan et al. (2022)	High	Mod	High	Low	NR	Mod	Mod	Mod to High
Moridi et al. (2021)	Mod	Mod to High	Mod	Uncertain	Mod to High	Mod to High	Uncertain	Mod to High
Nouman et al. (2019)	High	Mod	High	NR	NR	Mod	High	High
Setien et al. (2014)	Low	Mod	Low	Low	Low	Low	Low	Mod
Silva et al. (2016)	Low	Mod	Low	Low	Low	Low	Low	Mod

The measurement of outcomes using self-report instruments may potentially risk response bias and the impact of subjectivity, as the reliability and validity of the findings can be influenced by the participants' own perceptions and interpretations of their knowledge, attitudes, and behaviour (Egger et al., 2022). Additionally, three studies (Setien et al., 2014; Habermehl et al., 2019; Furman et al., 2020) had no description of how teaching was done and how instruction was conducted, limiting understanding of the education and learning process.

Four studies evaluated the impact of the intervention using a self-designed questionnaire that was piloted, and validity and reliability data were provided (Cheraghi et al., 2014; Fardazar et al., 2016; Afshari et al., 2017; El Seifi et al., 2018). In three studies, a validated questionnaire was used (Silva et al., 2016; Kahrman and Karadeniz, 2018; Ning et al., 2019). However, five studies used self-designed questionnaires (Setien et al., 2014; Ihalahewage et al., 2018; Habermehl et al., 2019; Furman et al., 2020; Amini et al., 2021), but did not report data on the validity and reliability of their instruments. This absence of psychometric information introduces a high risk of bias (Scott, 1997; Paterson and Britten, 2005).

Nine studies used psychological or behavioural change theories such as the PRECEDE model used by (Afshari et al., 2017) and the theory of planned behaviour used by Amini et al. (2021) in the design of questionnaires and interventions (Table 2-6). This provides a transparent and theoretical basis for decision-making relating to data collection and reporting of results that can reduce bias in interpretation and help to avoid other forms of bias such as those resulting from social pressure leading to reporting bias (Van der Steen et al., 2019).

Duration of follow-up ranged from immediately after the intervention (Silva et al., 2016) to six months (Ning et al., 2019). Loss to follow-up ranged from zero (Cheraghi et al., 2014; Setien et al., 2014; Afshari et al., 2017; Ihalahewage et al., 2018) to 40% (Ning et al., 2019; Furman et al., 2020), but some studies did not provide data about this and it was not possible to infer the loss to follow-up from the data presented in the report (Fardazar et al., 2016; El Seifi et al., 2018; Kahriman and Karadeniz, 2018; Amini et al., 2021).

2.5.2 Educational methods

The results of the review included the varied instructional approaches employed across the studies. The description of delivery of teaching method was not well described in any of the studies (Table 2-6) but usually included some form of information delivery and a discussion or question and answer session.

Four studies adopted a group learning approach fostering discussion (Cheraghi et al., 2014; Afshari et al., 2017; El Seifi et al., 2018; Amini et al., 2021), while three studies employed an individual one-to-one approach (Ihalahewage et al., 2018; Habermehl et al., 2019; Nouman et al., 2019), tailoring the educational content to the specific needs of each participant. The delivery methods showcased a varied range, including interactive question-and-answer sessions, audio-visual presentations such as PowerPoint, and the use of images to enhance comprehension. Most studies provided the participants with materials to take home in the form of written pamphlets or booklets. Two studies also provided the participants with child safety equipment such as socket protectors and cabinet clips (Habermehl et al., 2019; Furman et al., 2020).

Table 2-6: Summary of educational interventions

Study ID	Duration (group size)	Framework used in design or delivery of education	Delivery methods	Aim of intervention when discernible	Content if discernible
Afshari et al. (2017)	4 hours	PRECEDE (Green and Kreuter, 1992)	Lecture, group discussion, Q&A, instructional booklet	To motivate and modify inappropriate performance	Factors associated with injury in the home identified from Rezapur-Shahkolai et al. (2017)
Amini et al. (2021)	4 hours (10–15)	Theory of planned behaviour (Ajzen, 1991)	Lectures, group discussion, Q&A, instructional booklet		Developmental stages of toddlers, common injuries, preventative strategies, ability to control risk factors
Cheraghi et al. (2014)	4 hours	Health Belief Model (Rosenstock, 1974)	Lecture, group discussion	To present factors affecting mothers' practices and knowledge To address perceived severity, perceived barriers, cues to action and self- efficacy regarding child safety	Safety promotion and injury prevention are informed by the scientific literature
El Seifi et al. (2018)	45 minutes (8–10)		Lecture, group discussion Q&A	Increasing knowledge and self-efficacy	Scientific message based on Centres for Disease Control and Prevention child safety

Study ID	Duration (group size)	Framework used in design or delivery of education	Delivery methods	Aim of intervention when discernible	Content if discernible
			Videos Instructional booklet		and injury prevention guidance (Center for Disease Control, 2010) . Risk factors for injuries and methods of prevention
Fardazar et al. (2016)	90 minutes (15)	Protection Motivation Theory (Rogers, 1975)	Lecture Q&A Video.	Increase perceived vulnerability and severity in children under five years. Increase self-efficacy and behaviours in injury prevention.	Child development and injury risks, prevention strategies.
Furman et al. (2020)	20 minutes (Small groups or one-to-one)	Standardised curriculum developed by the Safety Centre at UPMC Children's Hospital, Pittsburgh, US.	No detail of the teaching methods. Provision of safety equipment (smoke detector, outlet covers, doorknob covers, cabinet latches, gun lock)	Increased use of safety equipment including that provided as part of the programme.	

Study ID	Duration (group size)	Framework used in design or delivery of education	Delivery methods	Aim of intervention when discernible	Content if discernible
Habermehl et al. (2019)	10 minutes (One to one)	American Academy of Pediatrics recommendations	No detail of the teaching methods but it involved a learned script Provision of safety toolkit (handouts, poison control magnet, window locks, outlet covers)	Provision of age-specific injury prevention information	Car safety, fall safety, home safety, injury prevention, poison control).
Honda et al. (2022)	Part of the second session of three-week Ante-natal clinic (ANC) program (17 min)		Informing discussion video	Having a safety perspective (chose of furniture, create a safe environment and prevent injuries)	
Ihalahewage et al. (2018)	Two occasions, no duration was given (18)	Health Belief Model (Rosenstock et al., 1988)	Discussion stimulated by the use of visual aids Collation of knowledge	Improved understanding of the determinants of poor safety	Risks in the home, role of family support, attitudes and beliefs relating to injuries

Study ID	Duration (group size)	Framework used in design or delivery of education	Delivery methods	Aim of intervention when discernible	Content if discernible
Kahriman and Karadeniz (2018)	One occasion – no duration was given (One to one)		Discussion stimulated by the use of visual aids	Raising awareness and knowledge of the prevention of injury	Dangerous situations and how to prevent them
Khan et al. (2022)	It took approximately 30 minutes per home		Pamphlet that includes information on common hazards and strategies to reduce them. Interactive tools delivered by a trained person. Regular and random home visits to follow up changes	Reduction in home injury hazards for children under 5 years of age	Hazards in kitchen, bath area, living/sleeping area, courtyard/rooftop, outdoors surrounding the home
Moridi et al. (2021)	Three months (It was delivered through 6 virtual training sessions conducted in a	The intervention designed based on Health Belief model	Each session lasted for 30–35 minutes (lectures, Q& A sessions, group discussion, educational materials such	To improve behaviours in relation to injury prevention through awareness, perceived sensitivity, severity, benefits, self-efficacy	Based on health belief model and no specific details about the content

Study ID	Duration (group size)	Framework used in design or delivery of education	Delivery methods	Aim of intervention when discernible	Content if discernible
	WhatsApp group)		as images, video clips, and PowerPoints presentations		
Ning et al. (2019)	No duration given (One)	Theory of planned behaviour (Ajzen, 1991) Haddon Matrix (Barnett et al., 2005) Framework for Rational Analysis of Mobile Education (FRAME) (Chengjiu et al., 2013)	Information delivery (text, cartoons, video) Interactive games	Effectiveness of using an app-based mobile phone intervention to prevent unintentional injury	Parenting skills, unintentional injury prevention, paediatric disease risk
Setien et al. (2014)	2 hours.	Raising Safe Kids: One stage at a Time (Safe Kids Worldwide, 2009)	No detail	Improvement of knowledge and behaviour in parents	Burns, falls, household fires, choking, suffocation, drowning, falls, vehicular accidents, poisoning, hazardous household products, firearms, sports.
Silva et al. (2016)	30 minutes		Information giving Discussion with use of visual aids	Understanding mothers' knowledge about prevention of accidents	Prevention of burns, poisoning, drowning and falls

Study ID	Duration (group size)	Framework used in design or delivery of education	Delivery methods	Aim of intervention when discernible	Content if discernible
Feng et al. (2023)	Phase 1 (12- week) health- education Phase 1 (9 months) Phase 3 (10 months)		Online social- network-based health education via WeChat groups	To investigate the methods by which online- health education and social networking may reduce the unintentional injuries among children under four years	
Nouman et al. (2019)	Four weeks (15–18 mothers)	Health Belief Model (Rosenstock et al., 1988)	Health education intervention using health belief model	Improvement in knowledge, attitudes and practice	

The time spent on education varied between ten minutes (Habermehl et al., 2019) to four hours (Cheraghi et al., 2014; Afshari et al., 2017; Amini et al., 2021) or stretched over weeks (Nouman et al., 2019). However, the reviewed studies did not offer sufficient insights into the rationale for selecting these diverse timing formats. Notably, shorter sessions were often utilised in waiting areas (Habermehl et al., 2019), home visits (Khan and Ismail, 2017) and during a visit to antenatal care (Honda et al., 2022), while longer sessions were observed in planned studies that recruited participants in advance. Education delivered through social media (Moridi et al., 2021; Feng et al., 2023) and smart phone application (Ning et al., 2019) featured a longer course compared to traditional approaches.

2.5.3 Effect of health education on knowledge, attitudes, and behaviours

Pre- and post-measurement of knowledge, attitudes, and behaviours were assessed using either structured self-administered questionnaires or checklists. The post-intervention assessment of the changes and follow-up period ranged from two weeks (Habermehl et al., 2019) to two years (Honda et al., 2022), at a mode of two months (Table 2-3). Follow-up after the intervention was associated with the loss of some study participants. A two-year post-test offers a longitudinal perspective, capturing long-term effects and trends, especially those that are relevant to attitudes and practice. On the other hand, the short period of a two-week post-test provides quick results and minimises attrition risk. However, the former needs more resources and provides a broader understanding of changes in attitudes and behaviour, while the latter has a limited perspective and is susceptible to short-term fluctuations.

2.5.3.1 *Change in knowledge*

Nine studies reported a statistically significant increase in caregivers' knowledge relating to child safety and injury prevention in the intervention group compared to the control group (Cheraghi et al., 2014; Setien et al., 2014; Silva et al., 2016; Afshari et al., 2017; El Seifi et al., 2018; Ihalahewage et al., 2018; Nouman et al., 2019; Amini et al., 2021; Furman et al., 2020). The greatest change in knowledge was a 110% improvement in a community-based study by Ihalahewage et al. (2018) (Table 2-7).

A behavioural change model, the Health Beliefs Model (HBM) (Rosenstock et al., 1988), was used to design their intervention as well as using a co-production approach with caregivers. The intervention took the form of a practitioner-facilitated group discussion where participants identified inadequate safety practices and approaches to reduce injury. During the intervention, the discussions with caregivers on safety practices were guided using the items of the questionnaire used by the researchers at the pre-intervention to assess the participants' knowledge and practice of home safety. The study by Setien et al. (2014) reported the least change in knowledge, amounting to 4%. In their study, the researchers independently designed the intervention, focusing on addressing risks associated with each child's developmental stage. Although there was a small improvement in knowledge after the intervention, it may have been due to the already satisfactory level (pre:12.4 (0.85) and post: 12.9 (0.63)) prior to the intervention. The total score across both tests was 14, which was a two-hour training session delivered by trained members of the Latino community (promotoras). This study had no control group to make a better evaluation of the effectiveness.

Table 2-7: Change in participants' knowledge associated with health education interventions

		Pre		Post		% change	Within group	Between group
		I or C*	Mean	SD	Mean		p	p
Afshari et al. (2017)	I		10.00	2.44	12.67	0.99	26.00	<0.001
	C		9.47	3.26	9.75	1.67	3.00	0.439
Amini et al. (2021)	I		18.40	1.50	20.20	2.27	9.00	<0.001
	C		18.84	1.73	18.86	1.85	0.00	0.058
Cheraghi et al. (2014)	I		8.43	3.77	13.15	1.09	56.00	<0.001
	C		7.17	2.26	7.90	2.27	10.00	0.028
Furman et al. (2020)			3.94	0.60	4.40	0.50	13.00	<0.010
Ihalahewage et al. (2018)	I		15.00	46.16	31.57	19.85	110.00	NS
	C		18.57	58.66	19.85	63.20	7.00	NS
Moridi et al. (2021)	I		44.15	8.23	77.12	8.97	33.97	<0.001
	C		46.22	8.10	47.39	38.14	1.17	0.282
Nouman et al. (2019)			0.49	0.26	0.84	0.00	71.40	
Setien et al. (2014)			12.40	0.85	12.90	0.63	4.00	
Silva et al. (2016)			78.16		90.70		13.00	<0.05

*I Intervention or C Control

These are a small number of studies, so it is difficult to tell whether the use of a theoretical framework makes a difference in the outcomes. Three studies used the Health Beliefs Model and produced a 56% improvement in knowledge (Cheraghi et al., 2014), a 110% improvement in knowledge (Ihalahewage et al., 2018) and a 71% improvement in knowledge (Nouman et al., 2019). The lowest knowledge change in studies that employed behavioural change models was reported in the study by Amini et al. (2021). They used the theory of planned behaviour and identified and showed a modest improvement of 9% ($p = <0.001$) in knowledge. Studies that utilised approaches other than behavioural change also demonstrated significant changes, albeit to a lesser extent, compared to studies focusing specifically on behavioural change.

2.5.3.2 Changes in attitudes

Attitudes, encompassing individuals' beliefs, perceptions, and emotional responses, were evaluated through pre- and post-intervention surveys or questionnaires. The measurement tools deployed in these studies involve items exploring caregivers' perspectives related to injury prevention. Health education interventions effectively improved parental attitudes towards child safety measures, as evidenced by a significant positive impact on measured attitudes. These interventions have achieved success by educating parents about the preventable nature of injuries and their responsibility to protect their children.

A statistically significant improvement was identified in six studies (Setien et al., 2014; Afshari et al., 2017; El Seifi et al., 2018; Ihalahewage et al., 2018; Amini et al., 2021; Ning et al., 2019) (Table 2-8).

Table 2-8: Change in participants' attitude associated with health education interventions

	I or C*	Pre		Post		% change	Within group	Between group
		Mean	SD	Mean	SD		p	p
Afshari et al. (2017)	I	67.06	5.77	72.31	3.12	8.00	<0.001	<0.001
	C	61.75	6.35	65.42	5.30	6.00	0.040	
Amini et al. (2021)	I	17.86	3.62	23.30	6.82	3.00	0.040	
	C	19.33	5.86	18.70	5.68			
El Seifi et al. (2018)		4.05	1.10	8.05	1.50	99.00	<0.001	
Ihalahewage et al. (2018)	I	13.66	43.42	31.83	87.96	133.00		
	C	18.00	53.49	20.00	62.05	11.00		
Kahriman and Karadeniz (2018)		165.31	16.36	176.76	12.97	7.00	<0.001	
Ning et al. (2019)	I	6.60		9.80		3.00	NS	NS
	C	6.60		6.70		2.00	NS	

*Intervention or Control

lhalahewage et al. (2018) created the greatest improvement by 133% with their intervention of home visits and safety assessments followed by a small-group discussion process. El Seifi et al. (2018) also identified a large improvement in attitudes, with a mean difference of 98%. Their intervention was a 45-minute lecture and discussion with a booklet to take home for groups of eight to ten women who lived with or near each other in a rural village setting. The intervention was based on 2016 guidelines from the Centers for Disease Control and Prevention (CDC, 2010). No theoretical framework was described.

Generally, the change in attitudes was smaller than the changes in knowledge. Three of seven studies providing attitude change scores described improvements of less than 15% (Afshari et al., 2017; Kahriman and Karadeniz, 2018; Ning et al., 2019). There was no consistent difference in approach between that group and those that saw a change of more than 30%. Attitudes were measured using a validated agree–disagree Likert scale (Table 2-3).

2.5.3.3 Changes in behaviour

Safety practice behaviour was reported in six studies (Setien et al., 2014; Fardazar et al., 2016; Afshari et al., 2017; lhalahewage et al., 2018; Kahriman and Karadeniz, 2018; Ning et al., 2019) (Table 2-9). Safety modifications made at home in response to the knowledge gained were confirmed through home visits (lhalahewage et al., 2018; Kahriman and Karadeniz, 2018), phone follow-up (Setien et al., 2014; Habermehl et al., 2019; Furman et al., 2020) or self-administered questionnaire (Ning et al., 2019; Honda et al., 2022).

Table 2-9: Change in participants' behaviour associated with health education interventions

		Pre		Post			Within group	Between group
	I or C*	Mean	SD	Mean	SD	% change	p	p
Afshari et al. (2017)	I	22.31	4.30	29.17	0.78	30.70	<0.001	<0.001
	C	23.81	5.35	22.81	4.45	0.00		
Fardazar et al. (2016)	I	7.89	2.36	12.91	2.11	63.60	<0.001	0.30
	C	8.00	2.46	8.07	2.38	0.87		
Ihalahewage et al. (2018)	I	36.25	5.70	43.72	6.30	20.60	<0.001	<0.001
	C	39.94	4.98	41.69	5.12	4.30		
Kahriman and Karadeniz (2018)		14.60	9.80	8.00	2.00		0.362	
Ning et al. (2019)		47.00		48.90		4.04		

*Intervention or Control

In the Habermehl et al. (2019) study, 60% of the participants used the products (poison control magnet, window locks, outlet covers) provided by the researchers, and 40% of them bought new child safety items. Similarly, in the study of Furman et al. (2020), free safety devices (smoke detector, outlet covers, doorknob covers, cabinet latches, gun lock) were distributed to study participants, and they responded positively and installed the devices in their homes.

The greatest improvement in behaviour was seen in Fardazar et al. (2016), who used the Protection Motivation Theory (Rogers, 1975) as their framework. Their intervention was delivered in two 45-minute sessions spaced one week apart with five mothers in each group session. In the first session, perceived vulnerability and perceived severity of accidents in children aged younger than five years were the focus. The second session focused on self-efficacy, response-efficacy, and prevention behaviours of the mothers.

2.6 Discussion

This systematic review aimed to evaluate the effectiveness of health education interventions in enhancing knowledge, attitudes, and behaviours of caregivers of children under five years concerning the prevention of unintentional child injuries (UCI) in and around the home. The analysis of seventeen intervention studies highlighted the potentially positive effect of various health education approaches. However, no studies determine whether one approach is better than another.

Notably, the review emphasised the need to understand better the complex factors influencing the effectiveness of health education strategies used in UCI prevention. There is an emphasis on the importance of a tailored approach based on the target

population's characteristics and the contextual factors specific to the local community. The following is a discussion and synthesis of the identified key themes, further contextualising the findings within the existing literature, exploring potential explanations for observed patterns or variations, and offering insights into the broader implications. Additionally, this discussion will address any limitations identified and highlight directions for future research in the field.

2.6.1 The use of behavioural change

Behavioural change approaches, which refer to interventions and strategies constructed to modify identified behaviour patterns (Strassheim and Beck, 2019), are a central focus of interventions in eight reviewed studies. These approaches are intricately linked to personal knowledge, attitudes, and behaviours (Strassheim and Beck, 2019). The results suggest a move from traditional approaches that focus on cognitive shift to modification of individual attitudes and behaviours. The principle being applied is that influencing observable behaviours is key to achieving lasting changes in attitudes (Strassheim and Beck, 2019).

This recognition may signal a broader acceptance of the complex interplay between attitudes and behaviours in shaping parents' use of child safety measures. It is, in turn, influenced by societal and cultural norms. For instance, the review identified parental age, education, and socio-economic status as significant contributors to UCI risks (Morrongiello et al., 2006; Mayes et al., 2014). This recognition prompts a deeper exploration of how these factors interact and influence caregivers' behaviours. For example, it was observed that limited education attainment in caregivers was frequently associated with inadequate safety practice which in turn increased

unintentional injuries (Morrongiello and House, 2004; Villalba-Cota et al., 2004; Thein et al., 2005; Morrongiello et al., 2006; Nour et al., 2018; Anwar et al., 2021), revealing a potential link between educational background and the ability to anticipate and mitigate injury risks. There is a strong link between low income and education (Liu et al., 2021) which makes low income a common risk factor, cited alone or in conjunction with education level (Giashuddin et al., 2009; Karb et al., 2016; Vecino-Ortiz et al., 2018).

In addition, children of young mothers, especially those with low educational attainment (Morrongiello et al., 2006; Nour et al., 2018), and those of low or Moderate socio-economic status, are a high-risk group (Sato et al., 2018). However, Simon et al. (2017) argued that some highly educated are also very likely to have unsafe behaviours and therefore, all parents should be included in safety education interventions. The review, therefore, advocates for a better understanding of these socio-economic factors and their intricate relationship with caregivers' knowledge, attitudes and behaviours towards UCI prevention. A holistic approach provided by behavioural change is advocated by these studies to achieve sustainable and impactful change in knowledge, attitudes and behaviours. The crucial role of behavioural change theories in these interventions became apparent throughout the analysis.

The Health Beliefs Model (HBM) (Rosenstock, 1974), a theoretical framework that emerged from the work of social psychologists in the 1950s and 1960s, was employed in four studies (Cheraghi et al., 2014; Ihalahewage et al., 2018; Nouman et al., 2019; Moridi et al., 2021). The HBM posits that individuals are more likely to adopt preventive health behaviours if they believe they are susceptible to an illness, understand the severity of the illness, and believe that acting would be beneficial (Rosenstock, 1974).

In the context of UCI prevention, the studies that utilised the HBM focused their education on aspects such as perceived severity, perceived barriers, cues to action, and self-efficacy. The transparent application of this model in the intervention design resulted in improvements across all areas. However, the HBM limitation in interventions for preventing child injuries lies in its inclination to focus on individual beliefs, potentially overlooking broader societal and environmental factors influencing child safety. This model may not fully address systemic issues and social determinants that significantly contribute to child injuries.

Another model used in two studies (Ning et al., 2019; Amini et al., 2021) is the theory of planned behaviour (TPB) (Ajzen, 1985). The underlying premise of this theory is that most intentional human behaviour is goal-directed, meaning that intentions play a major role in determining actions. Ajzen refers to this causal relationship between beliefs, attitudes, intentions, and behaviours as a theory of reasoned action. A second part of the concept looks at goal-directed behaviours that are impacted by both internal and external factors, thereby expanding on this theory. The theory of planned behaviour, as it is known, considers both the real and perceived control a person may have over their behaviour. It allows consideration of constraints on action and models because intentions do not always lead to actions (Armitage and Conner, 2001). Like the HBM, this model enables researchers to investigate the connection between knowledge, attitudes, and behaviours. The two studies that were part of this review assessed behavioural changes using parental self-report.

The Protection Motivation Theory (Rogers, 1975) was used to design and evaluate the Fardazar et al. (2016) study. According to Rogers (1975), fear of the consequences of illness can motivate individuals to alter their behaviour. This model, similar to the

Health Belief Model (HBM) and the theory of planned behaviour (TPB), delineates the connection between the perceived seriousness of a threat, the likelihood of its occurrence, and the efficacy of the recommended coping mechanism (Maddux and Rogers, 1983). The intervention in the Fardazar et al. (2016) study comprised two 45-minute sessions. In the initial session, mothers received education about the severity of injuries and children's susceptibility. The focus of the second session was to enhance participants' self-efficacy in preventive behaviours by concentrating on effective prevention techniques.

In the reviewed studies, another utilised model was the PRECEDE–PROCEED model (Green, 1974). The application of this model necessitates the prior development of an understanding of the community in which the eventual intervention is intended to be implemented. Thus Afshari et al. (2017) based their intervention on a study undertaken in a similar population (Rezapur-Shahkolai et al., 2017) and a pre-intervention collection of data in the study. In keeping with the behavioural health theories already mentioned, this model makes use of our understanding that beneficial behaviour change is influenced by several factors that enable, predispose, or reinforce behaviours that may or may not be preventative.

One of the ways of maximising the effect of education using the PRECEDE–PROCEED model is to show concern for the needs of the target audience and structure communications so that they agree with their motivations. In one of the early discussions of this model, Green (1974) identified fear as a significant motivational factor. This aspect is one of the fundamental elements shared across all the models discussed thus far. The recognition of fear as a motivational force underscores its

pervasive influence and suggests its importance in shaping behaviours, a theme consistently echoed in various conceptual frameworks explored in the literature.

The studies I have discussed so far provide a clear overview of the theoretical foundation for behaviour modification. While some have taken a more direct approach, all have employed techniques that promise improvement. A notable commonality among these interventions is incorporating discussion within small, homogeneous groups. However, it remains a challenge in most studies to precisely determine the extent to which participants actively generate discussion topics and contribute to problem-solving. Nevertheless, Fardazar et al. (2016) and, Ihalahewage et al. (2018) underscore the pivotal role of participants in shaping the agenda. This participant-driven approach ensures a laser focus on topics of utmost importance to these groups. Both studies reported significant change levels, a predictable outcome when educational materials are carefully tailored to meet the specific needs of the groups seeking change. As highlighted by Khanom et al. (2013) and Machin et al. (2018), the advantages of social networking and group learning extend beyond mere knowledge-sharing and issue discussion. These approaches also create social pressure, a powerful catalyst for positive change within the community.

The pervasive influence of fatalism is evident among specific demographics, which were the focus of the reviewed studies. Fatalism is characterised by the belief that individuals have no control over their circumstances and has been linked to a reluctance to adopt preventive measures (Perfetti, 2018). Santagati et al. (2016) suggested that fatalism may exhibit resistance to change in safety practice and is correlated with an elevated risk of unintentional child injury. Addressing fatalism requires behavioural health strategies to tackle elements like poor self-efficacy,

helplessness, meaninglessness, and perceived inevitability, all contributing to reduced efficacy for injury prevention. Tailored interventions are vital for recognising and addressing fatalism's impact, supporting individuals to foster a sense of control, empowerment, and proactive engagement in injury prevention. Behavioural change intervention can be used to address fatalistic beliefs and promote positive behaviour.

However, inadequate knowledge could be the core factor that determines poor safety practice. Previous studies examining the causal factors of UCI revealed that many caregivers had insufficient awareness of child safety measures at the study baseline (Lafta et al., 2014; Akturk and Erci, 2016; Nour et al., 2018). The lack of child safety knowledge could be a primary factor compared to a fatalistic belief, potentially resulting in a failure to anticipate injury risks and increasing the likelihood of injuries (Simpson et al., 2009). The studies included in the review showed low levels of pre-intervention knowledge, indicating the existence of inadequate child safety knowledge in some communities. This indicates that interventions that focus on knowledge improvement can be helpful for some populations.

2.6.2 Content and delivery of education

The teaching content was similar in most studies which included risk factors of child injury, types of common injury, types of home hazard and perception of preventability. The content was chosen by the researchers based on previous studies, guidelines, or policies relevant to the local population.

Three studies employed a mobile phone application (app) or communication tool as a method to deliver child safety education (Ning et al., 2019; Moridi et al., 2021; Feng et al., 2023). The choice of widely used platforms like WhatsApp and WeChat suggests

a focus on accessibility and user engagement. Furthermore, the specialised app development by Ning et al. (2019) indicates a targeted effort to create a dedicated space for parent education emphasising a technology-sensitive approach.

The use of phone apps for various health education purposes has been widespread (Jeffrey et al., 2019; Kang et al., 2019; Taki et al., 2019), demonstrating their effectiveness in positively influencing child safety attitudes and behaviour (McKenzie and Roberts, 2016; Omaki et al., 2017; Ning et al., 2019). For instance, such apps could provide interactive modules, quizzes, and real-life scenarios to enhance user engagement and learning. However, it is crucial to incorporate clinicians' opinions when designing a relevant app (Fitzgerald and McClelland, 2017; Jones et al., 2020). Their insights can ensure that the app aligns with medical best practices and addresses specific health education needs, enhancing its overall impact on users.

The appeal of utilising apps lies in their interactive and immediate messaging features. The common feature across the interventions in all three studies is incorporating a mechanism facilitating interactive learning among participants. WhatsApp was used by Moridi et al. (2021), WeChat by Feng et al. (2023), and a custom app for parent education was used by Ning et al. (2019). Apps offer advantages compared to conventional health education intervention methods by providing users with readily available, remote, continuous, and personalised access to interventions (Fitzgerald and McClelland, 2017).

The effectiveness of apps in promoting new and desired behaviours varies as some apps are more effective than others, and their cost, whether free or requiring a fee, does not necessarily reflect their quality or effectiveness. The development and

maintenance of apps require financial resources compared to widely used platforms such as WhatsApp. In addition, there are accessibility and inclusivity challenges, as some individuals lack the necessary hardware or broadband access to fully benefit from the app. This disparity can further widen health inequalities (Bol et al., 2018; Borg et al., 2019). Additionally, the app's design needs to adeptly consider various platforms used for access, as well as the characteristics of the target population, including factors such as learning disabilities and digital literacy (Galinski and Perez, 2017), as well as their willingness to use an app for health-related purposes (Powell and Deetjen, 2019).

A qualitative study, conducted in England by Jones et al. (2020), focused on the development and the usability of a health promotion mobile application called 'Grow up Safely' (GUS) to prevent unintentional injuries in children under five. The prototype app provides health education linked to stages of child development. This was achieved through three focus groups involving 15 mothers from a child centre located in a deprived neighbourhood. The participants' experience of using the app varied as some users with prior experience with health apps generally found mobile apps user-friendly and informative. While some considered the advice common sense, others felt it offered new information. Some of the participants found the language used complex and some suggested adding push notifications and endorsements to make them more engaged with the app.

Interventions using apps and social media platforms incorporated images, PowerPoints, and videos as educational tools to provide caregivers with visual resources. This strategy was not confined to apps and social media alone; studies exploring face-to-face, or group teaching methodologies have also incorporated multimedia resources (Fardazar et al., 2016; El Seifi et al., 2018; Ihalahewage et al.,

2018; Honda et al., 2022). The integration of images and videos in these different educational approaches demonstrated their effectiveness in communicating essential information to parents. These multimedia resources facilitate a more engaging and accessible learning experience, enhancing parental understanding of complex child safety concepts. Whether through social media platforms or traditional teaching methods, the incorporation of visual aids was shown to be a useful strategy, promoting active parental involvement and better retention of crucial safety guidelines.

The educational delivery settings were designed to align with the preferences and availability of the local population, prioritising community-based settings over hospital-based ones. This setting offers a unique platform to raise awareness about child safety within the community. In contrast to clinical hospital settings, community-based education integrates child safety initiatives seamlessly into the daily lives of parents and caregivers, family, and neighbours. By emphasising practical safety in familiar surroundings, this strategy fosters a sense of collective responsibility and cultivates a lasting culture of child wellbeing beyond traditional settings for health education. However, studies conducted in clinics and hospitals have shown a greater emphasis on multi-session courses and follow-up protocols. Such sessions can be accessible to clinic visitors and during waiting time (Habermehl et al., 2019).

In addition, being community based, the focus extends beyond the classroom, incorporating comprehensive teaching strategies and follow-up programmes, including home visits. Home visits offer a distinct advantage, allowing not only the assessment of behavioural changes but also the installation of equipment and implementation of home safety modifications. The Ihalahewage et al. (2018) study in Sri Lanka was integrated into a routine community visit and the intervention allowed direct

assessment of change. Home visits were used in Beaufort, South Carolina, USA, as an approach to child wellbeing, including child safety, and demonstrated positive outcomes (Rushton et al., 2015). In many studies within this review, PHCCs served as the venue for educational interventions, often integrated with other purposes, such as immunisations, providing an efficient means to reach the target population. However, as Furman et al. (2020) observed, while mobile centres proved effective in reaching otherwise inaccessible urban populations, increased effectiveness comes at a considerably higher cost for the intervention.

Two studies, (Habermehl et al., 2019; Furman et al., 2020), integrated distribution of safety equipment into their interventions. The incorporation of equipment is viewed as a passive approach to health promotion when contrasted with health education. The systematic review conducted by Abbassinia et al. (2019) indicated that the inclusion of safety equipment did not result in a significantly greater effect size for the intervention. The primary impact, as highlighted in the review, stemmed from the modification of attitudes and knowledge, subsequently influencing behaviours in terms of heightened vigilance and increased self-efficacy, while in the UK the Safe at Home scheme showed a significant reduction in injuries and reduced cost of treatment and rehabilitation (Jones et al., 2023). Home safety equipment and advice were provided to less advantaged families with children under five years of age based on home risk assessments made by trained staff.

Distribution of a sample of safety equipment to parents has been assessed comprehensively by Hill et al. (2022) who undertook a study to assess the impact of England's Safe at Home national home safety equipment scheme, which was implemented from 2009 to 2011. Employing a controlled interrupted time series

analysis, the research specifically targeted high-risk areas and disadvantaged families with young children. The scheme, encompassing safety education and equipment provision, demonstrated a noteworthy decrease in monthly hospital admissions for unintentional injuries within the two years following its completion. Notably, the study revealed that the initiative's efficacy was positively correlated with a higher density of equipment distribution. Nevertheless, the observed positive effects did not endure beyond the initial two-year post-implementation period, suggesting a transient impact associated with the quantity of safety equipment provided.

Overall, regarding materials and design of education delivery, the design of health education initiatives, including materials, settings, and resources, should consider available resources, expert opinions, community needs and individual preference. Tailoring the programme to the community's needs can enhance the opportunity for a positive outcome.

2.6.3 Strengths and limitations of the review

The findings of this review are relevant and applicable to children under the age of six and can be cautiously extrapolated beyond that age. The strength of this review lies in its inclusive approach to sourcing studies from different socio-economic communities, developing and neighbouring countries. By including research from countries such as Iran, Egypt, Turkey, Pakistan, and China, this review captures a diverse range of perspectives. Such a comprehensive scope allows a deeper understanding of the cultural nuances and healthcare dynamics that may influence various health-related phenomena. By drawing upon this wealth of diverse perspectives, the review aims to

offer insights that are not only robust but also applicable and transferable to Oman's unique healthcare landscape.

A limitation is that the outcome measures and data presented in the report did not allow for more than a narrative synthesis and this means that comparison between studies is incomplete. Narrative analysis in systematic reviews has limitations: subjectivity, lack of transparency, no quantitative synthesis, potential bias, and limited capacity for evidence-based recommendations. While it can be valuable when quantitative data are scarce, it should be used cautiously and recognised for its inherent constraints (Egger et al., 2022).

A lack of detail about educational interventions in most of the reports did not allow full comment on the value of theoretical frameworks to guide interventions nor the methods the researchers used to derive the content and delivery method of the sessions. In many cases the cultural and spiritual profile of the community may have influenced their baseline and response to education, and this was not well described in the studies. The review only included studies reported in English; if other languages were considered it could add additional knowledge.

It is crucial to use these findings cautiously due to the reliance of most studies on self-assessment as the primary measurement method. Self-assessment measures may be subject to potential biases, such as social desirability or recall bias, which can affect the accuracy and reliability of the reported changes in practice. Self-assessment measures may only partially capture the actual implementation or adherence to safety measures in real-life situations.

Another observed limitation is short-term post-intervention assessments, with most reviewed studies conducting evaluations within a short time after the intervention. Although this provided valuable insights into immediate changes in participants' child safety practices, it provided an inadequate understanding of the sustained impact of various educational methods over a long time, considering the possible socio-economic influences on the sustainability of change.

Despite these limitations, including potential biases and methodological variations, the review findings provided insights into practice and future research and the findings can contribute to advancing evidence-based decision-making about child safety initiatives and guiding future scientific research.

2.6.4 Implications for practice and research

The synthesis of available evidence on the effects of health education on parents' practice regarding child safety and injury prevention yields several key implications for enhancing child safety awareness in Oman. There are also implications for healthcare providers, child safety initiatives, parents, and avenues for future research.

The findings of the review suggest that implementing educational programmes about child safety could effectively reduce injuries by improving parents' knowledge, attitudes and practice in relation to the application of safety measures. These programmes would be designed specifically to enhance skills and understanding in relevant areas to child safety, thereby offering potential benefits for current healthcare practices.

Such initiatives could range from policy changes to community-based education and collaboration with other sectors to facilitate better delivery of and outcomes for educational initiatives. Healthcare providers need to develop and provide safety

education within their child health programme to promote child safety as equal to child health. Healthcare providers should take note of the positive impact of health education on child safety practices.

Any educational programme planned to be implemented in Oman should consider the cultural, societal, and healthcare context. Tailoring educational materials and strategies to the local context can enhance the effectiveness of these programmes. Therefore, a decrease in child injuries can also have economic implications. It can reduce medical interventions and healthcare and rehabilitation costs. This information can be used to advocate for allocating resources to support health education initiatives.

Caregivers can also benefit from the implications of this review by knowing that participation in education programmes can significantly improve their practice of child safety. Encouraging parents to participate in these programmes can empower them to make informed decisions about their child health and safety. Parents' right to appropriate knowledge and support must be a priority to empower the community for the best child safety practice.

There is an implication for future research in injury prevention. This review highlighted gaps in the existing research, such as areas where further studies are needed. It can also be a foundation for developing more comprehensive and culturally sensitive health education programmes in Oman and other regions. Many of the studies in this area used self-designed questionnaires based on behavioural and health beliefs models. Further work is required to create robust questionnaires that can be used across different studies to allow greater comparison of results and meta-analysis.

In summary, the implications derived from this systematic review underscores the transformative potential of educational interventions in enhancing carers' knowledge and empowering them to change their attitudes and behaviours. The actionable insights provided can guide healthcare providers' decision-making, policy development, and future research initiatives, ultimately contributing to the cultivation of child safety.

2.7 Conclusion

The review showed that there are various health education interventions that have a positive effect in enhancing caregiver awareness, skills, and attitudes towards injury prevention among children younger than five years. It can be delivered at different sites, either within healthcare facilities or in the community through traditional or technology-based interventions. Studies included in this systematic review were conducted in diverse settings and countries and the majority were conducted in low-income areas, where health education interventions showed enhancement in child safety knowledge, attitudes and practice.

When planning educational initiatives to improve outcomes, it is essential to ensure public accessibility and consider empowerment strategies. This involves providing social support, distributing necessary equipment, and following up to reinforce positive changes. Resources too are crucial, including expertise, finance, and collaboration between health educators, parents, and other social sectors to ensure the success and sustainability of the interventions.

Interventions employing behavioural change theories and models were appropriate to modify attitudes and practice in relation to beliefs. The effectiveness of these

interventions relies on effectively sharing information and tackling the challenges that impede their smooth implementation within the specific communities they target. Successful implementation demands the allocation of significant resources and a profound understanding of the multifaceted challenges parents and healthcare professionals encounter.

2.8 Contribution of the findings of the review to the current study

While the evidence presented in this review suggests health education for UCI can be effective in several different formats, it is crucial to recognise that the success of health education programmes in Oman centres on a comprehensive assessment of the local context. This assessment should consider factors such as cultural norms, healthcare infrastructure, and current child safety practices. By tailoring the strategies to the specific needs and challenges faced by parents in Oman, we can ensure the effectiveness of these programmes in promoting injury prevention.

Acknowledging the necessity for evidence-based educational interventions tailored to the Omani context, the findings of this review showed effectiveness in empowering individuals and communities to prompt changes in attitudes and practices. However, evaluation of the success of any programme needs to explore sustainability of changes of behaviour leading to improvements in child safety. Very few published studies consider this, and this will need to be incorporated when planning follow-up from this study.

While the application of a model of behaviour could not be shown to have an impact on the outcome of the studies reviewed, it did provide rationale and justification for the methods selected by the researchers. The current study seeks to explore the

intricacies of challenges across different socioecological levels, encompassing aspects within parents and communities, and organisational and societal factors. Using the socioeconomic model (McLeroy et al., 1988) will help to shape the design of the study and evaluation of the results, as well as supporting consideration of the factors that previous studies have identified as relevant to the success of an intervention.

By considering these complexities, the research seeks to provide an understanding that exceeds the broad assessment of intervention outcomes. This deeper comprehension will be a foundation for shaping well-informed and pragmatic recommendations for initiatives to prevent child injury. In doing so, the study aims to contribute not only to the existing body of knowledge but also to formulate sustainable and contextually relevant strategies for the enhancement of child safety and injury prevention in Oman.

A comprehensive understanding of UCI within the Omani home will, therefore, be explored from the caregiver's perspective. An equivalent exploration of healthcare challenges and opportunities related to safety education will be undertaken, which will contribute to ultimate recommendations that consider these different perspectives. The next chapter will provide a theoretical base for this research, including a theoretical framework.

Chapter 3 Methodology

3.1 Introduction

This chapter provides an overview of the philosophical underpinnings, research approach, and theoretical framework employed in this study. Initially, the philosophical stance is discussed, including the ontological, epistemological, and axiological approaches that informed the choice of study paradigm. Following this, the choice of theoretical framework used to address the research aim and objectives is explored. The research design and ethical approvals to conduct the study are also discussed. The research design, a crucial foundation, was selected based on the study's aim and objectives, ensuring a systematic approach to data collection and interpretation. The discussion aims to present a clear and cohesive understanding of how these elements contribute to the overall research approach.

3.2 Adaptations in response to the COVID-19 pandemic

In conducting this study, it is important to acknowledge the unique circumstances and challenges posed by the COVID-19 pandemic. The protocol development, ethics approval, and data collection were carried out during pandemic restrictions such as quarantine and other preventive protocols. Therefore, they were influenced by pragmatism to best achieve the study purpose. However, interview data collection was largely conducted when the COVID restrictions were partially lifted, which allowed me to visit the health centres, meet with healthcare providers, and distribute advertisements to caregivers.

3.3 Philosophical approach and rationale for research design

The researcher makes some judgments when planning, designing and conducting a project, and among these decisions are the research paradigm and design (Creswell and Creswell, 2018). This study design is mixed methods research (MMR), which was performed using a pragmatic epistemology. This philosophical point of view guided the choice of theoretical framework and aligned the assumptions about the nature of reality, knowledge, and the relationship between the researcher and the research participants. The following is a discussion of the philosophical stance, including the ontological, epistemological, and methodological approaches that informed the choice of mixed methods research for this project.

A paradigm can be defined as a way of thinking about or viewing the world (Walliman, 2021). It is constructed from a set of beliefs, which in turn are derived from a number of philosophical perspectives. The research paradigm encompasses ontology (the nature of reality), epistemology (the nature of knowledge and how it is acquired), axiology (the role of values), and methodology (the approach to conducting research) (Hathcoat et al., 2019). There is a spectrum of ontological positions ranging from realism, which regards phenomena as objective, observable, measurable and independent of the observer through to relativism (nominalism), in which reality is something that is created by the subject (Davies and Fisher, 2018).

In this research, it is suggested that UCI is a phenomenon that is observable and describable, indicating that a survey design would be well suited. I contend that this approach aligns with realism, wherein UCI is perceived as a collective category representing various specific injuries that exist autonomously, irrespective of the

observer. However, one could argue that UCI lacks universal existence, as evidenced by the debate regarding its definition and scope. The concept of injury could be argued to be subject to the observer's perception and interpretation, which more closely aligns with nominalism. In proceeding through this first section of the chapter, I am convinced that my study is in alignment with this notion as the concepts of socio-cultural and environmental factors are introduced.

Realism is an ontological perspective that asserts the existence of objective, independent realities or entities in the world, irrespective of human perception or interpretation (Levers, 2013). It posits that abstract concepts, properties, and objects have a genuine and intrinsic existence. In contrast, nominalism is an ontological perspective that denies the existence of abstract, universal entities or properties as independent realities. It argues that such abstract concepts, like categories or classifications, are human conventions or labels used to group similar things based on shared characteristics or perceptions (Levers, 2013). In nominalism, concepts like 'justice' or 'child safety' are considered human-made labels or social constructs, dependent on linguistic and conceptual choices, and their significance may vary across cultures or contexts due to differing interpretations.

The understanding and meaning of child safety and risk awareness are socially constructed through healthcare providers' and parents' perspectives, experiences, and interactions. This is social constructionism (Berger, 1991), which acknowledges that different social and cultural contexts shape individuals' interpretations and practices related to child safety (Clark et al., 2021). By exploring the perspectives of healthcare providers and parents, this study aims to unravel the socio-cultural influences, beliefs,

and values that underpin child safety measures and the appropriateness of educational interventions for community awareness.

By using a social constructionist lens, this research uncovers how these perspectives shape the implementation and effectiveness of child safety education in PHCCs settings. This acknowledges the importance of considering diverse viewpoints and experiences to develop comprehensive and contextually relevant recommendations for improving child safety awareness. Through interviews with HCPs, the aim is to delve deeply into their experiences, perspectives, and insights regarding the sociocultural dynamics that may influence UCI occurrence and injury prevention efforts. These interviews provide qualitative data invaluable for uncovering nuanced connections, while the survey, designed with a large sample size, enables the capture of a broader spectrum of sociocultural and environmental influences. While the survey offers a more generalised perspective, combining both methods provides a comprehensive understanding of the various factors underpinning injury occurrence and prevention.

Epistemology is how the researcher comes to know the truth (Bunniss and Kelly, 2010, Arthur et al., 2012). This includes a spectrum of paradigms, such as positivism, interpretivism, constructivism, transformativism and pragmatism (Walliman, 2021). Each of these paradigms offers distinct lenses, describing the researcher's perspective and influencing how knowledge is interpreted and generated (Bryman, 2016). Positivist researchers adhere to objectivity, maintaining detachment to confirm relationships and avoid bias. They are likely to proceed based on deductive reasoning, while in interpretive research, researcher insights are not separated (Allsop, 2013). Positivism appears to be appropriate for the study objectives of the necessity of health promotion

programmes as objective data are needed to estimate the size of the problem to support the need and evaluate the impact. On the other hand, interpretivism also seems appropriate to take an in-depth approach to study objectives related to the exploration of opportunities, the facilitators, and the challenges of including health promotion in child health programmes.

Hence, because of the social, environmental and cultural context involved in health promotion, the thesis of one existing reality does not fit, and a single positivist paradigm is not adequate to answer the research inquiry. Similarly, a single interpretivist paradigm is not suitable, because the phenomena involve objective realities related to parents' practice of child safety. Therefore, the approach of pragmatism offers a way of addressing the research problem.

The pragmatic paradigm is a flexible and holistic approach (Skamagki et al., 2022), which provides the philosophical framework for this study's design and methods. It is outcome-oriented and focuses on connecting knowledge actions, values, situations, and consequences (Creswell and Creswell, 2018). The pragmatic researcher can maintain objectivity in the collection and analysis of data and subjectivity through their own reflections on research data (Shannon-Baker, 2016). This relies on abductive reasoning that moves back and forth between deductive and inductive reasoning (Morgan, 2007). Pragmatism is founded on the belief that theories can be generalisable and contextual by analysing them for transferability to another situation.

A pragmatic paradigm is based on the concept that while objective subjective and intersubjective techniques can all contribute helpful information, each can only provide partial models of the investigated reality. A complete and accurate understanding of

the world cannot be achieved by relying on just one perspective. To obtain a well-rounded and comprehensive picture, it is necessary to consider multiple points of view and integrate them (Yardley and Bishop, 2008; Bishop, 2015).

Various realities are true of UCI at home, but a single research paradigm cannot provide a comprehensive picture of health promotion of UCI prevention in a context of PHC. Therefore, parents' opinions and practices relating to UCI prevention have been measured using a structured questionnaire with some open questions that provide a space for participants to express their opinions. In addition, the perspectives and insights of HCPs towards health promotion of child safety have been explored using semi-structured interviews. Hence, the research methods used in this study were mixed.

3.4 Axiology

This research is anchored in a set of core axiological values that prioritise the safety and wellbeing of young children. Axiology is concerned with the role of values in research (Hathcoat et al., 2019). It acknowledges that researchers bring their values and beliefs into the research process, impacting the selection of research topics, the framing of questions, and the interpretation of results. Recognising and transparently addressing these values is essential for maintaining research integrity. A researcher's axiological standpoint can influence the ethical considerations of a study, shaping decisions regarding participant interactions, data analysis, and the dissemination of findings.

This study represents a commitment to contribute to the prevention of UCI through evidence-based practices, recognising the short- and long-term outcomes that such

incidents can have on a child's physical and emotional development. Cultural sensitivity is integral to the approach, acknowledging that safety measures must be contextually relevant, with the consideration of the diverse backgrounds and circumstances that may contribute to family choices. Equity in access to safe environments is of paramount value, and this research aims to shed light on strategies that promote safety uniformly across diverse settings. Empowering parents and caregivers with knowledge about injury prevention aligns with a commitment to fostering a protective environment for every child. By addressing UCI, it is important to uphold ethical standards, respect cultural differences, and contribute to creating safe home environments for children where each child can thrive without the threat of injuries and hazards.

3.5 Reflexivity

Reflexivity is the action of examining one's thoughts, assumptions, and judgments. It is important because beliefs and values can lead to bias in the choices of methods used and influence the analysis of data. Throughout the process of this study a reflexive stance was adopted; a commitment that was underpinned by a steady dedication to documenting each step of the PhD journey. This reflexive process extended beyond mere documentation, encompassing regular monthly reflections with supervisors and research colleagues within the university. These sessions provided opportunities for collective reflection, fostering a collaborative environment that facilitated critical examination of assumptions, biases, and methodological choices.

Engaging in open discussions with academic supervisors and PhD colleagues enriches understanding of the research process and contributed to refining the

research methods. The ongoing work was presented to colleagues and lecturers in postgraduate seminars, subjecting it to constructive feedback and contributing to the iterative nature of a reflexive approach. This iterative reflexive approach played a pivotal role in enhancing the rigour and depth of the study, ensuring a thoughtful exploration of the research questions.

3.6 Theoretical framework

There are several health promotion theories and models that can be used for health promotion programmes (Hou, 2014; Raingruber, 2014). The choice of a theory depends on the specific problem and its determinants, as well as the available avenues for intervention (Hou, 2014). To address the research, aim and objectives, the choice of theoretical framework considered the breadth of the model to explore the social, environmental, and behavioural aspects of the problem. This project adopted the social–ecological model (SEM), sometimes referred to as the ecological model by McLeroy et al. (1988), to guide study conceptualisation, design, methods, data collection and analysis of the study findings (Figure 3-1). The SEM (McLeroy et al., 1988) was adapted from Bronfenbrenner’s (1977) Ecological Theory, which studies how social and environmental factors shape an individual’s behaviour and development.

The SEM (McLeroy et al., 1988) offers a way to address the intricate and interconnected nature of the phenomena under study, providing a holistic theoretical framework (Baron-Epel and Ivancovsky, 2015). The SEM is widely utilised in health promotion (Richard et al., 2011), including injury and violence prevention programmes (Tekkas Kerman and Betrus, 2020). It is suggested by the Center for Disease Control

and Prevention as a framework for violence and injury prevention (Center for Disease Control, 2020a).

The SEM suggests that health outcomes are affected by mutual interactions of the individual with their environment, which includes relationships and networks, physical resources such as housing and transport, and social, cultural, and political factors. The SEM provides a broader perspective to understand better the risk and the injury prevention opportunities for intervention by considering three dimensions: behaviour, physical, and social environment (Baron-Epel and Ivancovsky, 2015, Allegrante et al., 2006). Further, the SEM can be used to understand needs or guide health promotion at a community level because it highlights that changes at a community level are dependent on multilevel factors including the individual, their family, and the social, political, and cultural world in which they live (Cragg et al., 2013).

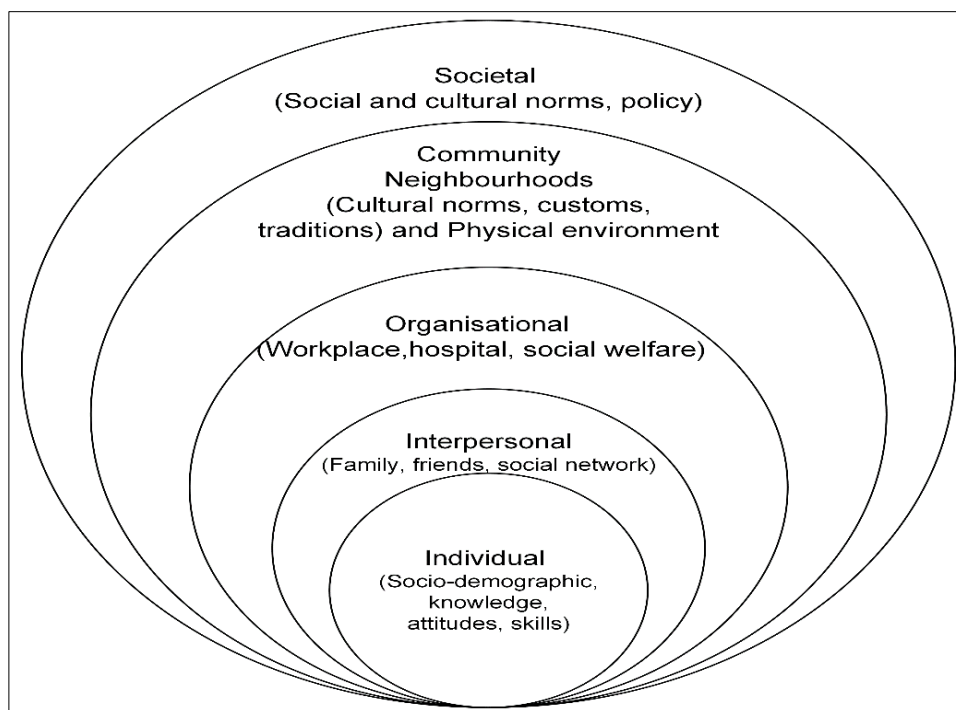


Figure 3-1: The socio-ecological model (SEM) (Center for Disease Control, 2020a)

The factors affecting behaviours in the SEM for health promotion (McLeroy et al., 1988) are presented as five levels: individual, interpersonal, organisational, community and societal, all of which are significant and interrelated (Figure 3-1).

The *individual* level is the core of the model, which looks at individual characteristics such as gender, age, knowledge, attitudes, and behaviours. In this project, the individual level focuses on parents as a core of injury prevention among young children, examining their knowledge, attitudes, and behaviour and the factors that influence them, such as level of education and age. SEM health promotion interventions at this level focus on education and empowerment to promote change in behaviour. Interventions employing psychological theories can be a good choice to empower individuals. One example is Icek Ajzen's theory of planned behaviour (TPB) (Ajzen, 1985), a predictive model that considers attitudes, norms, and perceived control in understanding human behaviour. Another notable model is the Health Belief Model (HBM), which explores into how perceptions of health risks and benefits shape decision-making processes (Rosenstock, 1974). The use of these theories and models in UCI prevention showed positive outcomes in parents' knowledge, behaviour, and attitudes (see 2.6.1). However, psychological theories abandon societal norms and other social and environmental factors (Davis et al., 2015). Constraints are ignored in favour of the cognitive process (Raingruber, 2014).

The bidirectional influences between individuals and their social environment was emphasised by Stokols (1996). Stokols (1996) highlighted how environmental factors shape individual behaviour and vice versa, which provides a more dynamic understanding of the relationship between individuals and their environment. Therefore, considering Stokols (1996) contribution to SEM, intervention at different

levels – including educational programmes, mass media, and support groups – should be provided at individual and community levels. Individual change that is facilitated by social changes at other SEM levels is more likely to be sustained. These models and theories can be considered for safety education that targets behavioural change at the individual level (Allegrante et al., 2006).

The *interpersonal* level of SEM examines family socio-economic status, family norms and attitudes, home and surrounding environments, and extended supervision of other family members (McLeroy et al., 1988). In this project, this level concerns family members and households. This includes influences and support from the closest social circle such as partners, grandparents, and other siblings. Within this level, health promotion initiatives are mainly designed to target the whole family and community by using community-based health education approaches that target the community.

The *organisational* level concerns the characteristics, policies, and procedures of the communities to which a group of individuals belong. In this project, primary health centres are the places responsible for the promotion of child health and safety of children under five years. A health centre's efforts to promote child safety can be influenced by many factors within and outside the organisation that need to be explored to empower these organisations to advocate for child safety.

The *community level* relates to settings such as neighbourhoods. Its focus is on community behavioural norms that might hinder the adoption of safety behaviour, cultural beliefs, and buildings, as well as safety standards for housing, streets, and playgrounds. Stokols (1996) contributed to SEM and added that cultural, social, and physical aspects of the environment have a collective influence on health. As

neighbourhoods are part of broader social and economic structures, it argues that the environment is multilayered and that how a person's environment affects their health varies depending on their practices and beliefs. Consequently, addressing these variables simultaneously will maximise the likelihood of long-lasting health gains. Intervention can include mass media campaigns and social media campaigns to raise awareness in the community.

The fifth level, the *societal level*, looks at the broad societal factors that influence child safety. These factors include social and cultural norms, policies, and funding enforcement of safety regulations. Prevention at this level considers advocacy for establishing policy and environmental safety standards and ensures equality in safe communities.

The SEM serves as a comprehensive framework, yet it is not without limitations. The limitation of intervening at one level may be more resource-intensive and require an extensive budget. However, focusing on one level can still offer insights, while considering other levels provides a broader context for a comprehensive understanding of the influencing factors.

In summary, the SEM was chosen as the theoretical framework for this study due to its comprehensive approach, capturing the relationship of individual, interpersonal, community, organisational, and societal influences. It aligns with the aim and objectives of this study and corresponds to the recommendations of the systematic review (Chapter 2). The model provides a solid foundation for analysing various levels of impact, contributing depth and breadth to exploring interconnected behavioural, social, and environmental factors that influence the parent's and family's practice of

child safety. Therefore, it was adopted to inform the data collection instruments and data analysis approaches.

3.7 Study design: convergent parallel mixed methods research

This study employed a convergent parallel mixed methods design (Figure 3-2) where the qualitative and quantitative components are given equal weight (Tashakkori and Teddlie, 2003). The design is parallel since although the quantitative survey was conducted before the qualitative interview component, the analysis of the quantitative element did not inform the conduct of the interviews. A convergent MMR design was used, which involves collecting and analysing qualitative and quantitative data separately and then merging the findings to gain a more comprehensive understanding of the research question (Creswell and Plano Clark, 2017).

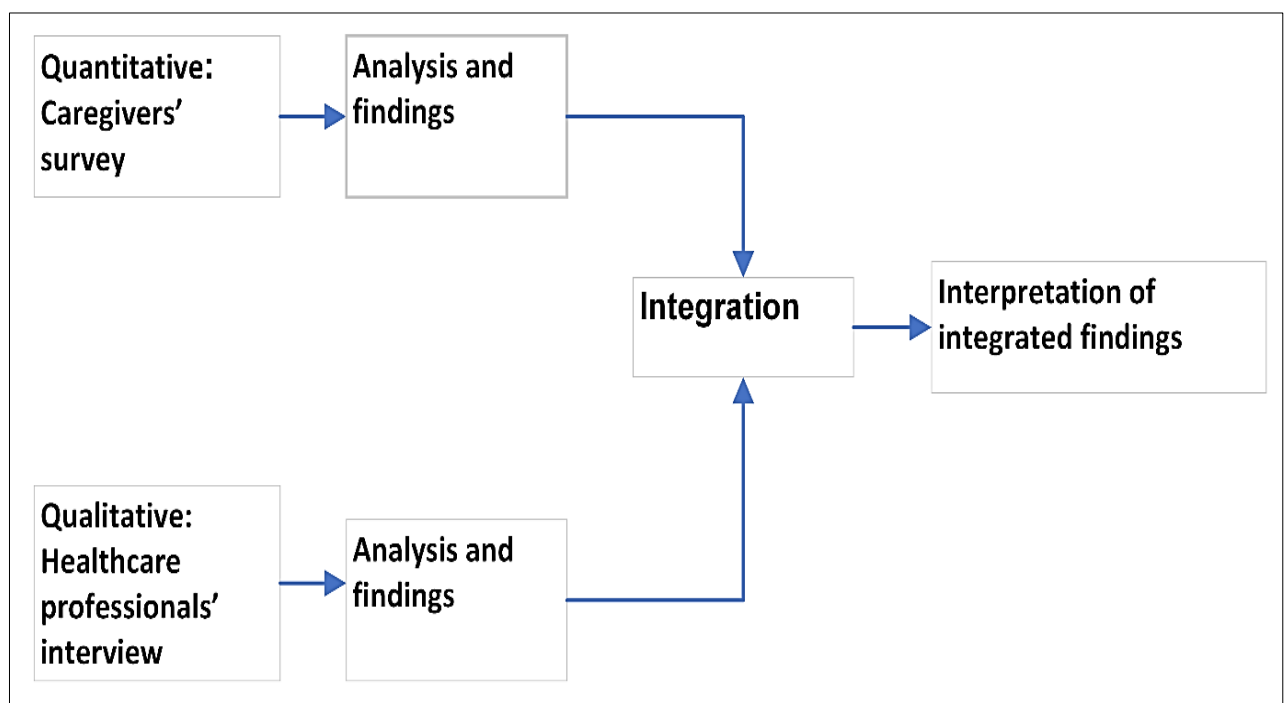


Figure 3-2: Mixed methods process employing convergent design (Bryman, 2016)

The quantitative part addresses objectives two and three (see 1.15.2). It focused on the exploration of safety practices being employed by parents or carers to protect children from injuries within the Omani home environment using a cross-sectional survey. Data were collected from the caregivers using a questionnaire. By using a questionnaire, it is possible to gather opinions from a large sample of caregivers who represented a variety of family characteristics and the communities in which they resided. Additionally, it allowed the gathering of contextual information related to the problem in Oman. A questionnaire as a tool of data collection offers many advantages. First, it facilitates collecting data from the study sample in a standardised way (Rattray and Jones, 2007). Secondly, it allows the researcher to gather data from a large group at minimal cost (Creswell and Creswell, 2018). Thirdly, it can make the participants feel more comfortable answering questions because no identification or face to face contact is needed (Polit and Beck, 2020).

On the other hand, questionnaires as instruments have limitations that must be acknowledged. One possible limitation is that different people may interpret the same question in various ways (Bryman, 2016). Additionally, questionnaires may not be suitable for individuals with poor reading abilities. Another limitation is that some participants may not have the opportunity to clarify questions or issues. To address these limitations, researcher contact information was provided, and participants were encouraged to seek clarification as needed.

The qualitative part was conducted to address objectives four and five (see 1.15). It explored healthcare providers' perceptions of factors influencing safety measures in Oman, and it looked at the challenges for child safety education and opportunities for improvement using semi-structured interviews conducted in person. This approach

allowed flexibility to follow up on responses, capturing details, providing clarification, and encouraging participants to expand on what they considered to be important and relevant. By encouraging participants to elaborate on what they deemed significant and relevant, the interviews aimed to uncover rich, context-specific information that might not have been surfaced through more standardised approaches such as structured interviews. The approach also offered a higher level of flexibility and structure to facilitate the organisation and analysis of the collected data (Clark et al., 2021).

3.8 Study settings and access

Both study phases were conducted in PHCCs that are under the umbrella of the MOH, Muscat, Sultanate Oman. The PHCCs in Oman are institutions that provide PHC, including health promotion and prevention of common morbidities through screening, health education, and follow up. There are 29 health centres in Muscat distributed over six Muscat wilayats (districts) (Department of Health Information and Statistics, 2022). Muscat is the capital city of Oman and has a diverse population in terms of socio-economic and cultural backgrounds. To encourage sample diversity a minimum of two health centres from each Muscat wilayat were purposefully selected for recruitment and data collection.

To access potential health centres, a request for a letter of site permission and data collection facilitation was obtained from the Directorate of Health Service (DGHS) Muscat region (Appendix E). Ethical approval was a prerequisite in getting the facilitation letter from the DGHS. The letters were sent electronically by DGHS Muscat to the heads of appropriate health centres and a copy of the letter was sent to the

researcher. Once permission was granted from the health centre it was visited and a discussion with the head of the health centre was conducted to explain in more detail the rationale and methods of the study.

3.8.1 Ethical approvals

This study obtained ethical approval from the Science, Technology, Engineering and Mathematics Ethical Committee, University of Birmingham, Ref: *ERN-20-1329* (Appendix B). Approval was also obtained from the Research and Ethical and Review Approval Committee (RERAC) at the Centre of Studies and Research at the Ministry of Health Sultanate Oman, Ref: *MOH/CSR/21/24481* (Appendix C). Permission was also received from the National Centre for Statistics and Information (NCIS) (Appendix D) as it is mandatory in Oman to receive permission from the NCSI prior to any research involving the public. After receiving ethical approvals and permission, site permission and facilitation support were requested from the Directorate General of Health Service (DGHS), Muscat Region.

3.9 Summary

This chapter discussed the research methodology integrating the lenses of social constructionism, pragmatism epistemology, and the SEM theoretical framework. These guiding principles illustrate the study's exploration into how individuals construct their realities within societal and cultural contexts, emphasising practical knowledge utility and acknowledging the interconnectedness of various systems influencing child safety. It lays the conceptual foundation for the study, offering insights into the overarching philosophical underpinnings. The adoption of social constructionism,

pragmatism epistemology, and the SEM theoretical framework informs the subsequent research design, ensuring a comprehensive exploration of the research topic.

The following chapter will discuss the details of the research methods used, including design, sampling, instruments, data collection, and the analysis process. Ethical considerations are integrated throughout the process of methods planning, data collection, and analysis.

Chapter 4 Methods

4.1 Introduction

This chapter discusses the methods employed in this study. Separate procedures were used for the quantitative and qualitative phases. Each phase includes a discussion of instrument development and validity, sampling strategy, data collection, data analysis, and integration plan. The chapter ends with a discussion of the integration process of the analysed quantitative and qualitative data.

4.2 Part 1: Quantitative

This section describes the methods used to conduct the survey of parents' perspectives and practices relating to UCI prevention. It includes a description of the development of the instrument, the sampling strategy, data collection, and analysis.

4.2.1 Instrument development

The questionnaire used in this study (Appendix G and Appendix H) was developed by MJ and AS and reviewed by JT through a multistage process described in Table 4-1 (Cohen et al., 2017). The questionnaire items were developed using the SEM as a framework, from tools used in similar studies on caregiver perceptions, attitudes, and behaviours relating to child safety (Vincenten et al., 2005; Nour et al., 2018). As discussed in the first two chapters of this thesis, UCI at home involves interrelated factors that need to be explored within the Omani context to enhance child safety promotion interventions. Therefore, the SEM was used as a framework to structure the

questionnaire. It focused on the exploration of social, behavioural, and environmental factors influencing child safety practice at home and causing UCI at multiple levels.

Table 4-1: Steps followed for Questionnaire development and validation *

Step (1)	<i>Questionnaire Development</i>
	Decision on questionnaire format
	Decision on items format
	Item development (literature – previous questionnaire)
	Questionnaire length
	Review the initial items pool
Step (2)	<i>Validity & Reliability</i>
	Content validity
	Assessed by six experts using modified Question Appraisal System-99 (QAS-99)
	20 colleagues were asked to read the questionnaire
	Pilot study on 20 participants

* Adapted from (Cohen et al., 2017)

The questionnaire was designed as a self-report tool and consisted of 48 closed and open-ended questions. Closed questions are the most common type (Bryman, 2016) and offer the advantage of being quickly completed by respondents and easier to code during analysis. The responses to closed questions comprised different types of questions: multiple-choice (MCQ), multi-response, dichotomous and Likert scale (Cohen et al., 2017). Closed questions constrain participants from expressing their opinions and concerns (Tsang et al., 2017). To overcome this limitation, most questions were followed by an open space that offered respondents an opportunity to add their opinions.

The questionnaire was divided into three parts:

Part 1 focused on socio-demographic information. It included 14 questions about the respondents' age, education status, employment and working hours, family income, number and age of children, and other household occupants, and it also collected data relating to their housing. MCQs were used in this part of the questionnaire to examine opinions. MCQs are usually preferred over single-item measures to eliminate bias, misinterpretation, and measurement error (Rattray and Jones, 2007). The use of MCQs, compared to other forms of questions, are considered to be more reliable as they have an objective scoring process (Considine et al., 2005).

Part 2 of the questionnaire included 16 questions focused on information about the history of injuries and the mechanism, consequence, intervention provided, supervision at the time of injury, and perception of preventability. The pattern of child supervision and the number, type, and severity of any child's injuries were established.

Part 3 of the questionnaire included questions about safety measures, which included the use of safety items, environmental alterations, behavioural modifications, and adherence to policy and legislation. Yes/no questions were used to evaluate dichotomous variables and determine participants' use of safety measures at home. For instance, the yes/no questions were used to find out if the caregiver keeps cleaning supplies out of children's reach. In addition, this part included a five-point Likert scale of strongly agree to disagree asking for opinions in relation to injury prevention. It provided information about the local environment's characteristics, including information about safety-related modifications and equipment in the home and local area. It included MCQs to assess the source of knowledge to identify sources of safety

information for parents to learn about child safety and education provided by society, including healthcare institutions. The questionnaire ended with two open-ended questions for participants' general suggestions and opinions.

The questions in Parts 3 of the questionnaire were derived from studies by Vincenten et al. (2005) and Nour et al. (2018). The study by Vincenten et al. (2005) aimed to understand parental perceptions of child safety in European countries, focusing on preventing accidental injuries in children aged under five. The questionnaire constructed by Vincenten et al. (2005) involved a systematic literature review, expert opinion, prioritisation of questions, pilot testing in the UK, and subsequent translation into ten languages, which ended in a validated survey. The Vincenten et al. (2005) survey addressed parental perceptions and behaviours related to injury prevention. It comprised nine questions addressing common types of injury, sources of information on injury prevention, and perceived challenges. It also evaluated parental agreement with statements related to injury avoidance, child-friendly product design, government involvement, affordability of safety items, and the clarity of instructions for child-safety products. It was administered to 2088 parents through face-to-face and telephone interviews across 14 countries. Data were weighted based on national population statistics, ensuring the reliability and relevance of the survey in providing valuable insights into parental attitudes to child safety in European countries.

Additional questions in Part 3 were based on questions designed by Nour et al. (2018). They developed the questionnaire in Makkah, Saudi Arabia, to assess mothers' knowledge, attitudes, and practices regarding home accidents. The questionnaire underwent expert evaluation, and a pilot study involving 20 mothers was conducted to ensure validity. The final questionnaire comprised four parts: the first gathered socio-

demographic information, the second evaluated knowledge with multiple-choice questions, the third assessed attitudes using a Likert scale, and the fourth measured self-reported practices. Scores were assigned, and participants were categorised as having good, fair, or poor knowledge, attitudes, and practices based on predefined ranges. The questionnaire design drew from an extensive literature search, including information from the World Health Organization, Centers for Disease Control and Prevention, and relevant Saudi Ministry of Health sources.

4.2.1.1 Validity

Assessment of validity is an essential phase in questionnaire development (Pettersen et al., 2004). Validity is the degree to which a concept is precisely measured in a quantitative study (Heale and Twycross, 2015). Content validity assesses whether the questions in an instrument and their scores capture all possible aspects of the concept (Creswell and Creswell, 2018). This was evaluated using expert opinion and pilot testing. Six experts from academia and clinicians working in child health and emergency in Oman health institutions were asked to review the questionnaire. A group of between five and ten experts is considered adequate (Gilbert and Prion, 2016). Communication with experts was done through emails and Zoom meetings due to COVID-19 quarantine measures in 2021. Experts' opinions of the validity of each item were checked using a form adapted from Question Appraisal System-99 (QAS-99) by Willis and Lessler (1999). The form includes questions to elicit opinions on each questionnaire item relating to instructions, clarity, assumptions, knowledge/memory, sensitivity bias and response categories. In addition, experts provided feedback on the format of the items' construction, length, and some suggested questions to be added.

The specific and overall impressions and suggestions from the experts were considered in the final questionnaire.

The questionnaire was then translated into Arabic (Appendix H), as most Omanis are Arabic speakers. After translation, it was checked by a research colleague and a professional translator who are native Arabic speakers with experience of translating to English. The forward translation involved translation of the original English questionnaire into Arabic while preserving the intended meaning of each item. Subsequently, the translated version underwent rigorous evaluation for clarity, cultural appropriateness, and identification of potential ambiguities by one Omani colleague working at the Oman College of Health Science. After translating the survey into Arabic, a back translation was performed, and a research colleague compared the original English version with the back-translated version.

The questionnaire usability was assessed by testing with a sample of 20 caregivers who met the inclusion criteria for the study. These respondents were not counted in the final sample size. Participants were requested to provide their feedback in a form that included six questions about the length, time, and clarity of the questions, the structure and format of the questions, and the difficulties of the questionnaire and the items (Appendix F). Feedback from the pilot test respondents was instrumental in further refining the questionnaire. Some questions were rephrased and adjusted to enhance clarity for better understanding, and to ensure that it was well received by the intended respondents (Boynton, 2004).

The responses from the pilot questionnaire were used to evaluate the internal consistency of question 38, which contained 15 questions relating to attitudes to

unintentional injuries. The internal consistency of a scale is measured by Cronbach's alpha (α) value, which ranges from 0 to 1, with optimal values between 0.7 and 0.9 (Creswell and Creswell, 2018). The Cronbach's alpha (α) value for the 15 items of the Likert scale component was 0.705, which is deemed acceptable.

4.2.2 Ethical consideration (survey)

Ethical considerations were paramount in the survey design, data collection and analysis. Prior to participation, potential participants were provided with a Participant Information Sheet (Appendix K and Appendix L). Access to the information sheet was provided through the URL link mentioned in the advertisement sheet (Appendix N) and via a hard copy offered to interested volunteers who were in health centres waiting area. The survey front page included a summary of the study's purpose and information that participation was voluntary. The information sheet and front page also included information on how to contact the researcher (MJ) to clarify any questions, and it was also included with encouragement to do so if necessary. Though the questionnaire was designed to minimise any potential discomfort or risk to participants, the information sheet included addresses of GPs and psychological support if needed.

Consent to participate in the survey was contingent upon the caregiver's willingness to complete the questionnaire. Two initial questions on the survey instrument indicated that participants had read the study information, and a subsequent question asked for their explicit willingness to participate (Appendix G). Only those who consented were eligible to proceed with the survey. Names and any information that may indicate the identity of the participants were not requested in the survey to ensure their anonymity. All completed questionnaires were stored securely on a password protected server

and only accessible to the research team. The results were reported in aggregate form, preventing the identification of individual respondents.

4.2.3 Data collection procedure

The quantitative data were collected from 15 October 2021 to 20 January 2022. The questionnaire was administered electronically using Microsoft (MS) Forms through a secure online platform hosted at the University of Birmingham. MS Forms is a data collection tool that has several advantages that make it appropriate for this study. It is an efficient way to collect data from multiple respondents that does not require manual transfer processes which can lead to error or data loss. In contrast with paper-based questionnaires, online questionnaires can take advantage of features which encourage completion of all questions (Evans and Mathur, 2018), which helped to minimise the potential bias associated with missing responses. However, to promote participant autonomy and inclusivity, the survey featured an 'others' option in multiple-choice questions, allowing respondents to express perspectives beyond predefined choices. In addition, question branching was employed for some questions, guiding participants to relevant sections. If 'other' was selected, the survey directed respondents to an open comment space, facilitating nuanced qualitative insights. This design captures diverse perspectives while ensuring data completeness and participant engagement. A clear instruction on how to complete each type of question was provided.

An online questionnaire is also convenient for participants because they can respond to it at their convenience and take as long as they need (Regmi et al., 2016). However, some potential participants had no subscription to the internet and participating in the questionnaire using their devices was impossible. The health centres also have no free

Wi-Fi. When this issue was recognised, participants with no internet service and who wished to participate while they were in the waiting room were offered use of the researcher's iPad.

4.2.4 Sampling technique

Caregivers who participated in the questionnaire were self-selected in a non-probability convenience sample technique. This sampling technique is suitable for the exploratory nature of this study, as it allows participants to voluntarily share their insights, fostering a more authentic exploration of factors contributing to their practice of child injuries prevention (Bryman, 2016). It also offered a feasible and cost-effective sampling approach for the questionnaire (Clark et al., 2019). However, convenience sampling is criticised because it provides little opportunity to control sampling bias (Burns and Grove, 2010). Hence, to promote variation in participants' characteristics (e.g., socio-economic characteristics) participants were recruited from ten purposively selected health centres from urban and developed provinces with various socio-economic backgrounds.

4.2.5 Sample size

The sample size of caregivers to participate in the survey should consider the aim and objectives, study design and analysis plan (Bryman, 2016). In addition, the total number of children from which the sample is to be drawn serves as a crucial parameter in determining the level of precision and confidence needed to obtain statistically meaningful results, ensuring the study's findings represent the entire population (Clark et al., 2021). According to the National Center of Information and Statistics (2020), the

total number of children below five years of age in Muscat is 98,195, constituting 22.4% of the total number of Omani children of the same age.

The sample size for this study was determined using a formula that considers the desired confidence level, margin of error, and the estimate of the population proportion. This approach ensures that the sample accurately represents the population, providing reliable and valid results. The sample size was calculated for a population with a 95% confidence level and a margin of error value of 0.05 using the formula:

$$n = \frac{Z^2 p x (1 - P)}{E^2}$$

$$n = \frac{(1.96)^2 \times 0.5(1 - 0.5)}{(0.05)^2}$$

The Z-score reflects the desired confidence level, P is an estimate of the population proportion, and E signifies the acceptable margin of error in the sample. Assuming a conservative estimate of the proportion ($p = 0.5$) and a desired confidence level of 95%, with a Z-score of 1.96, the calculation yielded a required sample size of approximately 384.16. Recognising that a fraction of a person in a sample is impractical, the sample size was rounded up to the nearest whole number, resulting in a recommended sample size of around 385 for the given parameters.

4.2.6 Survey recruitment

Caregivers were recruited by self-nomination from the visitors to PHCCs in Muscat and run by the MOH. To participate in the study individuals had to be an Omani caregiver over the age of 18 years with one or more children under the age of five. The criteria were clearly explained in the advertisement and information sheet (Appendix I,

Appendix J, Appendix K, Appendix L). To confirm eligibility, the survey began with a question that asked them if they were a caregiver of a child younger than five years. An advertisement for participation in the study, using a printed flyer posted on the communication board of the waiting area and immunisation room. The printed advertisement was also distributed to caregivers by nursing staff while they were in the waiting area. This approach allowed more opportunities for interested participants to know that the study was taking place and to seek information about its purpose and their rights and responsibilities.

Potential participants were provided with a participant information sheet translated to Arabic (Appendix K, Appendix L) as a hard copy and was also available on the study website that potential participants could navigate to via a QR code on the study advertisement displayed in the PHCC waiting rooms (Appendix I and Appendix J). The survey also included a summary of the study's purpose and reassurance that participation was voluntary. Details of how to contact the researcher (MJ) to address any questions were included with encouragement to do so if necessary.

Participant consent to participate in the survey was contingent upon their willingness to complete the questionnaire. Two initial questions on the survey instrument were used to indicate that participants had read the study information, and a subsequent question asked for their explicit willingness to participate. Only those who consented were eligible to proceed with the survey. Names and other information that might indicate the identity of participants were not requested in the survey to ensure their anonymity.

Although English is the primary source language for the consent form and information sheet, Oman is a country where Arabic is widely spoken. These materials were therefore translated into Arabic using forward and backward translation, with attention being paid to the accuracy of the translation.

4.2.7 Data analysis

Data analysis started with data preparation, which included data cleaning, coding, and selecting appropriate statistical analysis (Rowley, 2014; Guetterman, 2019). MS Forms stores data in an Excel spreadsheet (Microsoft Corporation, 2021), which allowed for initial data checking and coding.

Data cleaning involved reviewing responses for any errors or missing values and ensuring data quality standards. The original responses were in Arabic and were translated into English for reporting purposes. This translation process was carefully checked by a bilingual English and Arabic speaker to ensure data integrity and preservation of cultural nuances. Once responses were reviewed and translated, they were coded to make them compatible with SPSS and facilitate analysis. Data were then exported from Excel to SPSS 27.1 for Windows (IBM, 2020) for analysis. Attention to details during this phase was important to maintain integrity and ensure the quality of subsequent analysis. In SPSS, data were rechecked for accuracy including variables, values, labels, and level of measurements. Then, appropriate levels of measurement were adjusted prior to analysis. This process helped to ensure that the data were organised in a way that was easy for analysis.

SPSS descriptive statistics were initially used to analyse the categorical variables (Table 4-2). The emphasis at this stage focused on exploring patterns and

relationships within the categorical data, utilising appropriate tools and techniques to gain insights from the multiple-choice questionnaire data. The variables were categorised into five main sets: sociodemographic factors, injury pattern and mechanism, post-injury intervention, safety measures, device use and practice, and sources of knowledge and health education. All the variables entered into SPSS were analysed and presented as numbers and proportions. Frequency analyses provided a better summary and overview of the results. Visualisations, such as stacked bar charts or grouped bar charts, were used to help demonstrate response distributions across different variables. Ordinal data (agree/disagree scale) were presented in a table using mean, standard deviation (SD) and the percentage of total respondents who indicated agreement with statements.

Table 4-2: Summary of the study variables

Variable group	Variables collected
Respondent	Age Relationship to child Highest educational attainment Marital status Employment status of mother
Household	Residential area (Wilayat) Residents (number and relationship to child) Type of housing Ownership of housing Family income
Children	Number of children Age of children
A child who has a history of injury	Age. Gender Nature of injury Supervisor at time of injury

Variable group	Variables collected
	Management of injury Frequency of use of medical services because of injury Skills and knowledge of injury management Perception of preventability of injury
Constraints on supervision	Time Safety measures Multiple children Employment outside the home Naughty or disobedient child
Household safety features	Number and type of safety features in the home The rationale for not having one or more safety features Perception of affordability of safety features Use of safe practices at home
Environmental risks	Maintenance of roads Location of playgrounds Traffic management systems
Attitudes and beliefs relating to child safety	Responsibility for injury Role of fate or destiny Inevitability of injury Attitude towards use of safety equipment
History of health education	Exposure to health education relating to injury prevention Location of health education session A health professional who delivered the session Most likely place to get information related to child safety

Following descriptive analysis, chi-square testing was used to explore the relationships and associations among categorical variables for injuries and putative risk or causal factors. An alpha level of 0.05 was selected to signify statistical significance. The use of chi-square tests helped to ascertain the presence of dependencies between some variables (Table 4-3).

Table 4-3: Hypotheses tested by chi-squared

Hypothesis	Independent variable	Dependent variables
The occurrence of injury is associated with demographic characteristics of the household	History of injury	Residential area Perception of maintenance and facilities in local area Style of housing Ownership of housing Number of people in household Income level Employment of mother Number of children in household Number of children under five years in household
The occurrence of injury is associated with supervision arrangements in the household	History of injury	Main supervisor Employment of housemaid Perception of constraints on supervision
The nature of injury is associated with demographic characteristics of the child or their supervision	History of injury Nature of injury	Age of child Number of children in the household Supervisor at the time of injury

4.2.7.1 *Analysis of open-ended questions:*

The open-ended questions were analysed using framework analysis as outlined by Ritchie and Spencer (1993) (see section 4.3.6 for the detailed process). Framework analysis provided a systematic method for managing and mapping qualitative data from survey open-ended questions, allowing for the identification of key themes and patterns within the responses. This involved familiarisation with the data, identifying a

thematic framework, indexing, charting, and mapping, thus ensuring a comprehensive exploration of participants' views and experiences.

Initially, responses to questions were exported from MS forms along with quantitative data to the Excel sheet. Data was then coded using the SEM (McLeroy et al., 1988) as a guide, considering individual, interpersonal, organisational, community and societal levels. Recurring themes and patterns were identified, categorised, and organised according to the SEM in a framework matrix. This approach allowed for a thorough exploration of the comments added to the closed-ended questions, ensuring their meaningful integration into the data set alongside the quantitative data.

Following coding and charting, data were interpreted and presented in the findings chapter along with the quantitative findings. Integrating qualitative insights with quantitative results improved understanding of responses to open-ended questions. The qualitative and quantitative findings from the survey allowed for a comprehensive understanding of the factors influencing caregivers' knowledge, skills, and attitudes toward UCI prevention.

4.3 Part 2: Qualitative

This section describes the methods used to conduct the semi-structured interviews with HCPs. It includes a description of the sampling strategy, data collection, and analysis.

4.3.1 Sampling strategy

Initially, ten health centres were purposively selected from 29 health centres in six districts in Muscat. A variation in geographical and social characteristics (urban vs

modern), and the number of visitors to the health centre were used as selection characteristics. The variance in health centre characteristics helped to capture a range of socio-economic backgrounds and cultural contexts to help make the findings applicable to various socio-demographic communities. Therefore, the sampling strategy was designed to enhance transferability to similar settings.

After identifying health centres, chief nurses in each health centre were approached by the researcher to facilitate communication with potential participants. Each health centre has approximately 22 nurses and 11 or 12 doctors working in two shifts: a day shift (07.30 to 14.30) and an evening shift (14.30 to 21.00). All the HCPs did some shifts in the child clinic (immunisation room), so all the staff had an opportunity to participate in the study.

The advertisement for participant recruitment commenced after a meeting with the health centre's directors to discuss the assistance that could be provided to facilitate data collection. An advertising flyer (Appendix N) including an invitation to participate in the study, with the researcher's contact address, was posted on the staff communication board, and copies were given to the chief nurse in the health centre. Potential participants working with children were approached while at work, and those interested in participating were given the opportunity to ask questions about the study.

The principle of data saturation was employed to estimate a sufficient sample size. The point of saturation was achieved with 20 interviews conducted with HCPs from the ten health centres. Saturation was considered important in this study to guide appropriate conclusions of the data collection. Continuous data analysis was conducted during interviews, with patterns and recurring themes being identified. Saturation, which is a

concept developed by Glaser and Strauss, refers to the point when no additional insights emerge from the data, and all relevant conceptual categories have been explored and identified (Hennink et al., 2017), suggesting that further data collection is unnecessary (Kerr et al., 2010; Pope and Mays, 2020). Guest et al. (2006) suggested considering five elements when using saturation as a criterion. These elements are the homogeneity of the sample, the focus of the topic, the study purpose, the interview questions, and the analysis approach. Nine interviews can be adequate for a study aiming to outline broad thematic issues (Guest et al., 2013; Hennink and Kaiser, 2022). Guest et al. (2013) stated that though there is no definite participant number for the interview, 12 interviews should be enough.

The sampling strategy allowed for the practical recruitment of healthcare professionals from selected health centres. The emphasis on maximising heterogeneity in the sample was valuable for exploring diverse perspectives from different districts. It enhanced the richness and depth of insights within this PhD study, providing a comprehensive understanding of the various experiences among healthcare professionals in the PHCCs.

4.3.2 Ethical considerations (interviews)

Potential ethical issues in the study were considered to reduce any risk of harm from participating in the study, to maintain the privacy, anonymity, and confidentiality of all participants, and to obtain informed consent (Bryman, 2016). A participant information sheet (PIS) (Appendix O) was given to potential participants. It clearly explained the details of the study, including its purpose and the specifics of the interview process. This information included the expected time and duration of the interview and the use

of audio recording and transcription. Additionally, the PIS provided a thorough description of the potential risks and benefits of participation and the confidentiality and anonymity of personal data. Potential participants were given ample opportunity to ask questions, and it was made clear that participation was entirely voluntary. If participants agreed to participate in the study, they signed a consent form (Appendix P) before their interview and were provided with a copy for their records. To protect confidentiality and participants' anonymity, documents and records related to the interview were labelled with a code known only by the researcher.

A risk of triggering traumatic memories, either personal or vicarious, was considered. To mitigate harm, the PIS contained information about support services and participants were reminded before the interview commenced that they could stop at any time to take a break and could withdraw from the study without prejudice if they wished.

4.3.3 Preparation for the interviews

The four-phase process of interview by Castillo-Montoya (2016) was followed to provide a structured process. The process is the development of the interview questions that are aligned with the research aim and questions, developing inquiry-based conversation, getting feedback on the interview plan, and testing the interview in a pilot interview. The purpose of the first two phases is to create a protocol that helps to produce information relevant to the research question, while phases three and four help to ensure the trustworthiness of the research instrument (Castillo-Montoya, 2016).

The process started with developing the interview guide, which is aligned with the research question (Clark et al., 2021) and informed by the SEM model. It was

developed to ensure a comprehensive exploration of individual, interpersonal, organisational, community, and societal factors. The interview guide (Appendix M) was developed by the researcher (MJ) and reviewed by the supervisors (JT & AS). It included 12 standardised, open-ended questions about HCP perceptions of UCI and factors influencing its occurrence among children under five years. The term 'unintentional child injuries' was replaced by the term 'accidents at home that lead to injury' to make the focus clear. In addition, the questions directed participants to discuss existing health promotion practices relating to UCI prevention at their health centres and any suggestions for context-related health promotion initiatives.

The interview guide acted as a checklist to ensure all significant topics were covered, keeping the interview systematic and comprehensive, and utilising the time effectively (Patton, 2014; Ruane, 2016). Probe questions, such as 'Can you explain how?' and 'Can you give an example?' were used during the interview to clarify some responses (Clark et al., 2021). These probing inquiries aimed to better understand participants' experiences by encouraging detailed explanations and real-life examples.

The third phase was feedback and piloting of the constructed interview plan to enhance the trustworthiness of the tool (Ruane, 2016). In this phase, a review was made by four colleagues who have a background in child health and research interviewing. The reviewers role-played being an interviewee. During pilot interviews, each was asked to consider the structure of the interview (flow and organisation of questions), the clarity of the interview questions, and the time taken for the interview. Following the review, the interview was piloted with three colleagues working in healthcare institutions. They requested clarification on two questions, prompting us to edit them for simplicity.

4.3.4 Trustworthiness

The researcher's responsibility is to offer a detailed description of the research process, allowing others to assess its transferability to various settings (Nowell et al., 2017). Trustworthiness is how to persuade readers to see that the study findings are worth their attention. It is concerned with the criteria of credibility, dependability, and confirmability (Lincoln and Guba, 1985).

Credibility was ensured using procedures suggested by Nowell et al. (2017). This included engagement with the study participants by visiting their environment and conducting the interviews in the health centres. This engagement allowed development of a deep understanding of the context and building rapport, which enriched the data quality. Peer debriefing was used to ensure the accuracy of the interpretation of data. This took the form of a discussion with my supervisors, JT and AS, who provided critical feedback and a comprehensive review of the research findings, contributing to the overall credibility and validity of the study.

Dependability was considered in this study, as the translations of the transcripts from Arabic to English were checked by peer review, whereby a colleague with a PhD reviewed the anonymous transcripts. Three transcripts from the 20 interviews were reviewed to ensure appropriate translations and transcription. In addition, one of my supervisors reviewed a sample of the transcripts and the coding process to ensure that the results were grounded in data. At data analysis, a coding book was created with a framework analysis 'indexing phase' that was agreed with the supervisors JT and AS. Meetings were then conducted until they reached an agreement and were able to produce the final theme and method of data presentation.

The confirmability, the final facet of trustworthiness, is defined as the potential compatibility of the study, wherein the collected data's accuracy, relevance, or meaning can be agreed on between two or more people (Nowell et al., 2017). This was achieved by adopting a reflexive stance and documentation for an audit trail. A thorough audit trail was maintained throughout the research process, documenting decisions, methodological choices, and any modifications made during the study. This documentation serves as a transparent account of the research journey, offering insights into the evolution of the study design, data collection, and analysis. It also documented the steps taken and the rationale behind each methodological decision, including data collection and analysis. Therefore, future researchers can navigate and scrutinise the research process easily. This commitment to transparency and accountability enhances the confirmability of the study, ensuring that the findings are firmly grounded in the collected data and are reflective of the methodological choices employed. This documentation can allow an external reviewer to follow the decision-making processes and confirm the consistency of analysis. It also allows for the validation and replication of the study by providing a clear and accessible trail of the research.

Therefore, this study prioritised trustworthiness by embracing transparency, credibility, dependability, and confirmability. These strategies were instrumental in enhancing the quality and rigour of the qualitative findings, ultimately contributing to the overall validity and reliability of the research.

4.3.5 Data collection

Interviews took place at the participants' (HCPs) place of work in a space arranged by the chief nurse. The date and time for each interview were mutually agreed upon and scheduled during the recruitment process to ensure the availability of all participants. The interviews took place in a quiet room (office, seminar room, or counselling room) and a notice stating 'Interview in progress' was kept on the door. Conducting face-to-face interviews at the participants' workplace allowed the researcher to get clarifications and additional context-related data recorded in the notes, which supported an understanding of the context related to the practice of child health promotion in PHCC institutions.

All the interviews were conducted face to face and the time ranged from 25 to 40 minutes. Participants were given the option to express themselves in either English or Arabic according to their preference, fostering a comfortable and inclusive atmosphere. Interviews were recorded using a digital voice recorder with a participant's agreement, which was explained in the PIS and consent form. The recordings adhere to ethical guidelines, ensuring confidentiality and privacy. The interviews were concluded by thanking participants for their contributions, and any additional information was clarified as needed.

Observational notes were taken both before and after the interviews. Before the interview, preliminary observations involved documenting the surroundings, the interviewee's behaviour and any initial impressions. Post-interview, additional observational notes were recorded to summarise the overall impression of the interview, including dates and times, behaviours, and any noteworthy occurrences

during or after the interview. These notes served as a basis for understanding the interview environment and provided context for the subsequent analysis of the interview data. Making notes after the interview process also aided in maintaining data integrity, supporting interpretations, and allowing for tracking changes and developing themes throughout the interview series. All of these elements contribute to a thorough and insightful analysis (Roller and Lavrakas, 2015).

4.3.5.1 *Data management after the interviews*

The data were managed, stored, and shared as per the data management plan (DMP) by the University of Birmingham. All data items (audio and text) were pseudo-anonymised with file names and codes created that denoted the participant's profession and years of experience. The data were stored on a secure, password-protected portal, BlueBEAR Research Data Store (RDS), at the University of Birmingham per data management policies. BEAR RDS is a storage for 'research-in-progress' data. BlueBEAR is a UoB supercomputer for high-performance computing, which employs fast and efficient processing capacity for researchers (University of Birmingham, 2024). Access to data on BlueBear was restricted to the research team (MJ, JT and AS). Once the transcripts were completed and accurate, the audio files were deleted. The anonymised transcripts were shared with the supervisors. The data will be stored for ten years as per the University of Birmingham policy and requirements. After this period, it will be permanently deleted from the secure server.

4.3.6 Data analysis

A framework analysis approach was undertaken to analyse the interview data. Framework analysis was created in the 1980s by qualitative researchers Jane Ritchie

and Liz Spencer at the National Centre for Social Research in the United Kingdom for use in policy development (Ritchie et al., 2013). Ward et al. (2013) described it as 'flexible, methodical, and rigorous', with 'clarity and transparency'. This flexibility makes it suitable for the pragmatic approach of this study. In addition, framework analysis encourages researchers to immerse themselves in data, reflecting on their findings. This can help them better comprehend participant perspectives and experiences. Framework analysis is not constrained by any epistemological perspective, allowing it to achieve the optimum fit with the specific goals of any study (Ritchie et al., 2003). Framework analysis has some similarities with thematic analysis (Braun and Clarke, 2006) used commonly in psychology that produces a hierarchy of themes and sub-themes.

The framework analysis process includes five interrelated steps as outlined by Ritchie and Spencer (1993): familiarisation, identifying a thematic framework, indexing, charting, and mapping and interpretation. It starts with the researchers familiarising themselves with the data from the interview and then identifying a theoretical framework to guide the analysis. Thematic categories or codes are developed to classify the data, followed by indexing where relevant data portions are tagged with these codes. The coded data is organised into matrices during the charting phase, facilitating the identification of patterns and relationships. The researcher then interprets the data within the context of the chosen framework, summarising key findings in a final report.

These steps are not done in a linear fashion (Figure 4-1), and the researcher moves between stages back and forth (Kiernan and Hill, 2018). The iterative process of data

management involved the researcher (MJ) and the supervisors (JT) and (AS) moving forwards and backwards between stages.

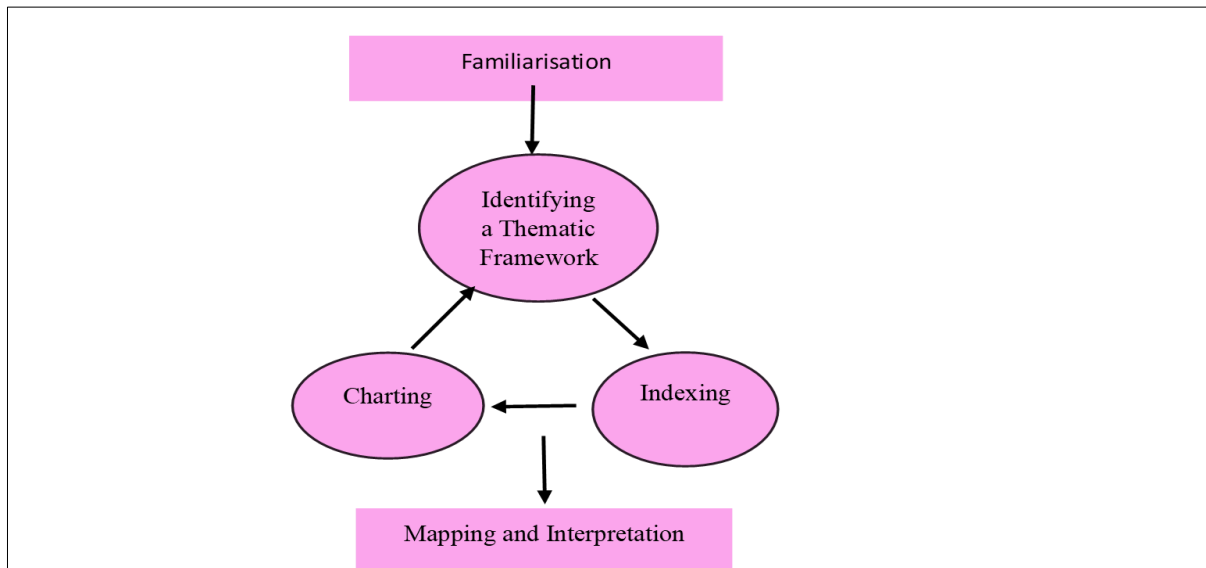


Figure 4-1: Framework analysis process (Kiernan and Hill, 2018)

Framework analysis allows the researcher to have a rigorous and transparent audit trail, which improves the rigour of the analytical processes' rigour (Ritchie et al., 2013). It offers an organised method for the coding process, where a codebook is used, extracted from objectives, interview questions, and literature reading, and the research team agrees on it before the initial coding process, and then it is revised later after the initial coding process. The coding process in the framework analysis model requires a significant amount of time. One of the benefits of the coding method is that it allows the researcher to easily summarise and compare the encoded data in an Excel document.

However, there are some limitations and challenges associated with the use of framework analysis. Parkinson et al. (2016) found some challenges in implementing it in their research. The analysis process takes a long time. Another limitation is the

possibility of approaching the initial steps of indexing and charting in a 'mechanical way', which risks the loss of valuable insights because of an over-emphasis on inductive analysis. However, Gale et al. (2013) argue that the tool has no adherence to either inductive or deductive thematic analysis, and whether a deductive or inductive approach is needed usually depends on the research question. The backward and forward development process of the themes ensured flexibility. The procedures are straightforward; however, the recursive process requires switching back and forth between phases (Gale et al., 2013). The framework analysis method is comparable in its key steps or procedure to Braun and Clarke (2006) approach to thematic analysis but differs in the process of coding. While Braun and Clarke use a bottom-up coding style, framework analysis uses a predetermined code book and the coding phase is more structured by using a framework, indexing and charting (King and Brooks, 2021).

4.3.6.1 Familiarisation

Familiarisation is the immersion of the researcher in data, providing an introduction and overall impression of the data contents and context of the data (Ritchie and Spencer, 1993; Parkinson et al., 2016). It involved a multistep process, including transcription and translation for comprehensive understanding.

4.3.6.2 Transcribing

Transcription is the first step in data analysis (Bailey, 2008) and, if omitted, may result in drawing conclusions before checking the data. In this study, the transcription of the recorded interviews was done verbatim by MJ. Transcribing verbatim is the process of writing recorded interviews with precise accuracy, maintaining the original wording and expression without any alteration or interpretation (Virginia and Victoria, 2013).

After the initial transcription, the researcher engages in a dual process of listening to the audio recordings while simultaneously reading the transcripts. This step validates the accuracy of the transcription, ensuring that the written text represents the spoken words. Simultaneously, the researcher actively notes any exciting or relevant details that may have been captured during the interviews which are related to the study aim and objectives. This dual approach enhances the depth of understanding, allowing the researcher to grasp the verbal content and subtle notes such as tone and emphasis. By combining auditory and visual engagement, the researcher uncovers additional layers of meaning and context, laying the groundwork for a thorough analysis and interpretation of the interview data.

Simultaneously, during this review, the researcher actively constructs preliminary concepts. These concepts describe each data set in the transcript, encapsulating the key themes and notable aspects of the participant's responses. This step aims to establish a foundation for identifying framework codes. By encapsulating the essence of each data set in these initial concepts, researchers can streamline the identification of overarching patterns and themes, contributing to developing a coding framework for in-depth analysis.

In addition, notes which were taken alongside the interview, such as the profession of the participants and where the interview took place, were checked while reading the transcripts to consider the context and get comprehensive information. The process of recalling non-verbal communication was easier as the researcher was the one who conducted the interview.

4.3.6.3 *Translation*

Following transcription, the interview was translated. The transcripts of the Arabic-language interviews were translated into English. The transcripts were initially translated from Arabic to English by the researcher MJ, who then had them reviewed by a colleague who is a bilingual Arabic-English speaker. Both translations were then compared to ensure accuracy and equivalency. The two bilingual translators then negotiated any inconsistencies that arose during the procedure.

The translated transcripts were read repeatedly to ensure immersion in the data and information. Some patterns were noted, which initiated thinking about ideas articulated in the interview. Important observations were highlighted and included in initial notes.

Dependability and confirmability were considered by involving supervisors at every phase (Easton et al., 2000). The first two transcripts were examined by the supervisor (JT), and suggestions were considered in other transcriptions. Once an interview was transcribed, the researcher checked the transcript for any errors by listening back to the recording and reading the transcripts simultaneously. All transcripts and notes were labelled carefully and stored in BlueBEAR. They were archived with dates to provide an audit trail and confirmation of data adequacy to confirm the data analysis and interpretation.

4.3.6.4 *Identifying a framework*

The purpose of this stage of the framework analysis is to organise the data and make them meaningful for interpretation (Parkinson et al., 2016). The levels of the SEM were used to develop the framework to code the transcripts. The *a priori* codes informed by the SEM were carefully identified to extract the data that provide answers to the

research objectives that look at factors affecting safety practice from an HCP perspective. The codes also focused on exploring the organisational culture within the organisational level of the SEM, where the *a priori* codes focused on identifying data related to health education practice, challenges, and opportunities for improvement within PHC.

In addition to the codes identified using the SEM model, emergent codes identified in familiarisation and later stages were identified and added to the codebook to enrich the data. The majority of *a priori* and emergent codes aligned with the SEM model. Parkinson et al. (2016) found from their experience of employing framework analysis that when developing a framework, it is useful to start with *a priori* coding. They argued that the development of framework categorisation should initially focus on data management, not on interpreting the data (Parkinson et al., 2016).

The initial framework was piloted on three interview transcripts to refine *a priori* coding. This step helped to enhance the initial framework, ensure its flexibility, and to be appropriate for the analysis of the data. During this stage, the transcripts were read by going through them line by line and applying the codes from the developed framework. The framework was refined throughout the testing analysis, and clarity of codes was obtained. Clarity was essential for coding the rest of the transcripts. The process of framework development needed time and several iterations (Parkinson et al., 2016). The final framework developed and used in this study for the indexing phase of analysis consisted of the categories in Table 4-4.

Table 4-4: Coding framework developed from the SEM

Individual level: parents Family socio-economic status Parents knowledge and awareness Ways of getting information Caregiver behaviour Interpersonal level: family Family norms and attitudes Family culture and believes. Socio-economic status Family support Parent, sibling, and extended family supervision Home physical environment Organisational level: health centres Health education practice Organisational challenges Professional challenges Parents challenges Resources and funding Opportunities for safety promotion Collaboration with other sectors	Community level Community socio-economic status Building and enforcing safety standards for playgrounds, road infrastructure, housing, and other environments Fatalistic and other cultural beliefs Behavioural norms that do not support safe behaviours. Enforcement of safety laws Societal level Cultural influences Economic factors Policies and regulations Social facilities e.g., childcare, nurseries

Once the framework had been piloted in three interviews and discussed with the research team, it was applied to the rest of the interview transcripts.

4.3.6.5 *Indexing*

The 'indexing' stage is the initial step in coding the transcripts. This stage aims to organise the transcripts into framework categories (Ritchie and Spencer, 1993). Therefore, the developed framework was used to code each interview transcript

(Appendix Q). The coded part of the transcripts was then placed in the appropriate category, and the process was carried on throughout the transcripts. Some sections from the text were allocated to more than one code if they added something to the interpretation. Data that did not fit any category were coded as 'Other' or led to creation of a new category. Parkinson et al. (2016) identified framework analysis development as an 'ongoing process' that can be adjusted at the latter stages of analysis. After indexing all the transcripts in the same way, the NVivo 12 features of extracting coded texts in a table matrix was utilised to organise data for exploration in the following stage of analysis.

4.3.6.6 *Charting*

In the charting stage, the indexed data was organised in a chart which helped to facilitate data interpretation. The arrangement of data in a matrix is a feature that distinguishes the framework method from other qualitative analysis such as thematic analysis (Parkinson et al., 2016). Through NVivo the data was exported in a matrix that displays data in rows (case), columns (codes), and cells of summarised data. The matrix provided a structure that allowed the researcher to systematically develop and reduce the data so that it could be analysed by case and code (Gale et al., 2013). To chart the transcripts, the researcher worked through each framework category, summarising the indexed data for each participant. The facilities available in NVivo helped us link the summaries and the original section to retrieve later if needed for clarification. During summarisation the data set was reduced to make it manageable while, on the other hand, making sure to keep the participants' words and edit them only for clarity. Finally, the 20 interviews were summarised before moving to the final part of the framework analysis.

4.3.6.7 *Mapping and interpretation*

This stage of framework analysis aimed to move from organising data using a framework matrix to getting a comprehensive understanding of it. As Ritchie and Spencer (1993) have outlined, this involves synthesising key aspects of the data to map and interpret the entire dataset efficiently. The process included defining and clarifying concepts, illustrating the diversity and characteristics of phenomena within the data, forming typologies, identifying relationships, and constructing bottom-up explanations, which helped the researcher suggest strategies for health education and injury prevention where applicable.

Therefore, the data that were extracted into the matrix during the 'charting' phase underwent a thorough review, annotations were added, and an examination of emergent patterns ensued. Gradually, a deeper understanding began to take shape. Subsequently, these identified patterns were explored to create themes relevant to the research questions (Appendix R). This systematic process allowed for extracting meaningful insights, contributing to a comprehensive understanding of the dataset. The themes identified play a crucial role in revealing the intricate layers of information embedded within the transcripts.

Employing the SEM as the framework for analysis adds depth and context to the identified themes. This model, which encompasses individual, interpersonal, community, organisational, and societal levels, allows for a comprehensive exploration of the social and environmental factors influencing safety measures and injury prevention. This phase involved categorising themes according to these nested levels, providing an understanding of how various factors interact and shape the narrative. Interpretation, then, delves into the relationships between these themes and interprets

their implications. By utilising the SEM, the analysis goes beyond surface-level observations of data, capturing the dynamic interplay between individual factors, interpersonal dynamics, community influences, organisational structures, and broader societal contexts.

This approach facilitates a more holistic comprehension of the data and contributes to the development of targeted interventions and policies that address the multifaceted nature of the issues under consideration. Being the researcher and the analyser helps to develop a comprehensive understanding of the interview data. This was followed by summarising the findings in a table and reporting them in narrative style in the findings chapter. The understanding of findings happens gradually throughout the analysis process.

Credibility was checked by presenting the interpretation to the supervisors (JT & AS), who provided their comments and suggestions. The outcome of the mapping phase was reported in the final report.

4.3.7 Integration of quantitative and qualitative data

In this study, the findings from caregivers and healthcare professionals were integrated to gain a more comprehensive understanding of the research aim and objectives. Integration refers to the stage where the quantitative and qualitative methods converge (Tashakkori and Teddlie, 2003). Determining the point of integration and how the results are integrated is the most critical decision in the design of mixed methods research (Schoonenboom and Johnson, 2017; Clark, 2019). The timing depends on MMR design and can occur at the design, methods, interpretation, and reporting levels (Fetters et al., 2013).

In convergent mixed methods research, the goal is to combine quantitative and qualitative findings to address the research question comprehensively. Merging is an approach to integrating data, which includes merging, connecting, developing, and embedding (Creswell and Creswell, 2018). The approach of merging data is about combining the data from different sources in text and numbers by reporting both in a discussion section (Creswell et al., 2011). In this study, a separate quantitative and qualitative data analysis was undertaken, aligning with the research objectives and theoretical framework.

Data integration at the interpretation and reporting levels can occur using narrative, transformation, and joint display integration approaches. Transformation involves converting data from quantitative to qualitative and *vice versa*. In joint display, data are presented in visual means. Integration commonly uses a narrative approach, often adopting three approaches: weaving, contiguous, and staged (Fetters et al., 2013). The contiguous approach to integration encompasses the presentation of findings within a single report, but the qualitative and quantitative findings are reported in different sections. The staged approach to integration often occurs in multistage mixed methods studies when the results of each step are reported in stages as the data are analysed and published separately. Weaving involves writing both qualitative and quantitative findings together on a theme-by-theme or concept-by-concept basis.

This study used the contiguous approach to integrate the data at the reporting level, as it allows for the seamless integration of quantitative and qualitative data, a method particularly well suited to the research question and data. It involved presenting data from HCPs and caregivers in a different section in the findings chapter. The survey was presented first in the findings chapter and then was followed by the findings from

the interview. Subsequently, to facilitate understanding, the questionnaire and interview findings were presented in a joint display table that arranged the conclusions using the SEM (see Table 5-19).

The quantitative and qualitative data from the questionnaire were reported in the findings section using a weaving approach of integration. This approach involved writing both qualitative and quantitative findings together on a theme-by-theme and guided by SEM.

Following this the key findings were then interpreted and discussed in the discussion chapter. Issues related to interpretation based on the results integrated from various data, including the unequal focus placed on different items of data, the validity of each form of data, or the combination of quantitative and qualitative research, were all considered.

To help clarify for the reader which findings relate to the caregiver survey, and which relate to the HCP interview, each group will be referred to differently. Caregivers who completed the survey, and results related to the survey will be denoted by using the term 'respondents'. HCP interviewees and results related to those interviewees will be denoted by the term 'participants'.

4.4 Summary

Research methods are a vital part of any research process, as the quality of the findings depends upon them. Hence, this chapter has provided detailed information on the methods followed in this research study. Justification was provided on the research design that was chosen to answer the research aim and objectives. The study design

was convergent mixed methods research within a pragmatism paradigm. In the quantitative phase, a survey was employed to collect data from Omani caregivers of children under five years of age using an online questionnaire modified from previously used questionnaires. Non-parametric statistical analyses included frequencies, proportion, and chi-square, which were employed to analyse the data using SPSS 27.1. The qualitative component involved a semi-structured interview with healthcare professionals working in PHCCs to explore factors affecting safety practices among Omani caregivers and challenges to safety education and injury prevention. Qualitative data analysis was guided by framework analysis and aided by NVivo 12. This approach allowed the independence of both data types during data collection and analysis to be maintained. Convergence occurred during the data interpretation phase, where we merged quantitative and qualitative findings were merged. Ethical guidelines were rigorously followed throughout the study, ensuring participant confidentiality and informed consent. Strategies such as member checking enhance the validity and trustworthiness of the findings.

Chapter 5 Findings

This chapter presents the findings from mixed methods study employing an online questionnaire administered to caregivers and interviews conducted with healthcare professionals (HCPs). The research was guided by the SEM (McLeroy et al., 1988) to answer research objectives from individual, interpersonal, community, organisational, and societal levels. The aim of the research is to explore the needs, challenges, and opportunities to enhance Omani parents/caregivers' awareness and practice in relation to unintentional child injury prevention. The research objectives covered are:

- 1) To explore Omani caregivers' knowledge, practice and attitudes towards preventing unintentional child injury
- 2) To identify factors that influence Omani caregivers' practice of considering child safety measures in their homes
- 3) To Explore the perceptions of HCPs regarding how parents prevented and managed UCI
- 4) To identify through interviews opportunities and challenges for considering child safety education within the priorities of child health programmes in Oman from HCPs perspective.

The term 'injury', as previously defined in this study (Section 1.1), refers to '*physical damage that results when a human body is suddenly subjected to energy in amounts that exceed the threshold of physiological tolerance*' (Peden et al., 2009). An accident is defined as an unplanned or unexpected event that results in an injury, for example, a fall from a height, ingestion of a toxic substance, or contact with a heat source. In the subsequent sections of this chapter, the exploration centres on cases managed at

home and those where medical attention was sought. This exploration incorporated socio-demographic characteristics to uncover the diverse factors influencing injury occurrence. By studying both those who experienced no injuries and those who did, along with their management, valuable insights into safety practices within the Omani context were gained.

This chapter includes three sections, each contributing a crucial dimension to the understanding of the subject. To be clear, the source of data participants who took part in the survey are referred to as respondents, and those who took part in the interview are referred to as participants.

Section 5.1 presents the findings from the caregivers' survey, including respondents' socio-demographics, household characteristics, history of injuries, supervision, hospital visits, perception of preventability, safety practices, and sources of child safety knowledge. The findings are presented according to SEM levels. The experience of injury cases who attended medical care or not was examined in relation to the independent variables, including socio-economic characteristics, beliefs, and safety practice. Other child safety measures such as supervision and home safety were examined in relation to socio-economic characteristics. Survey responses to open-ended questions were aligned with relevant variables addressed by closed-ended responses.

Section 5.2 presents the findings from the semi-structured interviews with healthcare professionals organised first by presenting the participants' demographic data, followed by the five SEM levels and subthemes under each theme, and supported by relevant quotes.

Finally, in section 5.3, the findings from the survey and the interview are integrated and presented in a table, facilitating a holistic understanding of the research findings.

The findings from both the surveys and interviews will be presented using the different levels of the SEM, which comprise individual, interpersonal, community, and organisational factors, and societal influences.

5.1 Quantitative findings

The section on the quantitative findings will begin with demographic data about the respondents and the nature and types of incidents experienced by children. Following this, the results are presented according to the five levels of the SEM.

5.1.1 Respondents' (caregivers') demographic data

The questionnaire was administered to caregivers of children under five who visited primary healthcare centres located in the Muscat region between 15 October 2021 and 12 February 2022. It was completed by 383 respondents from four areas in Muscat region, with the majority coming from Al-Seeb (Figure 5-1).

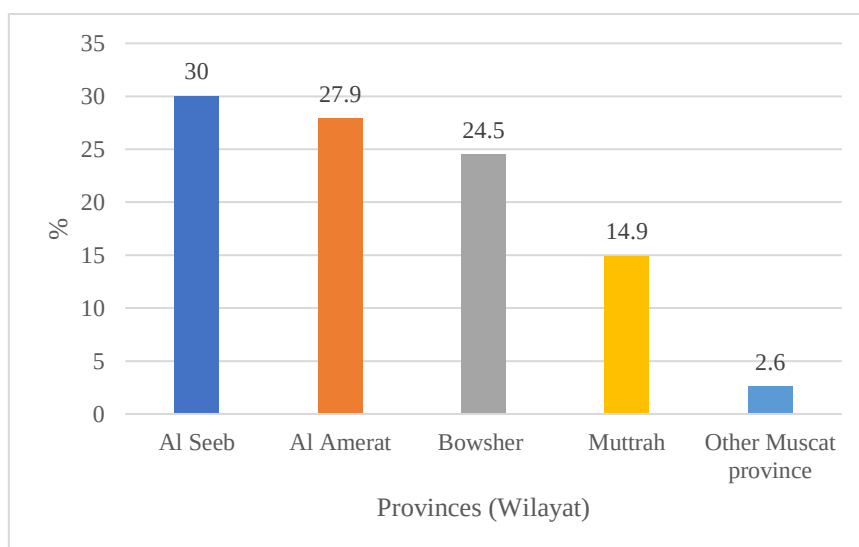


Figure 5-1: Wilayat (areas) where respondents reside

Most respondents (94.3%, n=361) were mothers (Table 5-1), the majority being married (98.4%, n=377), and just over half (54.5% (n=209) employed outside of the home.

Table 5-1: Respondents socio-demographic characteristics

Respondent	Characteristic	n (383)	%
Respondent	Mother	361	94.3
	Father	13	3.4
	Aunt/Uncle	7	1.8
	Other	2	0.5
Respondent age	18–20	3	0.8
	21–30	124	32.4
	31–40	217	56.7
	41–50	38	10
	Above 50	1	0.3
Educational qualification	Postgraduate degree	30	7.8
	Bachelor's degree or equivalent	130	33.9
	University diploma	60	15.7
	High school	139	36.3
	< High school	24	6.3
Marital status	Married	377	98.4
	Divorced	5	1.3
	Widow	1	0.3
Employment	Housewife	174	45.4
	Working mothers:		
	Day shift (07:30–14:30hrs)	118	30.8
	Day shift (08–17:00hrs)	31	8.1
	Shift worker	53	13.8
	Self-employment	7	1.8
	Total working mothers	209	54.5
Working hours	<7	32	15.3
	7–8	132	63.2
	9–10	40	19.1
	11–12	3	1.43
	>12	2	0.95
	Total	209	

Households were comprised of more than one family unit, with most (58.7%, n=225) having six or more residents. It is usual for households to be multigenerational, with 31% (n=94) including grandparents and 21.9% (n=84) including aunts and uncles (Table 5-2).

The modal number of children was two per household (26.4%, n=101), with a range from 1 to 8. The number of children per household is similar for mothers who work outside the home and those who do not ($\chi^2=5.658$, df =7, p=0.580).

Table 5-2: Residents in household

		n	%
Number of residents	2 to 5	158	41.3
	6 to 10	184	48.0
	More than 11	41	10.7
	Total	383	100
Number of children	1 to 3	262	68.4
	4 to 5	94	24.5
	More than 6	27	7.0
	Total	383	100
Number of children under 5	1	270	70.5
	2	95	24.8
	3	12	3.1
	4	2	0.5
	Total	379	100
Residents*	Partner	334	87.2
	Grandparent	94	24.5
	Uncles/Aunts	84	21.9
	Niece/Nephew	25	6.5
	Others	9	2.3
	Total	383	100

*multiple response question

Most respondents live in a house of more than one storey (49.5%, n=189), and 71%, (n=271) live in a house owned by themselves or their family (Table 5-3). The modal number of people living in each house was five, with a minimum of two and a maximum of 25 people. In over 37% (n=142) of the privately owned multilevel houses, there is a

higher occupancy with parents, grandparents, siblings, domestic workers, and siblings' children.

Table 5-3: House style and household income

		n	%
Ownership	Rented	109	28.4
	Owned	271	71.0
	Other	3	0.8
	Total	383	100
Type of house	More than 1 storey	189	49.5
	Single storey	122	31.9
	Annex	7	1.8
	Other	3	0.8
	Total	382	100
Household incomes	>1500	51	13.3
	1000-1500	114	29.8
	500-1000	149	38.9
	<500	66	17.2
	Other	3	0.8
	Total	383	100

Among the group of 209 mothers who work outside of the home, 8% (n=32) send their children to a nursery, while most children remain at home and under the care of a family member or housemaid (Table 5-4). Most, 36% (n=138), rely on grandparents, 18% (n=69) on the child's father's care, and 24.5% (n=94) are supervised primarily by a housemaid.

Table 5-4: Supervision while mother is at work

		n	%
Supervision while mother at work	Grandparent	138	28.6
	Father	69	14.3
	Housemaid	94	19.5
	Aunt/Uncle	57	11.8
	Nursery	32	6.6
	Sibling	44	9.1
	Other	49	10.1
	Total	483	100

Approximately one-third (35.0%, n=134) of the participants reside with a housemaid and this is more common in households with an income greater than 1000 Omani Rial ($\chi^2=50.57$, df 4, $p<0.001$), which equates with the income that most respondents believe to be adequate (Table 5-5). Housemaids are more likely to be found in households where the mother works outside the home ($\chi^2=26.788$, df 1, $p=<0.001$).

Table 5-5 Income level, working mother and modal children

Income level OMR	Perception that this is an adequate income		Working mother		Housemaid		Modal children per household
	n	%	n	%	n	%	
>1500	48	94.1	36	70.6	35	68.6	3
1000–1500	105	92.1	87	76.3	55	48.2	2
500–1000	118	79.2	63	42.3	34	22.8	2
<500	21	31.8	23	34.8	7	10.6	2

1 OMR= 2.04 GBP

5.1.2 Characteristics of children's injury patterns

Out of 383 survey respondents, 59.4% (n=227) reported that their children sustained injuries at home via a few different mechanisms (Table 5-6). Most reported that injuries were attributed to falling from a height, such as high furniture (51.5%, n=101) and falling downstairs (25.5%, n=50). When children experienced an injury, 47.8%, (n=107) sought medical attention. The highest number of cases taken to hospital, totalling 67, were related to burns caused by a hot beverage. Among these cases, three children were admitted to hospital (Table 5-6).

Table 5-6: Type of home incidents

			Outcome of the incident* (%)		Supervisor at the time of the accident (%)				
	n	%	Hospital treatment	Hospital admission	Mother	Father	Grand-mother	House-maid	Other
Fall from furniture	101	51.5	38	1	43	12	8	15	23
Bumping into furniture	73	37.2	49	-	56	14	6	11	14
Fall from stairs	50	25.5	44	2	36	10	8	18	28
A finger stuck in the door	39	19.9	51	-	56	8	2	18	15
Burned by a hot drink	36	18.4	64	3	53	8	3	19	17
Incidents with a sharp object	20	10.2	60	-	45	10	5	15	25
Slipped on the floor	17	8.7	38	-	65	-	6	18	18
Choking on food	15	7.7	36	-	73	-	7	-	20
Ingestion of toxic substance	14	7.1	29	-	50	14	-	21	14
Fall from baby walker	10	5.1	19	-	30	10	10	30	20
Near-drowning	6	3.1	50	-	67	33	-	-	-
Swallowed or choked on parts of play equipment	3	1.5	33	-	67	-	-	33	-

*There is a significant amount of missing data relating to the outcome of the injury (first aid, other home treatment, hospital attendance or hospital admission)

In the open survey question related to respondents' opinion of home injuries, many (12.53%, n=48) expressed their biggest concern was burn injuries and the need to enhance public awareness to avoid such injuries.

There were similar numbers of male and female children who had a history of accidents ($\chi^2=0.56$, df 1, $p=0.45$) (Table 5-7). The children most likely to have been injured were aged between two and three years ($\chi^2=18.821$, df=3, $p<0.001$), with a relative risk of 1.35. This means that children aged between two and three years are 35% more likely to experience an injury than other children in the sample.

Table 5-7: Children's age, gender, and history of injury

				History of injury	
		n	%	n	%
Gender	Male	207	54.0	126	32.9
	Female	176	46.0	101	26.4
Age	<1 Year	47	12.3	19	4.9
	1–2 Years	132	34.5	69	18.0
	2–3 Years	108	28.2	79	20.6
	3–4 Years	96	25.1	60	15.7

There is some variability in the age of the child and the type of incident; the number of burns from hot drinks and falls from furniture was high among children between one and three years (Figure 5-2). In response to an open question about the type of injuries sustained by child after the incident, respondents identified fractures and cuts to the head, hands, or legs often resulting from falls as the most prevalent.

5.1.3 Individual level

5.1.3.1 *Belief in the inevitability of injury*

According to the findings presented in Figure 5-3, respondents' perceptions about the preventability of child injury vary, with 43.0% (n=156) believing it is often preventable and 46.1% (n=177) considering it sometimes preventable.

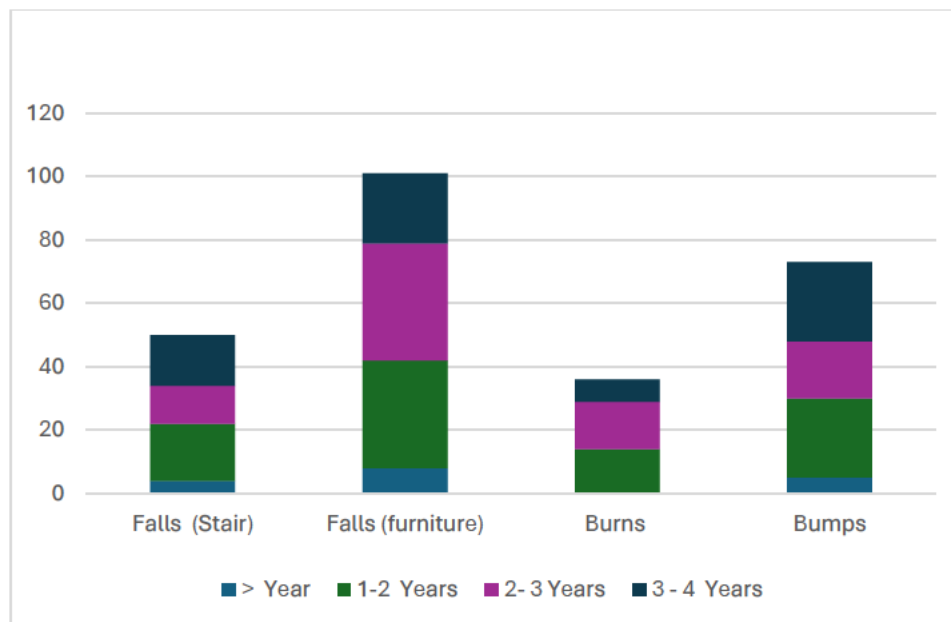


Figure 5-2: Child age and type of incidents

This perception is similar amongst parents whose children experienced injury and those who had not. The findings showed no relation between this perception and the mechanism of injury and no association with the need for medical attention.

A significant proportion (64.3%, n=247) strongly agreed with the statement 'Children will always be injured no matter what we do to protect them.' In addition, only 20% (n=77) agreed with the statement 'Parents should be blamed if a child is injured at home' (Table 5-8). This perception is unrelated to socio-economic characteristics.

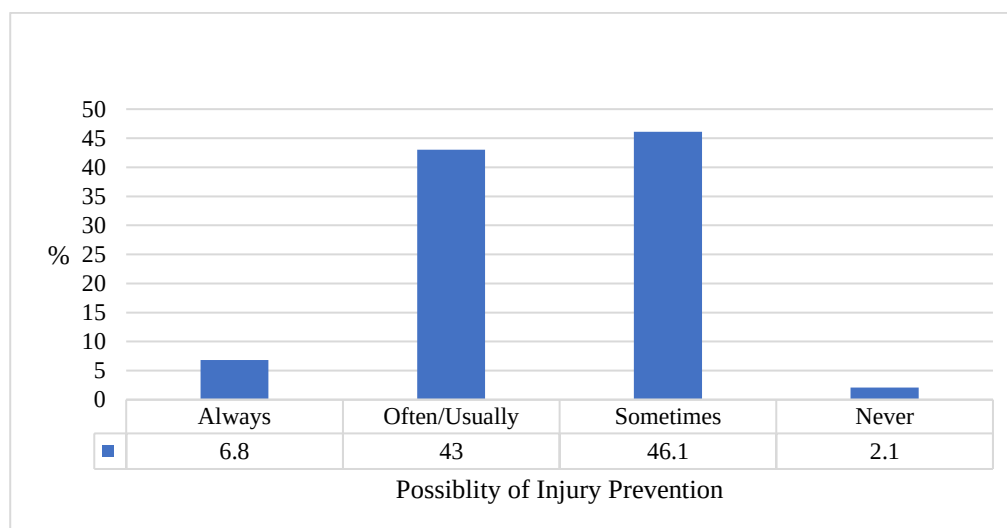


Figure 5-3: Is child injury preventable?

Almost one-third (32.8 %, n= 75) of the participants who answered that their children had been injured believed that the injury could not have been prevented. Many participants in the comments expressed the view that it would be difficult to completely prevent children from getting injured. Some others noted that accidents are a normal part of life and that injuries can still occur even when parents are present and closely observing their children. Some participants suggested that the child's age and the process of learning to walk can also contribute to the likelihood of accidents happening. Others mentioned that they were unsure how to prevent injuries, especially when they happened suddenly while children were playing or running. A few even mentioned that sharp edges in the building or other environmental factors may also play a role.

Those who expressed the opinion that their children's injury could have been prevented showed more awareness of preventive measures, as many stated that it could have been avoided through proactive safety measures. These measures

included being more cautious when handling hot beverages. Others suggested that parents should be more attentive to their children's needs and provide assistance during their early development, including ascending stairs. Some recommended placing sand or a rug in the child's play area, while others emphasised maximising supervision and attention. Some people also advised against giving children sharp objects like pens when playing with other children. In contrast, others suggested keeping objects like lighters out of reach of children to avoid accidents.

Table 5-8: Perceptions related to the prevention of child injuries

	Agree %	Mean	SD
1 Child injury prevention is mostly a parent's responsibility	82.5	4.23	0.779
2 If my child gets hurt, it is my fault	26.6	2.98	0.950
3 The injury is not the parent's or family's fault but the result of fate and God's will	71.6	3.92	0.832
4 Parents should be blamed if a child is injured at home	20.0	2.74	0.981
5 Children will always be injured no matter what we do to protect them	64.3	3.64	0.899
6 It is appropriate to legally question the carer when a child is injured due to negligence	40.8	3.21	1.077

Most respondents agreed (71.6%, n=275) with the statement, 'Injuries are not the fault of the parents or family but rather the result of fate and God's will.' This perception had no relation to the respondent's age, level of education, or income, but showed a significant relationship with the mother being employed ($\chi^2 = 4.664$, $df = 1$, $p = 0.031$).

5.1.4 Sources of information

Most respondents agreed (82.5%, n=317) that it was their responsibility to keep their child safe at home. They got information about child safety from various sources (Figure 5-4). Social media was the most common source of information among the respondents, with 64.60% (n=245) using it. Browsing the internet (54.6%, n=207) and television (53.6%, n=203) were also popular sources. In contrast, lectures and campaigns were less widely used, with only 14.1% (n=54) of respondents indicating them as sources of information. When asked about their preferred source of learning, most respondents highlighted internet browsing and social media applications like Instagram as their favourite ways of acquiring information. Many respondents mentioned exchanging information with their friends and learning from their elders as the most trustworthy way of learning about child safety. However, these preferences did not relate to respondent age or level of education.

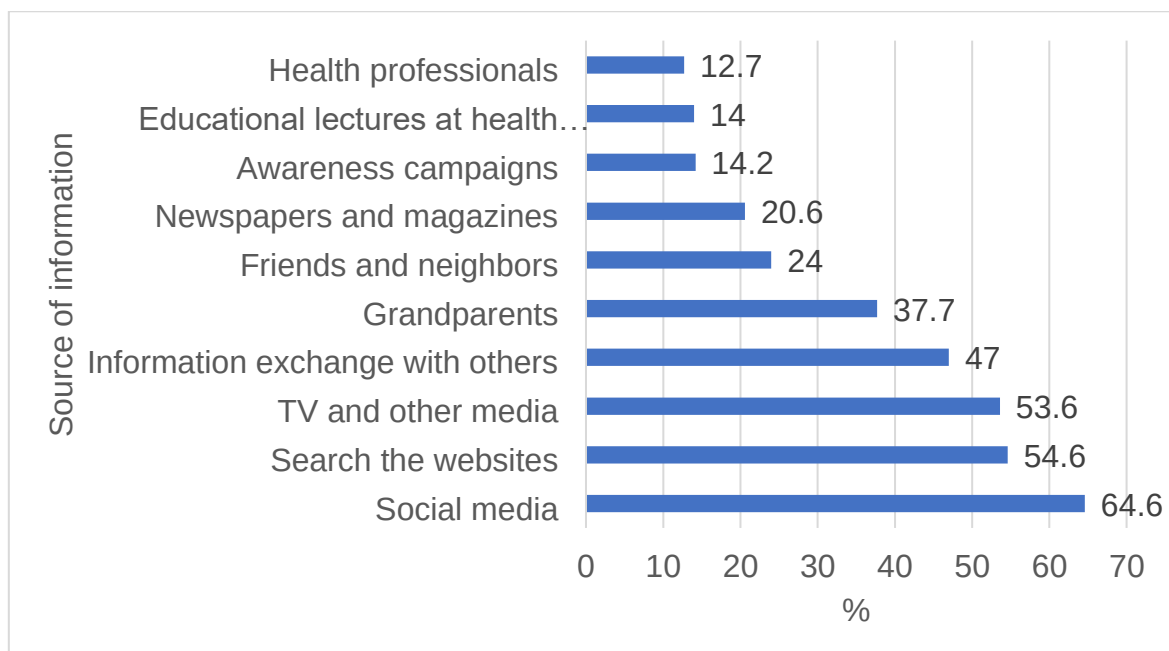


Figure 5-4: Sources of child safety information

The participants shared their suggestions for promoting injury prevention awareness. Most participants suggested increasing awareness among young mothers through education but did not specify where and how this education should be conducted. Some participants suggested displaying educational resources on TV, while others recommended incorporating injury prevention into the school curriculum. Additionally, some respondents suggested training children to identify and avoid potential dangers. Another participant recommended keeping safety messages in shopping centres, as mothers often visit these locations regularly.

5.1.4.1 *Inadequate knowledge and skills relating to preventive measures*

Most participants exhibit positive safety practices that can minimise potential home hazards (Table 5-9). However, many respondents still engage in potentially unsafe practices. Some respondents 12% (n=46) answered that they do not store detergent, chemicals, and drugs in a high or locked cabinet. When parents were asked whether the water heater temperature in their homes was adjusted to 50–60 Celsius degrees in their houses, 37.1%, (n=142) answered ‘No’. Additionally, almost 20% (n=76) responded ‘No’ to the statement ‘Toys are appropriate for your child's age and made from safe materials.’

Table 5-9: Home safety practice

	n	%
Basins and buckets are always kept empty after use	355	92.7
Avoid drinking hot drinks when holding the baby in your arms or playing with him	351	91.6
Sharp kitchen tools are stored in high areas	346	90.3
Detergent, chemicals, and drugs are stored in a high or locked cabinet	337	88.0
Avoid giving hard, small fruits or nuts to children to eat without supervision	336	87.7

	n	%
Store plastic bags out of children's reach	330	86.2
Avoid giving small candy and bubble gum to children under three years	311	81.2
Toys are appropriate for child's age and made from safe materials	305	79.6
Furniture kept away from windows	280	73.1
Electricity points covered or placed high on the wall	270	70.5
The water heater temperature was adjusted to 50–60 degrees Celsius	241	62.9
Avoid the use of a baby walker	144	37.6

5.1.4.2 Barriers to modifying the home environment

Only one respondent did not use any safety equipment in their home, and the median number of pieces of equipment was six. The most commonly used equipment was window locks used by 70.8% (n=272) of respondents (Figure 5-5), and the least commonly used was carpeting on the stairs, used by 7.6% (n=29). Notably, 13.1% (n=50) respondents reported cases involving children who had sustained injuries from falling downstairs. Findings showed that 191 households had a staircase, of which 29.7% had taken a proactive step by installing stair gates.

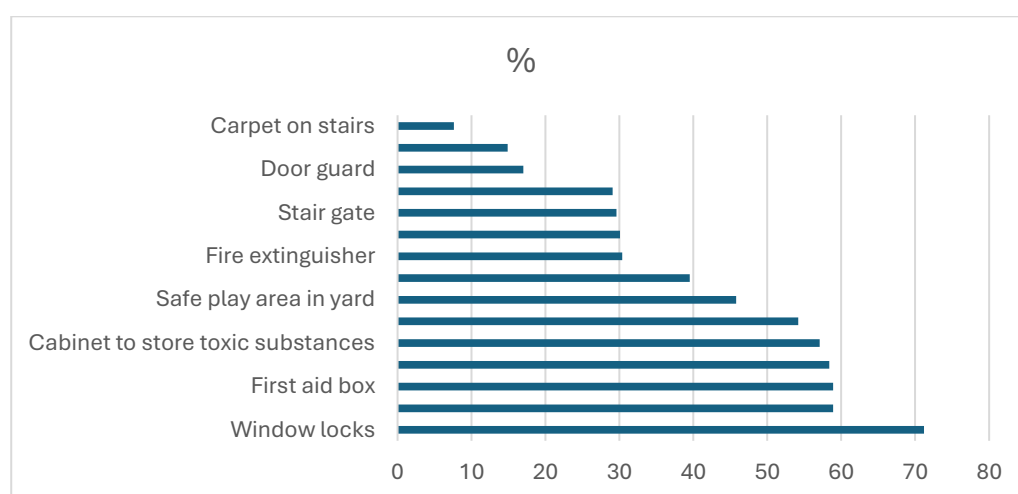


Figure 5-5: Use of safety equipment at home

When asked why items were not in use, the majority (42.3%, n=162) mentioned being unfamiliar with these items, and 35.5% (n=136) cited cost as a factor (Table 5-10). There was a significant association between safety equipment usage and family income ($\chi^2= 60.499$, df 4, $p<0.05$). However, participants were in favour of spending some of their income on purchasing safety supplies (mean 4.03 (out of 5), SD= 0.68). There was no association between the respondent's education level and safety equipment use ($\chi^2=1.760$, df 4, $p=0.780$).

Table 5-10: The reason for not having safety equipment

Reasons	n	%
The cost	136	35.5
The time	54	14.1
Lack of information	104	27.2
Not available in local stores	45	11.7
Not important	56	14.6
Unfamiliar with it	162	42.3
Other reasons	30	7.8

In response to the open-ended question about preventing injuries, participants provided valuable insights, emphasising the need to incorporate child safety considerations into home designs when building a new home or reconstructing it. Of the respondents, 97.2% agreed with the statement that 'child safety is a priority when designing home construction' (Table 5-11).

Table 5-11: Respondents' opinions concerning some safety measures

	Agree %	Mean	SD
It is my responsibility to learn how to keep my child safe	86.7	4.10	0.691
It is wise to spend some of the income on purchasing safety supplies	82.9	4.03	0.681
Child safety is a priority when designing home construction	97.2	4.45	0.558
Individuals should be obligated to report any nearby excavations to the appropriate authorities	95.4	4.45	0.586

When asked for suggestions, respondents expressed a need to develop targeted health education initiatives to enhance family awareness regarding habits that increase the risk of injury. Specifically, caregivers emphasised the importance of avoiding practices related to burns caused by hot drinks. The suggested health education should focus on house modifications, including installing safety devices.

5.1.5 Interpersonal level

There was no relationship between the number of residents, the type of ownership, the number of storeys of the house, or household income in terms of whether an accident was more likely to have been reported in the survey (Table 5-12).

Table 5-12: Household characteristics and likelihood of injury

		Injuries to children				p
		n	%	n	%	
Number of residents	2 to 5	158	41.3	90	57.0	0.073
	6 to 10	184	48.0	118	64.5	
	More than 11	41	10.7	19	46.3	
Home residents	Grandparent	92	24.0			
	Uncles/Aunts	84	21.9			
	Housemaid	134	35.0			
	Niece/nephew	25	6.5			
	Others	9	2.3			
Ownership	Rented	108	28.4	69	63.9	0.265
	Owned	271	71.5	158	57.7	
Type of house	> 1 storey	189	49.9	112	59.3	0.836
	Single storey	122	32.1	75	60.0	
	Apartment	61	16.1	37	60.7	
	Annexe	7	0.02	3	42.9	
Household income	>1500	51	13.3	37	72.5	0.140
	1000–1500	114	29.8	71	62.3	
	500–1000	149	38.9	80	53.7	
	<500	66	17.2	38	58.5	

5.1.5.1 Number of children

The number of children per household (Table 5-13) did not influence the likelihood of there being an incident ($\chi^2=3.325$, df 2, $p=0.198$). Neither was there a relationship between the number of children under the age of five years and the likelihood of an accident ($\chi^2=5.396$, df 3, $p=0.145$).

Table 5-13: Characteristics of children and injuries

				Injuries	
		n	%	n	%
Number of children	1 to 3	262	68.4	148	56.5
	4 to 5	94	24.5	63	67.0
	>6	27	7.0	16	61.5
Number of children under 5	1	270	71.2	150	55.6
	2	95	25.1	65	69.1
	3	12	3.2	7	58.3
	4	2		1	50.0

However, respondents identified 'caring for more than one child' as contributing to child injuries (28%, n=110) (Table 5-14). This perception correlated with the number of children ($\chi^2=13.725$, $p<0.001$). The majority (68.4%, n=262) of the respondents have one to three children (Table 5-13) and 25% have two children younger than five. While there is no statistically significant difference in the number of children between employed mothers and housewives, it is worth noting that employed mothers tended to have a slightly higher number of children. Injuries among children were found to be proportionally high across all categories of the number of children.

Table 5-14: Respondents' perception of risk factors for accidents

Reason for accidents	n	%
Naughty children	246	64.8
Inadequate supervision	151	39.3
Inattention	133	34.6
Distraction (phone or TV)	113	29.4
Caring for more than one child	110	28.6
Fatigue	104	27.1
Mother employed outside the home	91	23.7
Unsafe household environment	73	19.0
Inadequate safety measures	68	17.7
Big family	34	8.9

5.1.5.2 *Working mothers*

Children of working mothers experienced more injuries (34.8%, n=133) compared to the children of mothers not working outside the home, (24.6%, n=94), but the difference was not significant ($\chi^2= 3.396$, $p = 0.065$). There was no relationship between whether the mother or another person was supervising the child and the occurrence of an accident ($\chi^2=0.978$, $df\ 1$, $p=0.323$). Similarly, there was no relationship between who was supervising the child at the time of the incident and whether the incident led to a hospital visit or admission ($\chi^2=10.300$, $df\ 16$, $p=0.850$).

Most respondents said their time was compromised. There was an association between maternal employment and the perception of time available for supervising children during play or meals, with mothers working outside the home feeling they had inadequate time for supervision ($\chi^2 = 19.571$, $df\ 1$, $p < 0.001$). In open questions, respondents described what compromised supervision time. Some said that they got busy with housework such as cooking, cleaning, and helping older children with homework. Others said children were usually supervised by siblings, a grandmother or a housemaid while playing and eating. However, in their open responses, the respondents did see a relationship between the supervisor and the likelihood of injury.

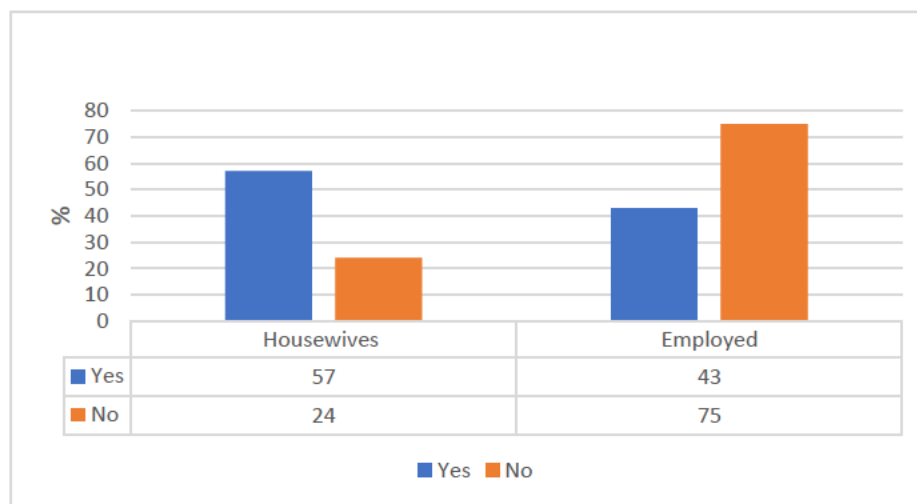


Figure 5-6: Perception of availability of enough time to supervise children while playing and eating

The risk factor selected most often by respondents was 'naughty children (Table 5-14), but there were also several reasons given for loss of focus on the child, including fatigue (27.1%, n=104). More mothers who worked outside the home cited fatigue (63, 30.1%) than housewives (41, 23.7%), but this was not statistically significant ($\chi^2=1.984$, df 1, $p=0.098$). More mothers who worked outside the home cited external employment as a risk factor (76, 36.4%) than housewives (15, 8.7%) ($\chi^2=40.00$, df 1, $p<0.001$).

5.1.6 Organisational level

5.1.6.1 *Inadequate safety education programmes*

Figure 5-7 illustrates the distribution of respondents based on their attendance at health education sessions on child injury prevention. The results indicate that a significant majority (79.4%, n= 304) of the caregivers responded that they did not attend any educational activity related to child injury prevention.

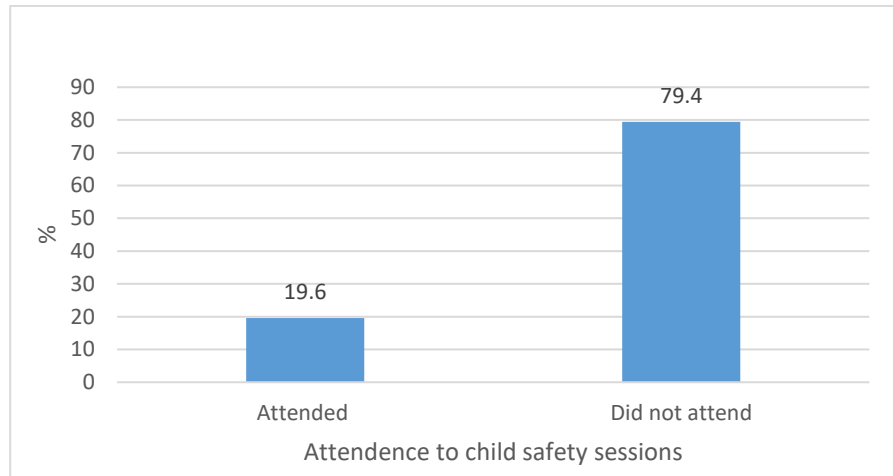


Figure 5-7: Caregivers' attendance to child safety health education

When participants were asked if child safety was discussed with them in different healthcare settings, most (60.5%, 235) said it was not (Figure 5-8). Of those who attended, 29.1 % (n=97) stated nurses were the main professionals who educated them.

Most survey respondents (68.8%, n=263) reported having some first-aid skills. How these skills were acquired is unclear, as only 26.4% (n= 101) attended first aid classes (Figure 5-9). The most common locations for training were hospitals, workplaces, private institutions, and colleges. There was no relationship between the number of hospital visits and carer first aid training ($\chi^2 = 1.240$, $p = 0.743$). Attending first aid courses was significantly associated with higher family income ($\chi^2 = 17.227$, $df\ 3\ p < 0.001$), the mother being employed ($\chi^2 = 33.485$, $df\ 2$, $p = <0.001$), and higher levels of educational attainment ($\chi^2 = 17.227$, $p < 0.001$). However, there is no association with place of living ($\chi^2 = 22.255$, $p = 0.089$).

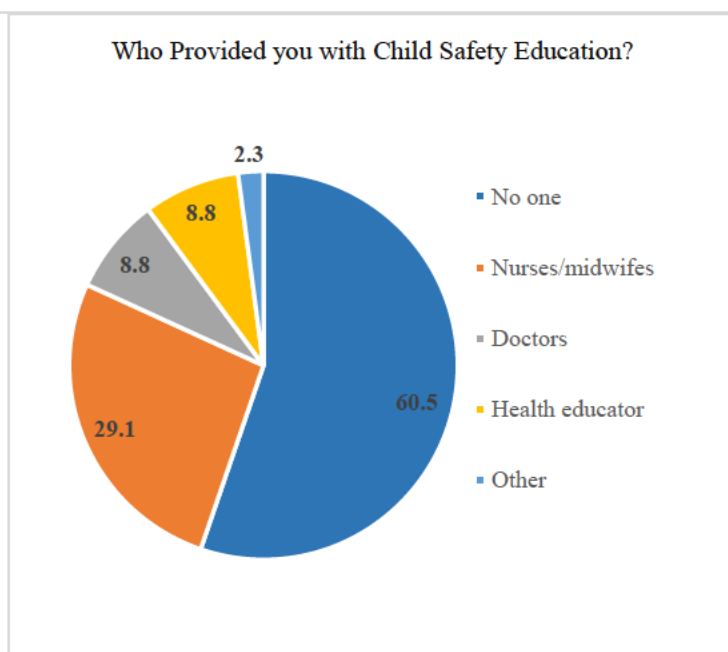
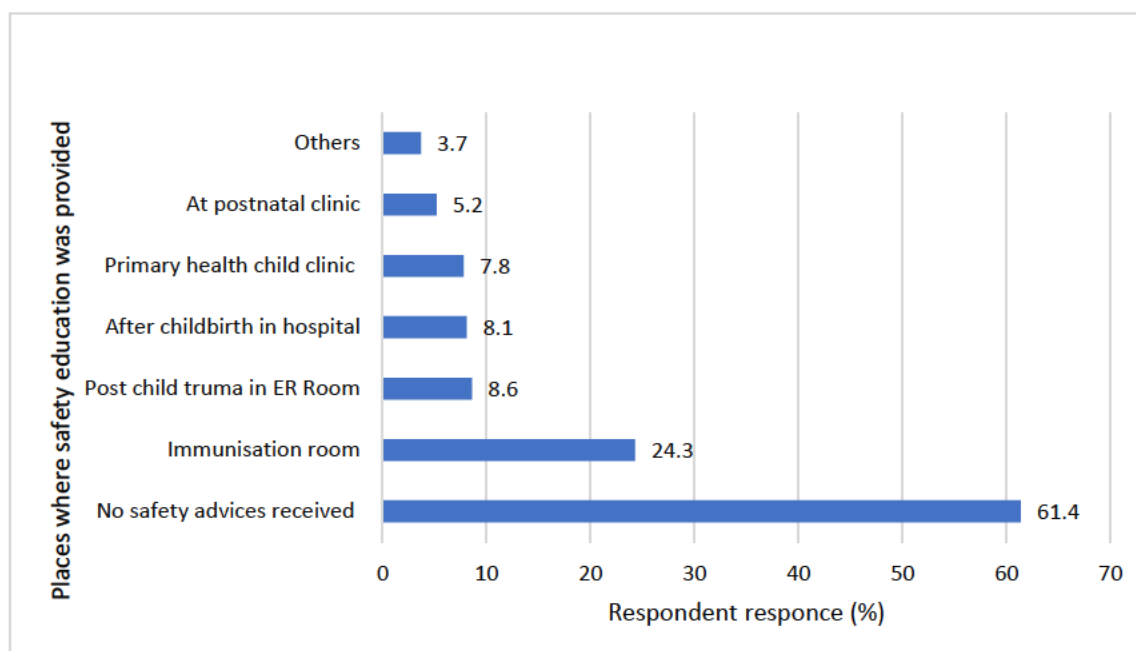


Figure 5-8: Places and HCPs who provided health education on child safety

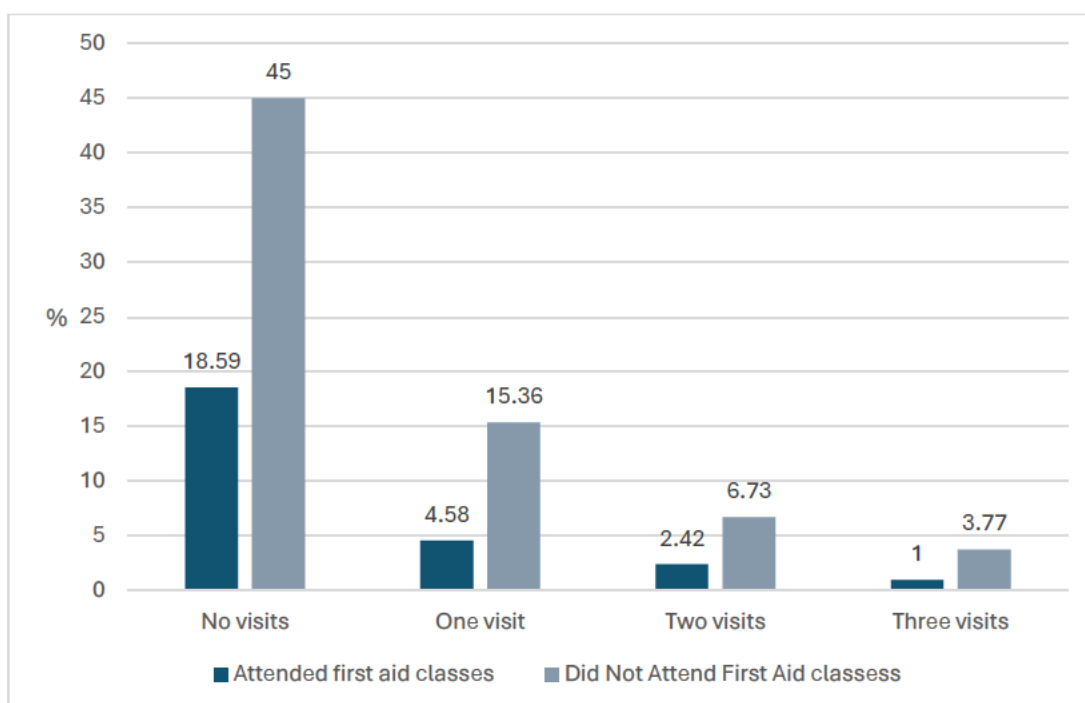


Figure 5-9: Attendance of first aid classes and the number of visits to hospital

5.1.7 Community level

The highest proportion of children reported as injured came from Bowsher and other Muscat areas (Table 5-15). This is significantly higher than the other areas ($\chi^2=14.413$, df 4, $p=0.006$) with a relative risk of 1.29, meaning that children from Bowsher are 29% more likely to suffer an injury than those from elsewhere. The highest proportion of low-income households is also in the Bowsher wilayat.

Table 5-15: Injuries and income by residential area

Residential area	Number of respondents		Injuries in each area		Households with income of <500 OR per month	
	n	%	n	%	n	%
Al Amerat	107	27.9	53	49.5	16	24.2
Muttrah	55	14.9	34	60.7	19	28.8
Al Seeb	116	30.0	64	55.7	10	15.2
Bowsher	94	24.5	67	71.3	21	31.8

Other Muscat	10	2.6	9	90.0	0	0

In the open comments, some respondents preferred restricting their children's outdoor play due to safety concerns. Commonly perceived factors included narrow streets, inadequate speed restriction measures, and the street's proximity to their homes. Of these respondents, 28.4% (n=109) indicated that their children's outdoor play areas were away from street, a concern predominantly presented by caregivers from urban and modern settings (Table 5-16). Furthermore, 61.4% (n=234) of participants responded that the street in front of their residence was poorly maintained with issues like potholes and potential hazards. This perception was related to carers' income ($\chi^2 = 11.781$, df 4, p= 0.026), where respondents with less income were more concerned. However, most parents did not blame authorities and considered it a shared responsibility to ensure the safety of children and having secure play spaces an absolute necessity. Of all respondents, 95.4% (n=366) agreed that 'It is necessary to notify the concerned authorities when noticing any excavations in the vicinity' (Table 5-11).

Table 5-16: Environmental concerns relating to child safety

	Total		Al Amerat		Muttrah		Al Seeb		Bowsher		Other	
	n	%	n	%	n	%	n	%	n	%	n	%
Roads well maintained	148	38.6	40	27.0	24	16.2	43	29.1	37	35.0	4	2.7
Speed limit signs	38	10.2	14	35.9	8	20.5	8	20.5	8	25.0	1	2.6
Speed bumps	118	30.8	31	26.3	21	17.8	40	33.9	23	19.5	3	2.5
Play area is away from street	109	28.5	27	24.8	14	12.8	34	31.2	30	27.5	4	3.7

In addition to other concerns, many respondents also pointed out the lack of proper playground space in their community. They expressed their worries about the hazardous conditions that could arise from lack of maintenance of play areas.

5.1.8 Societal level

Regulation of safety in home design was shown to be insufficient. For example, a significant proportion (29.5 %, n=77) of respondents reported having electrical outlets positioned at a reachable height for children (Table 5-9). This situation presents itself across both rented and privately owned houses.

In addition, findings showed that 11.7 % (n=45) of participants responded that some safety equipment is not available in local stores (Table 5-10).

Additionally, many participants highlighted in the comments the issue of drowning, particularly concerning incidents taking place at chalets, and that safety regulations concerning private pools in chalets be updated.

5.1.9 Summary of survey findings

In summary, 383 caregivers completed the survey. The findings showed that children between the ages of two and three are more prone to injuries than other children, where falls from furniture and burns from hot drinks are the most common. Burns cases were the most common that needed medical attention. The findings showed that there were some unsafe practices, relating to staircases and electricity outlets for example. Additionally, some safety equipment was inadequate, which was shown to have a significant association with family income. Some participants responded that the

unavailability of some safety equipment in local stores was a factor in not having one or more equipment items.

A significant proportion of respondents answered that injury is not preventable, and most saw it as God's will. This perception has no contributing factors. In addition, a significant proportion perceived it happening due to a child being 'naughty.' The number of children in a household did not increase the likelihood of an accident, but respondents identified caring for multiple children as a contributing factor to child injuries. Mothers who worked outside the home cited external employment as a challenging contributing factor. There was an association between maternal employment and the perception of time available for supervising children during play or meals, with mothers working outside the home feeling they had inadequate time for supervision.

The findings also showed that most caregivers responded that they did not attend any educational activity related to child injury prevention. Social media was the most common source of information among the respondents, and they preferred it to other sources of knowledge, such as traditional lectures. Some respondents attended first aid courses, which were significantly associated with higher family income and educational attainment.

5.2 Qualitative findings

5.2.1 Participants' demographic data

The interviews took place in Muscat, Oman from 3 November 2021 to 15 February 2022, specifically within PHCC settings. The duration of the interviews varied from 25

to 40 minutes for each session. The participants were 20 Omani PHCPs providing care to children: ten doctors and ten nurses (Table 5-17). All participants were employees of the Oman Ministry of Health (MOH) with five to fifteen years of experience in MOH institutions and a minimum of five years of experience in PHCCs. In the health centres, nurses worked in the Expanded Program on Immunisation (EPI) clinics on rotation, but the nurses in the sample did not only work in the EPI room. Thus, the nurses had multi-specialty responsibilities within the health centre, child health being one. The role of the ten doctors included follow-up of children from the EPI clinic and seeing other children who presented to health centres for a consultation. describes the participants' details, where the health centres were located, the average number of visitors to the EPI, and where the interviews were conducted.

Participants were from ten health centres selected purposefully from four wilayat (provinces) in Muscat Governorate, Oman. Each wilayat from which health centres were selected represents a distinct context encompassing a variety of socio-demographic characteristics that provided information from different socio-demographic and economic aspects of the less urbanised areas, including old, crowded neighbourhoods and the modern residential neighbourhoods.

Al Amarat and Al Seeb districts are large and include new residential areas characterised by busy health centres and they receive the highest number of children per day for the EPI clinics compared to other provinces (Table 5-17). Muttrah wilayat and some areas of Al Wattaya (WadAdai) are characterised as old and densely populated residential areas where many residents speak non-Arabic languages (the majority speak Balochi and Urdu) and live in old and shared family households.

Table 5-17: Semi-structured interview participants characteristics

Wilayat (districts)	Health centre	Average visitors (<i>n</i>) to EPI per day*	Code	Profession	Years of experience	Place of interview
Al Amarat	Al Amarat	52	HCP 1	Senior family physician	15	Conference room
			HCP 3	Nurse	16	Office
	Al Hajer	22	HCP 4	Family physician	12	Seminar room
			HCP 5	Nurse	10	Seminar room
	Al Nahda	47	HCP 19	Nurse	8	Doctor's office
HCP 20			Family physician	6	Doctor's office	
Bowsher	Bowsher	30	HCP 2	Senior family physician	14	Doctor's office
			HCP 14	Nurse	9	Doctor's office
	Al Ansab	38	HCP 17	Senior family physician	14	Doctor's office
			HCP 18	Nurse	20	Seminar room
	Al Ghubrah	18	HCP 12	Nurse in charge	20	Doctor's office
HCP 13			Senior family physician	15	Seminar room	
Muttrah	Muttrah	15	HCP 6	Family physician	10	Doctor's office
			HCP 7	Nurse	13	Seminar room
	Al Wattyah	23	HCP10	Nurse	11	Doctor's office
			HCP 11	Family physician	7	Doctor's office
Al Seeb	Al Mawaleh	41	HCP 8	Family physician	12	Seminar room
			HCP 9	Nurse	8	Seminar room
	Al Mabeela	59	HCP 15	Nurse	8	Seminar room
			HCP 16	Senior family physician	16	Doctor's office

*The source of the average number is filed notes and information from the annual health report.

5.2.2 Identified themes

Five major themes emerged through the analysis of interviews guided by the SEM. Within these major themes, a set of subthemes emerged, exploring the factors, attributes, and challenges present at distinct levels of the SEM (Table 5-18).

Table 5-18: Themes and subthemes

Themes (SEM)	Subthemes
Individual level (parents)	Inadequate knowledge of safety measures Perceived inevitability of child injuries
Interpersonal level	Supervision arrangement (multiple caregivers) Large family (number of children) Multiple family households
Organisational level	HCPs' knowledge of child safety Need for health education guidelines Role conflict and coordination Limited time and resources Parents' engagement and learning preference Opportunities in PHCCs for promoting injury prevention Health centre visits Community outreach programmes Technology and social media
Community level	Unsafe play areas in old neighbourhoods Temporal patterns of injuries (Eid and Ramadan)
Societal level	Inadequate child safety regulations Unavailability and quality of safety equipment on the market

5.2.3 Individual level (parents)

5.2.3.1 *Inadequate knowledge of safety measures*

Most participants indicated that child injuries occur despite parents' interest in protecting their children from the danger of injuries. They perceive that parents often

lack awareness of appropriate preventive measures, such as appropriate supervision or adjusting the home environment.

'I believe that most of the accidents I have seen happen due to poor safety measures at home... I have seen many cases of burns from hot beverages [which have] happened while parents hold their children and drink at the same time. I have seen finger injuries from the door accidentally closing on a child's fingers. They need to learn how to avoid these injuries' (Nurse, HCP 3)

'There is a tendency to overlook the importance of proactive safety measures at some houses. Parents must recognise that taking preventive actions can reduce the risk of accidents and ensure the safety of their children.' (Doctor, HCP 6)

Six participants noted that certain incidents were seen in children of young parents. They added that some young parents have a limited understanding of child development, which affects their ability to estimate and anticipate the risk of injury and provide appropriate supervision. However, these participants did not elaborate on efforts and initiatives to educate parents about child development.

'Injuries often happen unexpectedly when hazards are not anticipated, and children are not supervised properly. Despite parents' efforts, accidents can happen when risks are overlooked. Young parents must learn about child motor development and stay aware and proactive in identifying and addressing dangers for child safety.' (Nurse, HCP 5)

Some participants observed that some parents demonstrated a hopeful expectation concerning the probability of their children encountering an injury. This thinking

tendency leads them to believe that injuries are less likely to happen to their children despite acknowledging the potential dangers.

‘...another thing is everyone feels it cannot happen to their children. They hear about such accidents, but they do not feel it can happen in their house, but it can, it can happen to any child, it is an accident.’ (Doctor, HCP 6)

Furthermore, four participants noted that some children frequently presented to the emergency room with injuries. They said that there are cases where children repeatedly experience injuries, which makes them worry about child safety. They relate this to a lack of implementation of safety measures in the home environment. Participants mentioned that when these frequent injuries are noted, they do an additional assessment to determine the causes.

‘Some children may visit us frequently, maybe around 3–4 times a month. It surprises us to see them injured repeatedly. We get worried about why these incidents occur so regularly. Is it due to insufficient safety measures by the family or poor supervision, or could it be attributed to the child’s hyperactivity or other factors?’ (Nurse, HCP 5)

‘There are children frequently brought to my clinic with wounds and burns, mostly resulting from falls and accidents with furniture. I do not blame the parents, but I believe insufficient safety measures are being taken at home.’ (Doctor, HCP 19)

Participants mentioned that parents often provide different explanations when they investigate these cases. Seven participants mentioned that parents usually experience distress when their children sustain injuries. They added that despite their distress,

some parents may express their feelings by attributing the injury to their children's behaviour to process the event and make sense of their emotions. They noted that the parents use the term 'naughty' to describe the child. Participants argued that these children are not necessarily naughty but rather exhibit natural curiosity. Participants perceived a potential gap in parents' knowledge, indicating a need for parents to understand the stages of child development. Such understanding would enable them to be proactive and respond appropriately regarding supervision and implementing safety measures.

'...they say the injury is part of childhood. He will not be a boy if he has no stitch line or stitch scar on his face...even the fractures. Oh, your child did not have a fracture in his childhood. They wonder about you! How come your child did not get a fracture at all? As if it is a must [that], children experience a fracture and cut wounds? We have to change all these ideas.' (Nurse, HCP 7)

'I have noticed that some people tend to view accidents as normal occurrences, especially when it comes to their children. I believe that this perception may stem from a desire to alleviate feelings of guilt and self-blame for not being able to protect their child from harm. It is understandable to want to find ways to cope with such painful emotions, but it is also important to take steps to prevent future accidents...' (Doctor, HCP 2)

Some participants related the unsafe activities engaged in by some toddlers to be due to bad modelling from peers, games, and TV shows that include violence. They suggested that parents must be alert to these influences on child behaviour. They should be educated about avoiding these unsafe sources.

‘.... they get some of the ideas to harm themselves from the internet, YouTube, and video games. They watch a bad model who uses knives and all. This is the new generation; they imitate whatever they see. Parents must be careful...’ (Nurse, HCP 14)

They emphasised the importance of educating caregivers about making age-appropriate toy choices and ensuring that the play facilities meet safety standards.

‘Some parents may overlook the importance of selecting toys that are suitable for the developmental stages and abilities of their children. Instead, they provide only one toy for their children, showing little concern for its quality and potential risks...’ (Doctor, HCP11)

‘There was an incident of a child whose finger was stuck in a broken toy. Mother gave it to him when it was broken, and his finger went in. It was sharp, and his finger was stuck, and she could not take it out. We tried, and we could take it out, and it was injured, and he was crying excessively.’ (Doctor, HCP20)

Another issue, as expressed by the interview participants, was where play equipment was placed. It includes swings, bicycles, and skateboards, which pose a danger to children during play. In this instance, the equipment was positioned near a wall, resulting in instances where children accidentally collided with it while playing. The participant noted that such cases are frequently observed in emergency rooms.

‘Some have a seesaw in their backyard, and the kids often exaggeratedly play on it, pushing each other forcefully and sometimes hitting the wall. The lack of adequate space for the seesaw and an unsafe playground environment contribute to the risk of injuries...’ (Nurse, HCP14)

5.2.3.2 *Perceived inevitability of child injuries*

In the interview, participants indicated that, in their interactions with parents of injured children, they had observed a surprising trend where parents did not express regret or perceive their child's injury as abnormal. Seven participants expressed the view that injuries are predetermined by fate and destiny (قضاء وقدر), indicating that parents should not be held accountable for such occurrences. 'Destiny' was frequently invoked throughout the interviews to explain their perspective on accidents. This belief underscores a religious understanding wherein events are perceived as being guided by 'Allah' and beyond human influence or intervention. However, the influence of this belief on parents' preventive measures was not mentioned by these participants.

'Yes, injuries can be prevented, but only sometimes. Some happen due to destiny. Parents do their best to protect their children, yet it happens for no reason..... parents must not be solely blamed for such occurrences.'
(Nurse, HCP3)

'While parents strive to protect their children from any accidents as much as possible, some accidents seem to happen despite their efforts. Even with all preventative measures taken at home, a child may still experience an injury, such as falling down the steps or chair.' (Doctor, HCP1)

One participant raised the issue that sometimes, when she investigates an injury case and counsels parents, they argue that these injuries are just a normal part of the process and should not be considered a problem.

'...they say it a lot, especially when we want to find out what happened. They argue that they are children and that anything may happen to them...

Yes, it is God's will, but things may change if we make some adjustments at home... (Doctor, HCP 4)

HCPs themselves had uncertain opinions as to whether injuries could be prevented, and others believed that injury happens in a moment and cannot be prevented. They perceived some injuries as part of God's will and destiny. Some participants said that it could happen even with diligent caregivers and advocated a non-judgmental stance when dealing with parents of injured children. However, some participants mentioned that most cases happen if there is insufficient caution exercised at home.

'We cannot say accidents can be prevented because they happen sometimes in a matter of seconds. You do your best to keep a child safe, but accidents can happen in a second when you are in the kitchen, busy with something, or even when using the bathroom. And you know how fast children are – they do things quickly and sometimes all at once...' (Nurse, HCP 3)

'Of course, most injuries are not intentional, and they can happen suddenly... Sometimes, there may be no specific reasons for such accidents; they are destiny. Even if the mother provides 24-hour supervision, there can be moments when she briefly overlooks or looks away, and unfortunately, an incident may occur in that split second. It is noticed that these accidents happen unexpectedly, and regardless of the mother's vigilance, they can be attributed to the will of a higher power.' (Doctor, HCP11).

5.2.4 Interpersonal level

5.2.4.1 *Supervision arrangements by multiple caregivers*

One of the themes extracted from the interviews is the participants' consensus that the mother bears the greatest responsibility for the child's injury. However, opinions differed regarding the belief that children of working mothers are more vulnerable. Nine participants believed that child supervision was compromised because of the mother's absence for long hours at work and the reliance on the housemaid to care for the child. The family assigned them multiple tasks, including childcare, cooking, cleaning and laundry. Participants said this multi-tasking affected supervision and exposed children to the risk of injury, especially burns injuries, due to children staying with the housemaid while cooking. In addition, they see childcare is a duty for housemaid and they are less attentive to children.

'...The housemaid may have many [different tasks] to do in the home. She must cook and take care of a child. Maybe not one child, more than one child, and she is not the mother. She will not give that attention to the children. So, many cases come here because of that...' (Doctor-HCP 4)

'...When the mother is working and not at home, the maid takes care of the children. Suppose she is overworked. Usually, she misses supervision of the children or if the home setup is unsafe... An accident occurred last month to one of the children when the maid was cooking, she did not notice that the baby was around, the baby pulled the cooking plate, and all the hot oil came on the baby girl. She had a second or third-degree burn, so now, whom to blame in such a case?' (Doctor, HCP 6)

According to the findings from the interviews, multi-caregiver arrangements can pose a risk to child safety when there is inadequate understanding and coordination between them. Participants reported that injuries sometimes occurred in the afternoon when parents, exhausted from work, left their children to play unsupervised or entrusted their care to the housemaid. At times there is confusion about who is to provide supervision.

'If the child does something while his mother is at home, we can say that it is negligent if she does not supervise him, but if we look at the point, the mother may have been working all day. She came in the afternoon and rested, so the other caregiver is left the child to be taken care of by the mother, but she was tired...' (Doctor, HCP13)

Two participants drew attention to an important minority issue, specifically parental divorce, which often leads to multi-caregiver arrangements that potentially expose children to injury. The risks are amplified when the father abandons the child, leaving their care to the mother or grandparents or vice versa. The participants expressed the view that the absence of either the father or mother negatively impacts the child's safety requirements.

'I have noticed that children of divorced parents experience more injury, especially when one parent, usually the mother, becomes the primary caregiver. This may not be a common issue, but it is happening, and this group need to be taken into consideration.' (Doctor, HCP 17)

The findings identified domestic overload as a factor that affects the quality of supervision. Participants highlighted instances where injuries occurred to children of housewives who lacked assistance. These mothers became occupied with household chores, leaving their children unsupervised. Participants shared specific experiences

of cases that arrived at the hospital, typically involving situations where the child was left unattended while the mother was preoccupied in the kitchen.

‘Some mothers have many children, making it challenging to give individual attention to each child. In addition, they may lack support from relatives or anyone who can assist them, leaving them to handle all the responsibilities alone...cooking, cleaning, and caring for their children. Without help, these mothers are left to manage everything on their own.’
(Nurse HCP 5)

Three participants shared their experiences of witnessing burn cases in the emergency room, where mothers had inadvertently left their children unattended during bath time, giving them access to hot water taps as well as exposing them to the risk of drowning. As a result, severe burns occurred. One participant pointed out that inadequate supervision was not the only factor contributing to these incidents; unsafe environments also played a role. It was noted that certain families lacked awareness about the importance of adjusting water heater temperatures, which could greatly reduce the risk of child burns from hot tap water.

‘Recently, we encountered a case involving a one-year-old child. The mother was cleaning the child in the bathroom when she momentarily became occupied retrieving an object. During this brief distraction, the child inadvertently turned on the hot water, resulting in burns. The question of whether the mother should be held responsible in such a situation is complex and cannot be answered definitively. Personally, I do not approach the situation with a mindset of blame.’ (Doctor, HCP2)

5.2.4.2 *Large family (number of children)*

Participants expressed concern about the challenges for effective supervision associated with parents having young children who are close in age. Thirteen participants perceived that the number of young children diverted the caregiver's attention from providing adequate supervision. Participants suggested exploration of potential support mechanisms for parents navigating the complexities of supervision challenges and to ensure safety.

'...there are some mothers who have challenges having young children close in age. They get busy with one child and their attention is diverted from other ones. Managing multiple children of similar ages can be challenging for her, which might contribute to difficulties in supervision...'
(Doctor, HCP 20)

'Some mothers may have 4–5 children who are close in age, which can bring about significant responsibilities. It is understandable that they might feel fatigued and could benefit from additional support.' (Nurse, HCP 7)

5.2.4.3 *Multi-family household*

Multi-family households were perceived to be an issue by five participants, particularly from Al Mabeela and Al Ghubrah wilayat. Three of them explained that some families share one house, which is crowded with a number of people. The problem is compounded when there is poor accessibility and inadequate design and maintenance. Families sharing one house have children of the same age, and all share the same facilities of the kitchen and bathrooms. In this type of household, it is challenging to create a safe environment and parents have difficulty supervising their

children. Participants emphasised the importance of targeted intervention to address this issue.

‘There are too many extended families in Umabeela, sharing a small house with a high number of children, which limits their ability to have separate spaces or dedicated areas for children to play safely, and each family sleeps in one room and keeps all their stuff in the same space...’
(Doctor, HCP 16)

‘...It is tough to control everything when multiple families are living together, and there may be shared spaces like the kitchen or common bathroom that you cannot lock. If there is a swimming pool in the yard, it can be hard to monitor children's safety around the water. It is essential when we teach families about safety to consider these challenges.’
(Doctor, HCP13)

5.2.5 Community level

5.2.5.1 Unsafe play areas in old neighbourhoods

The community level was perceived by the participants as a factor that contributed to the risk of injury. Five participants from PHCCs in old quarters noticed that many injured children came with cut wounds on their feet and legs after playing in the street. The houses are old, crowded and the roads narrow, leaving no space for children to play. Due to limited play facilities in their small houses, children are compelled to play on the streets, which exposes them to risks like road traffic accidents, falls, and cut wounds.

‘When I was working, particularly in Al Hail, I rarely encountered child injuries... I mean, yes, there were occasional cases, but here in this setting,

it is almost a daily occurrence, sometimes happening multiple times a day.'
(Doctor, HCP 6)

'...there are some places where there are no places for kids to play.... kids play on the street...very few areas have designated safe areas for children to play... You know it is a hard situation. Yes, some areas have play facilities, but it is more in modern areas. Children from old areas play in places where it could be rough places, such as mountains and sand, with stray animals, and they get bitten by dogs or cats in the place where they live...' (Nurse, HCP 7)

Eight participants highlighted that children must have equal opportunities, and there should be no differences in the available play areas between old and new neighbourhoods.

'Once about the old neighbourhood where more injuries happen, they need somewhere safe to play. By safe, I mean a designated play area for children, like a playground.' (Doctor, HCP 8)

5.2.5.2 *Temporal patterns of injuries*

The findings indicate a temporal pattern in injuries, with a higher frequency observed during the afternoon, weekends, and the Eid period. These temporal trends highlight specific time-related contexts associated with increased injury occurrences. Seven participants noted more injured children being brought to the hospital during the afternoon. The injuries often occurred in the home yard or in front of the home, particularly on the street close to the home. They observed that children are left unsupervised in some communities in the afternoon to play in the back yard or the street.

'I observed that more injuries occur in the afternoon when children play with their peers, sometimes without supervision.' (Nurse, HCP14)

'Some families may have different routines or responsibilities. For instance, some parents may take an afternoon nap, inadvertently leaving their children unattended. Occasionally, we observe children playing outside their homes around 2 pm, engaging in activities like riding bicycles without adult supervision.' (Nurse, HCP 12)

The injuries peak, according to some participants, during social events and holidays such as Eid and Ramadan. Eid is one of the events recognised as having more child injuries because of the large gatherings, and people are busy with dressing and preparations, and looking after guests.

'I have observed that many burns and falls occur during Eid gatherings, when families come together, and everyone becomes busy, leading to distracted supervision. This seems to happen consistently. Awareness about such risk must be considered'. (Doctor, HCP 20)

'Injuries occur more frequently during vacations, Eid celebrations, and rainy days, especially involving cuts and falls. It happens in Eid when families are occupied with various tasks and participating in Eid traditions. This may result in less supervision for children. The rise in injuries during holidays could happen because of poor supervision, it is also possible they are simply accidents beyond our control.' (Nurse, HCP 14)

Three participants said they receive in the emergency room more burn injuries in the holy month of Ramadan. Many families cook deep-fried food during this month as part of the tradition. These burns increase in the evening during the rush to prepare for *iftar* (breaking fast time).

‘I have noticed quite a few cases of burns from hot oil while cooking certain dishes, particularly during Ramadan near iftar. It is important to be careful and take proper precautions to avoid any accidents in the kitchen...’
(Doctor, HCP17)

Burns resulting from hot tea and coffee rank among the most frequently seen injuries. Three participants highlighted that many burns happen from hot beverages placed on the floor while the family are having their meal as part of the tradition. Placing hot drinks on the floor increases the chances of toddlers easily reaching these drinks while running or walking or because of curiosity and subsequently getting burned.

‘As a doctor, I have witnessed numerous burn cases caused by tea and coffee at the health centre. Families sitting on the floor while consuming their meals make hot flasks and tea easily accessible to children. It is concerning as children’s play and running increase the risk of accidental collisions with the hot drinks.’ (Doctor, HCP 20)

5.2.6 Organisational level

5.2.6.1 HCPs’ knowledge of child safety

Some nurse participants expressed that their own child safety knowledge needed to be improved to take an active role in injury prevention initiatives. They considered that a refresher course would help them to educate and empower parents and families to apply safety measures better.

‘I feel unprepared as I was transferred from tertiary hospitals to primary hospitals without any preparation for working in health centres. I need to attend a course that can help me better provide help to children who are

exposed to risky situations at home. I hope to receive proper training before starting primary health care...’ (Nurse, HCP19)

‘I think it is important to have dedicated personnel, like nurses and doctors, to handle the training process. That way, there will not be any interruptions or delays in health education. Training a smaller group of people at first might be a good idea until they are fully trained. You can train the next group once that group has completed their training. This way, everyone will receive the same level of training, and there will not be any gaps in knowledge or skills....’ (Nurse, HCP 18)

In contrast, most doctors expressed confidence in their knowledge and abilities to educate about safety measures. Some elaborated by explaining that they received preparation during their training for family physicians and medicine. Nevertheless, some did express the need for updates and refresher courses.

5.2.6.2 Need for clear guidelines

Most of the participants agreed that there were no guidelines that clearly instructed them on providing child safety education. They said guidelines existed for other health promotion topics but not for child injury.

‘Yes, I agree that this is an important issue and needs health education. But there is no clear guideline here to clarify to us who should conduct this education and how... Is it for every mother to visit my clinic? Without guidelines, we might each approach it differently, but having clear guidelines would standardise the promotion process.’ (Doctor, HCP1)

‘There is no standardised health education available here. We lack clear guidelines that provide specific instructions for us.’ (Nurse, HCP 5)

Thirteen participants find the Pink Card, the child health promotion booklet, not sufficient as a guideline for comprehensive health education. They noted that it primarily directs attention to specific topics such as immunisation, tracking changes in weight and height, and nutrition.

‘The Pink Card is more about the child’s vaccine schedule, child weight and height, and what changes happen to them at every visit. What the child should be able to do. At this age, he should crawl, walk, smile, laugh, and respond to you...it is not for child safety.’ (Nurse, HCP15)

‘I think we need clearer guidelines to help us provide parent education other than the Pink Card. The Pink Card is good, but I think it would be more appropriate to have a programme for teaching all mothers and families, such as on social media or television. Mothers need more education, especially new mothers. So, I think we need an education for the whole community...’ (Doctor, HCP1).

Six nurse participants highlighted that they refer to the information and instructions on the Pink Card and encourage parents to read the information provided on it. They also encourage them to ask questions if they need further clarification or additional information. Some participants said HCPs should not assume all parents read the information on the Pink Card. Interest in reading differs from one individual to another. They noted that some parents ask for clarification and additional information, and some ignore that.

‘The Pink Card contains information for parents to learn. We advise them to read it before their next visit to the EPI clinic. We must ensure they read

and understand everything, but we do not go through it with them here...'
(Nurse, HCP 19)

5.2.6.3 *Role conflict and coordination*

The findings showed a difference of opinion as to who should educate parents about child safety. Eight participants said that health education, such as organising a health promotion event, was usually the job of health educators. However, some raised a concern that there was only one health educator responsible for all health education in each health centre. They usually gave lectures on various topics to the health centre visitors in the waiting area or face to face in their office in some cases. Their general focus was raising community awareness of non-communicable diseases.

'I believe a health educator is the most appropriate person to educate parents about child safety.' (Nurse, HCP 15)

'Actually, we have a health educator in this health centre, but I am not sure if child safety education is her responsibility. What I do know for sure is that she is involved in birth spacing counselling. So, I am not sure if child safety is related to her role or if she should provide parent counselling on safety. I do not know.' (Doctor, HCP1)

Five doctors said that nurses are responsible for child safety education, and it should be among the topics discussed with parents during EPI visits. They viewed EPI clinics as the appropriate venue to engage with caregivers about home safety and other child health promotion topics.

'This is the job of the nurses; it is their role to educate the caregiver about child safety.' (Doctor, HP13)

‘...The messages in the Pink Card, it is unclear, not sure if [it should] be done by nurses or doctors....’ (Doctor, HCP 11)

5.2.6.4 *Limited time and resources*

The majority of participants highlighted the need for more resources that can facilitate health promotion. One aspect that was identified to be challenging was time. Most participants saw time and work overload as a constraint in a busy area such as a health centre.

‘Actually, there is the challenge of staff shortage and work overload on staff. So, what will the nurse focus on, health education or daily work? It is very crowded here.’ (Nurse, HCP 5)

‘I am limited with time. I only have about 10 minutes per patient.’ (Doctor, HCP 6)

‘But no, I do not have the time to sit and just do health education and just talk about that. You know, I can bring it in whenever I can, yeah? Yeah, when it comes to me, it is time.’ (Doctor, HCP11)

However, other nurses had a different opinion.

‘It is not just about finding time for short messages; it is when we start explaining, and parents may have questions and need clarifications, and unfortunately, I often find myself lacking sufficient time to address them all.’ (Nurse, HCP 15)

Another participant indicated that the absence of learning materials was a challenge.

‘Who can make videos? or deliver lectures? We overlook this point; we do not have videos to explain these points to parents. We need time and experts to do this.’ (Doctor, HCP4)

One of the doctors highlighted the absence of a social work service and paediatric community nurse to assess the level of safety at home, which hinders a clear understanding of child safety.

‘Here in Oman, there is no social worker or paediatric community health nurses’ services, no one to see what’s happening behind closed doors.’ (Doctor, HCP 1)

5.2.6.5 Parents’ engagement and learning preferences

Four participants noted that some visitors to health centres may face challenges in finding time to engage in learning activities delivered in health centres, often due to demanding work schedules. Furthermore, even when resources such as pamphlets are provided, some parents may choose not to read them.

‘Some parents are unwilling to sit and say: I want to go home, I took permission from my work, and I need to go back there.’ (Nurse, HCP 9)

‘It could be from the parents’ side that they are in a hurry to finish their appointment, and they may prefer not to sit and listen to us.’ (Doctor, HCP 8)

5.2.7 Opportunities for promoting UCI prevention

During the interviews, most participants expressed a positive attitude and a keen interest in initiating safety education.

'We need to address these concerns because we might observe them more frequently. It is our duty to inform the community in society about how we can work together as a community to help reduce these unintentional injuries.' (Doctor, HCP 6)

'I find it an interesting and significant topic, as the saying goes, 'you touched the wound.' However, I believe it requires extensive effort; it is a collective task that demands collaboration, as one hand alone cannot clap. If comprehensive plans are devised and implemented, they could prove highly advantageous to the community.' (Nurse, HCP 7)

Moreover, most of the participants have had valuable first-hand experience in providing emergency care for children affected by different types of home injuries and supporting their families. They conveyed feelings of emotional exhaustion and recounted emotional instances when they experienced profound sadness due to cases that led to the death or permanent disability of a child. During the interview, 12 nurses and doctors shared their experience of caring for unfortunate injury cases.

On the other hand, they expressed the view that health education on children's safety is not within the priorities of health education in the immunisation room. Current health promotion focuses on breastfeeding, nutrition, and vaccination. Other than that, it only represents a priority if there is a reason to provide advice.

'..... I believe we are not giving much attention to this topic... We must improve our practice because we are not taking care of this important point, and we should prioritise educating parents about child safety...' (Doctor, HCP1)

5.2.7.1 Health centre visits

A few participants highlighted visiting the health centre and its waiting area as an opportune setting within a PHCC to provide educational materials such as pamphlets, play informative videos on TV, or even deliver lectures on child health and safety.

‘The good thing is that we receive many patients together in the waiting room, so we can give them these leaflets to read simultaneously and take home...’ (Nurse, HCP10)

Two participants suggested playing videos in the waiting area as visual resources that can attract participants more, and it can involve some scenarios and pictures to help parents relate the scenarios and images to their own lives.

‘I think we require a dedicated child safety programme, booklets and videos accessible to centre visitors in the waiting area. Videos could be played while they wait for their appointment, allowing them to learn about preventing accidents such as drowning and burns, as well as how to administer basic first aid before reaching the health centre.’ (Nurse, HCP 12)

Four participants highlighted the potential of printed learning materials as an appropriate opportunity to educate parents and families about child safety measures. An example can be booklets, brochures, and pamphlets. They said printed resources could be a suitable health education method at the community level as they can ensure every caregiver receives one copy and goes through the information. They felt nurses could encourage mothers to read and ask questions.

‘Printed materials can serve as an educational tool to deliver a key message for the parents to protect their children from injuries...’ (Doctor, HCP13)

Three participants said one-to-one teaching could help some parents to learn better and suggested an educational approach tailored to their needs and public preferences. They pointed out that individual training allows them to ensure that parents have received the knowledge and can ask questions and speak about their experience.

‘I believe that giving pamphlets to parents or displaying videos can give them knowledge, but I do not think this will be enough for all. We need to speak with them and understand their challenges. I know this needs time, but this will help to motivate parents better’. (Doctor, HCP 1)

‘In an ideal scenario with sufficient time and a less busy place, I favour face-to-face education for parents. It encourages deeper interaction, helping me understand parents’ needs and challenges. However, given the current busy health centre, arranging one-to-one meetings for all parents has become quite challenging.’ (Doctor, HCP 8)

During the interviews, some of the nurses stated that in the EPI room, their work was usually in providing instructions regarding post-vaccination care, such as managing fever, advice regarding breastfeeding and discussing future appointments. It was usually fast and occurred at the same time as the work they were engaged in.

‘We generally in the EPI clinic give some health education in quick points and no explanation or details.’ (Nurse, HCP19)

‘Health education is not practical in the EPI room. With other patients waiting outside for their appointments, we have limited time for each patient. We are responsible for checking and documenting height and weight, giving immunisation, and assessing nutrition status, among other tasks, all within a very constrained time.’ (Nurse, HCP 18)

Some participants felt that keeping child safety education until a child visits the EPI clinic was too late.

‘This information must be explained to the mother after the birth of her child before her discharge from the maternity ward because they come to us in a health centre when the child is two months old...’ (Nurse, HCP19)

Eight nurse participants agreed on the importance of including child safety in the health education delivered to parents visiting the EPI room. They mentioned some challenges that hinder this practice from being achievable. They said that appointments take place in busy and high-pressure environments, with limited time and opportunity for health education. Some of these participants perceived that health education was primarily the responsibility of health educators rather than clinicians.

Within the theme of available opportunities for educating families about child injuries, the antenatal clinic emerges as a notable avenue for HCPs to engage and educate expectant parents. Seven participants pointed out the benefits that can be achieved if parents’ education started early before childbirth.

‘I wish it is done for pregnant ladies when they come; for example, they come for multiple visits for their pregnancy care. We can take the opportunity to teach the mother about childcare and safety during these visits to their pregnancy clinics...’ (Doctor, HCP 1)

'I believe it would be good to initiate education for parents from the antenatal clinic. I may not have time to sit and educate her for a long time, but if time allows, I will do so. Pregnant mothers are keen to ask us and acquire knowledge... They often inquire about post-delivery care, such as how to provide proper childcare.' (Nurse, HCP 18)

'It would be a good idea, too, before the mother's ninth month of pregnancy, there must be a programme targeting them. They can be invited for a two-week course by a health educator or any assigned HCP to provide them with essential information for their childcare.' (Doctor, HCP20))

5.2.7.2 Community outreach programmes

One of the participants suggested moving from only providing education at the health centre and reaching families in the community.

'We have a few educational materials or videos, but there must be more than these approaches. We need to reach out to every house in the country to teach them, either through the media or by going ourselves to visit them, and to educate them. Because, in the end, the country is built by the future of the children who are here today, and we must take care of them to be healthy.' (Doctor, HCP2)

However, some other nurses found home visits challenging due to limited resources, time, and staffing constraints.

'It is difficult to make home visits as we have a staff shortage.' (Nurse, HCP3)

5.2.7.3 *Technology and social media*

Five participants had different opinions and said that using printed resources in this era is not wise, as they are a waste of effort, time, and money, and most parents now prefer to find information on social media. It can be the best choice for health promotion as it allows the dissemination of information all at once.

‘Nowadays, people do not seem to have the time or patience to read booklets anymore. They prefer to get their information quickly and easily, which is why ‘Instagram’ and ‘TikTok’ have become popular...’ (Doctor, HCP 7)

‘It is easier nowadays; we can develop a video clip and then publish it through WhatsApp and Instagram. We can reach every house through social media, so it will be an opportunity to educate parents by posting a video or a picture with information on how accidents can be avoided on social media.’ (Doctor, HCP 4)

However, one of the participant doctors considered that social media, despite its popularity, does not help in getting feedback about changes in practice.

‘I think through social media, we can reach a large number of parents quickly, but we cannot have direct insight into how many of them made meaningful changes in their home based on the information we posted in social media.’ (Doctor, HCP 17)

5.2.8 Societal level

5.2.8.1 *Inadequate child safety regulations*

During the interviews, seven participants emphasised the issue of insufficient policies and standards to ensure the safety of the environments where children reside and engage in play. In addition, six expressed concerns about the lack of attention to the quality and safety standards in children's play facilities and toys.

'We need better policies to ensure that children have safe spaces to live and play. I believe much work is needed for safety awareness, but implementing such a policy would be a significant step forward.' (Nurse, HCP 14)

'I believe there is a significant gap in policies regulating the quality and safety of children's toys. There needs to be greater emphasis on this area, with policies in place to ban unsafe toys in the market.' (Doctor, HCP 11)

5.2.8.2 *House and building structure*

During the interviews, three participants voiced their suggestions for raising community awareness regarding building structure and safety standards. They highlighted the importance of providing better guidance and support to ensure that families have access to relevant information and resources for constructing safe living spaces.

'Is any sector responsible for addressing this issue? Are there safety standards in place for stairs, tiles, or windows? I believe it is crucial to examine this aspect when aiming to prevent injuries.' (Nurse, HCP 16)

'There could be an unsafe home environment, such as a narrow house with stairs; this is also another issue as falls from stairs can happen too.'

For example, in an old building, the distance between steps is high and might cause a head injury because of a fall.’ (Nurse, HCP7)

The participants perceived that risk related to house structure was high in both modern and older houses. They indicated that despite architectural changes in new houses, the structure neglects child safety, such as unsafe stairs and slippery tiles.

‘...It is sometimes about the structure of the house. Some houses contain unsafe features for kids. This is even more in old houses. When old houses were built, families did not take child safety into consideration and their safety... Yet, it could be that they have less money to modify it.’ (Doctor, HCP 20)

‘Nowadays, houses have changed. Before, most houses were only one floor. Now, the majority are two-floor buildings, and it is necessary to fix safety gates in the stairs.’ (Nurse, HCP10)

Participants observed that priority was given to aesthetic appeal over safety concerns in newly constructed houses, citing cultural values, family preferences, and lack of awareness as contributing factors. For example, some prioritise slippery ceramics despite the increased risk of injuries, especially for children playing.

‘Nowadays, people prioritise decoration over the safety of children. It is our responsibility to prioritise the safety of children rather than solely focusing on decoration.’ (Nurse, HCP20)

Some participants highlighted their concern regarding the safety of some places such as farms and chalets. They mentioned that there is a growing trend for families and friends to congregate in chalets and farms that often lack adequate safety measures

for swimming. Many accidents happen during these gatherings, particularly cases of drowning in chalets.

‘...Many chalets have a swimming pool without proper safety measures in place. posing a significant risk for young children.’ (Doctors, HCP 2)

‘What concerns me nowadays are the drownings occurring in private farms and chalets due to their inadequate safety measures and lack of swimming fences. It is incredibly dangerous. Implementing a policy mandating proper safety measures is essential to prevent such tragedies.’ (Nurse, HCP 18)

5.2.8.3 Availability and quality of safety equipment on the market

Nine participants perceived that the lack of availability of some equipment in local stores prevented parents from having access to such equipment. This issue was highlighted by some HCPs who conveyed discontent regarding the poor availability. They believed it was important that any recommended equipment they suggested to parents should be easily available. HCPs felt their advice would be more effective if caregivers could easily purchase the recommended safety products. They suggested that this could be one of the factors why some parents avoided installing the necessary safety equipment.

‘Unfortunately, not all equipment is readily available in the market; only a few items are accessible in certain markets. I find it challenging to recommend specific products to parents when they are unavailable. Personally, I have faced difficulties finding certain items for my children. As a solution, I resorted to online shopping to acquire this equipment.’ (Doctor, HCP 13)

'Parents often struggle to locate safety gates, as safety equipment is unavailable. There needs to be coordination with the Ministry of Commerce to ensure the availability of safety equipment in the market.'
(Nurse, HCP 19)

5.2.9 Summary of the findings from interviews

The findings from the interviews showed that HCPs perceived that injury to young children was due to multiple factors. They argued that some parents, especially young parents, have inadequate awareness of safety measures and risk of injury. Participants suggested that the notion of preventability of injury was associated with the perception that it is destiny, yet this belief was usually expressed after the injury had occurred. Supervision was felt to be challenging with certain large families and multi-household families. There were particular social traditions, such as Eid and Ramadan, where supervision is interrupted, and it was believed to have an association with more incidents causing injury. HCPs shared that where safety education is provided this is usually given post-injury. They referred to the absence of clear guidelines and cooperation as the main factors for not providing consistent and unambiguous education. They said that time, resources and parents' preferences can influence future inclusion of safety education. Societal challenges such as limited policy and regulation related to child safety need to be considered to ensure effective safety education.

5.3 Integration of quantitative and qualitative findings

Table 5-19 integrates the data from the survey and the interviews guided by the SEM. The findings from the two sources collectively contributed to the answer to the study's

aim and objectives. The findings showed that multilevel behavioural, social, and environmental factors influence effective safety practices of supervision and environmental adjustment.

At the individual level, parents' awareness and beliefs were shown to be the fundamental factors influencing the approach to child supervision and environmental adjustment. The findings from both sources indicated that some parents have poor awareness of child safety and poor anticipation of potential injuries associated with child development. In addition, the survey showed that some parents are unaware of some safety equipment and the importance of fixing them at home to minimise the risk of injury. Both sources showed an influence of belief in God on the occurrence of injury, yet there is not enough data to determine its relation to the parents' efforts to apply safety measures.

At the interpersonal level, socio-economic status affects appropriate supervision. The findings from the survey showed some issues, including multi-caregivers, especially while the mother is absent from home for work commitments. Housemaids assigned multi-responsibilities were perceived by HCPS as an important interpersonal factor of cause of inadequate supervision. Many parents live with their extended family is perceived by HCPs as parental factor that hinder parents from maintaining the safe home environment. Family income and the unavailability of safety equipment on the market are factors that contribute to inadequate environmental adjustment.

Table 5-19: Summary of the findings (integrated)

SEM	Parents' perspectives (survey: closed and open questions)	HCPs (semi-structured interviews)	Integrated findings	Implications for UCI prevention health promotion
Individual level	Attribution of injury to naughtiness. Perceived inevitability of child injuries. Inadequate use of some safety equipment. Inadequate safety measures.	<i>HCPs consider the following important parental factors in UCI:</i> Attribution of injury to naughtiness Injury normalisation. Inadequate child safety awareness. Perceived inevitability of child injuries. Injuries increase in the afternoon.	Inadequate knowledge of safety measures. Perceived inevitability of child injuries.	When planning UCI health education or parenting programmes, parents' attitudes and behaviours and design interventions that contain behavioural change approaches should be considered
Interpersonal level	Low-income families. Employed mother. Multiple caregiver arrangement. Number of siblings. Multiple family household.	Family SE status. The burden on the employed mother. Number of siblings. Multiple family household. Multiple caregiver arrangements including housemaid overwhelmed with too many household duties. Inadequate use of some safety equipment (awareness of safety equipment + availability + cost).	Barriers to adopting a safe home environment. Interrupted supervision due to complex socio-economic factors.	Health promotion interventions should be designed to educate families and use methods that can disseminate information to the larger community. Employed mothers with housemaids must be encouraged to share learning materials with them. Housemaids participating in childcare must not overwhelmed with too many duties.

SEM	Parents' perspectives (survey: closed and open questions)	HCPs (semi-structured interviews)	Integrated findings	Implications for UCI prevention health promotion
Community level	Unsafe physical environment, e.g., playground, street. Most respondents said they reported any hazard outdoors to the municipality. Caregivers learn by themselves from elderly family members, social media, and friends. Some working parents receive first aid classes in the workplace.	Living in a economically disadvantaged village (unsupervised, poorly maintained playground, unsafe street). Social events (Eid and Ramadan). Lack of adherence to safety recommendations. Failure to report safety hazards and concerns.	Inequality related to playgrounds, unsafe streets, and access to safety resources. Injury patterns increase during social events. Inequality in learning opportunities.	Intervention at the community level, in collaboration with the municipality (local government), to provide a safe place for children to play. Collaboration with the Ministry of Social Affairs to provide support for disadvantaged communities. Health education campaign during Eid and Ramadan to maintain adequate supervision and safety measures.

SEM	Parents' perspectives (survey: closed and open questions)	HCPs (semi-structured interviews)	Integrated findings	Implications for UCI prevention health promotion
Organisational level	Limited child safety education.	Limited safety education initiatives. HCPs' knowledge of child safety and the need for refresher courses. Other health promotion priorities. Need for health education guidelines Inadequate time and resources. Educational materials (development and cost). Busy health centre. Parents' engagement and learning. preferences are influenced by parents' time (tied with other appointments), learning needs. Opportunities for educational enhancement. Child health programme. Visits to health centre. Community outreach. Employing technology in health education.	Limited safety education programmes. Need for safety education guidelines. Limited collaboration and coordination among HCPs in parental education. Use of available opportunities.	Current practice needs to be enhanced to include standardised health education programmes. These opportunities should be considered critical when planning a health education program based on the needs indicated by social, environmental, and behavioural factors at each level. Planning for health education programs should consider challenges within the organisation to ensure effective and quality intervention

SEM	Parents' perspectives (survey: closed and open questions)	HCPs (semi-structured interviews)	Integrated findings	Implications for UCI prevention health promotion
Societal level	Poor availability of safety equipment Inadequate safety education intervention.	Lack of policies lack of collaboration between sectors. Building safety standards. Safety standards of children's play equipment and toys. Social and economic inequality (nurseries fee). Lack of social support networks. Lack of access to safety information. Communication barriers.	Inadequate child safety legislation and regulation.	Collaboration with other governmental sectors to issue some policies that can help to reinforce child safety, including Royal Oman Police, Ministry of Commerce and Municipality Health education should consider varying approaches and educate the community through an educational campaign. Health centres should be resourced to provide injury prevention training. Advocate for affordable childcare nurseries. Advocate for safe play areas and toys. Advocate for the development and enforcement of child safety regulations.

At the community level, some factors are shown in the integrated findings. Injury increases in some communities due to sociodemographic factors, including crowds, narrow streets, and lack of play facilities. Due to family being busy, more injuries happen in holidays and events such as Eid, Ramadan, and in the afternoon.

At the organisational level, less attention is provided to child safety education, as shown by the survey and the interviews. The interviewees showed less understanding of their role and responsibilities due to the absence of guidelines. There are time and resource constraints that hinder consideration of safety education. Some opportunities are deemed appropriate to initiate safety education. Visits to PHCCs and community outreach through social media and communication programmes are seen as more appropriate. Yet, the survey showed that parents prefer advice from elders and friends and learning from social media.

At the societal level, the integrated findings showed that policies and regulations emphasising safety in the home structure and the safety of toys and play equipment are limited. It showed that some safety equipment is not available on the market. A small proportion of children are sent to nursery when the mother is absent from home.

5.4 Summary

The findings showed that almost half of the caregivers in this survey had at least one child who experienced at least one injury, and the majority happened because of falls and burns. Inadequate knowledge, a perception that injuries are not preventable and inadequate supervision influence injury occurrence. Adequate supervision decreases in large families, multi-households, and when care is provided by multi-caregivers. There are unsafe practices and inadequate adjustment of the home environment

among some participants due to inadequate knowledge of safety measures and the cost of safety equipment. The findings also showed limited learning opportunities for parents to enhance their child safety practice and understand child development. The findings showed that antenatal clinics, waiting areas, and EPI rooms in PHCCs are potential venues for safety education. However, HCPs' time, busy health centres, staff shortages, and resources are a challenge. Health education, which implements social media and other online applications, was suggested as a potential approach, and most caregivers prefer it. In the next chapter, the key findings of the study will be discussed, including recommendations, limitations, and implications.

Chapter 6 Discussion

6.1 Introduction

This chapter addresses the research aim and objectives of this mixed methods study. The aim of the study was to explore the challenges and opportunities to enhance Omani parents/caregivers' awareness and practice in relation to unintentional child injury prevention at home. The chapter includes an analysis and synthesis of the study's findings and their implications for appropriate and context-related interventions for child safety in Oman.

The SEM (McLeroy et al., 1988) was used to analyse the problem from multiple aspects, including parents, family, community, and society. The discussion includes information and findings from the reviewed literature, the caregivers' survey, and the HCPs' semi-structured interviews. Discussion of data from caregivers' and HCPs' perspectives and the reviewed literature has provided an understanding of the study problem and helped make context-related recommendations.

The chapter will be presented in the following structure. It will start with a discussion of the key findings focusing on factors, challenges, and opportunities for UCI prevention at each level of the SEM. It will then discuss the strengths and limitations of the study. Additionally, it will discuss the implications of the findings for theory and practice, including a discussion of potential avenues for future research.

6.2 Understanding UCI prevention in Oman using the SEM

The study objectives were:

1. To explore Omani caregivers' knowledge, practice and attitudes towards unintentional child injury prevention.
2. To identify the factors that influence Omani caregivers' practice of considering child safety measures in their homes.
3. To explore the perceptions of HCPs regarding how parents prevented and managed UCI.
4. To identify opportunities and challenges for considering child safety education within the priorities of child health programmes in Oman.
5. To identify appropriate health education strategies to promote child safety practices within the Omani context.
6. To provide recommendations for enhancing child safety education in primary health care based on the identified opportunities, challenges, and influencing factors, integrating the perspectives of healthcare providers and parents.

The findings of this study largely fit into the SEM (McLeroy et al., 1988) (Figure 6-1). The figure summarises factors influencing child safety practice within the five levels of the SEM using integrated insights from carers and HCPs. Using the SEM allowed the development of an understanding of the interrelated social, behavioural, and environmental factors contributing to poor UCI prevention practice within the Omani context across the five levels of the SEM. Consequently, it helped to identify a suitable health promotion approach that can be considered by HCPs to enhance UCI prevention awareness.

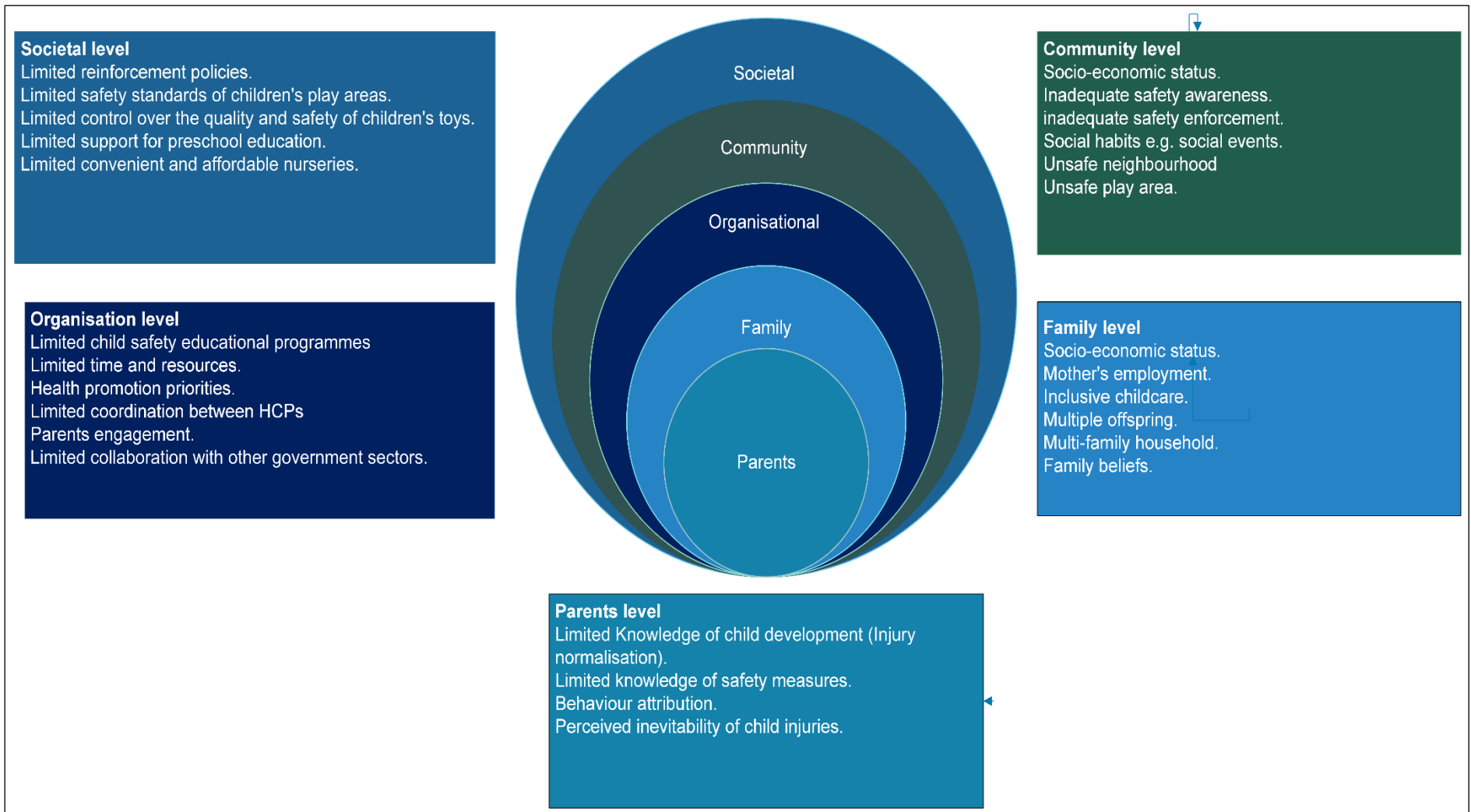


Figure 6-1: Factors contributing to poor practice of injury prevention

The following sections in this chapter discuss the key research findings presented in Figure 6-1 and Table 6-1. It will include the potential approaches that can help modify them, and recommendations to HCPs and other governmental sectors that are concerned with child rights, safety, and legislation.

6.2.1 Inadequate knowledge

The findings of this study showed that there is inadequate knowledge among some caregivers in relation to proactive safety measures. The survey findings revealed that 64.8% (n=246) of parents and caregivers attributed child injury to the child being naughty. Moreover, HCPs in the interviews highlighted that parents commonly relate child injuries with 'naughtiness'. However, it is important to note that what may be perceived as 'naughtiness' is typical behaviour for a child at that stage of development. Children at age one to three years are at sensorimotor and preoperational phases of child development (Berk, 2015), they are curious to explore the surrounding environment and lack the cognitive ability to recognise danger (Smidt, 2013, Garzon et al., 2007). The expression 'naughty' by parents could stem from societal norms and what parents mean by 'naughty' within their own context. Understanding whether 'naughty behaviour' implies deliberate defiance or simply a lack of understanding of expected behaviours is important. Further information and understanding of this expression would clarify parents' behaviour and can help in addressing misconceptions surrounding child injury and promoting more effective approaches to parenting and child development.

Table 6-1: Study - key findings

SEM level	Key findings
Individual level (parents)	Inadequate knowledge Poor anticipation of child injury Inadequate knowledge of child motor development (behaviour attribution) Inadequate knowledge of safety measures Perceived inevitability of child injuries (depends on type of injury - minor vs major and religious influences) Injury normalisation
Interpersonal	Interrupted supervision (complex care environment) Multiple caregivers (working mother) Number of children Barrier of adapting the home for child safety Inadequate knowledge of safety devices Unaffordable devices Parents preference of safety devices use Multiple family household
Community	Socio-economic status Inadequate safety awareness Inadequate safety enforcement
Organisational	Limited child safety educational programmes Absence of guidelines (limited coordination between HCPs) Limited resources (time and training)
Societal level	Limited legislation, regulations, and enforcement (play area, toys safety, home structure) Limited coordination between government sectors to collate societal efforts Limited convenient and affordable nurseries Poor availability of the safety devices (societal)

Parents with limited knowledge of child development might underestimate their children's abilities and vulnerabilities at various developmental stages (Zolotor et al., 2008), leading to inadequate supervision and exposure to risks. For example, a parent who is unaware of typical motor skills' development in toddlers might not predict the swiftness with which their child could reach an unsafe object on a countertop. Some other parents tend to overestimate their child's ability to recognise and avoid risk sources (Morrongiello, 2018). The survey respondents noted that the child sustained injuries when left alone or in the company of siblings, highlighting instances where parents may have overestimated the child's ability to navigate potentially risky situations without adequate supervision. Caregivers might assume that children are more capable of recognising and responding to potential hazards than they are. This assumption goes for children who are asked to supervise their siblings. This overestimation can lead to a lack of proactive safety measures, such as fixing safety gates on staircases to minimise the risk of a child falling from height. Failing to recognise evolving needs and behaviours can hinder their ability to foresee potential dangers, resulting in increased accidents and injuries.

Understanding the process of child development by caregivers is important to make them more proactive, optimise safety measures, and prevent associated risks (Zolotor et al., 2008; Morrongiello, 2018). Kim et al. (2022), suggested incorporating child development stages when educating parents about child injury prevention. In comparison with countries like the United Kingdom and Canada where parenting programmes are well established and have shown good outcomes (Sanders, 2012, Vella et al., 2015), Oman currently has not considered such programmes. Within the

SEM, inadequate knowledge of safety measures could be influenced by the absence of educational interventions within the Omani context.

Parental education programmes, including educational campaigns, have demonstrated positive outcomes such as improved child behaviour, reduced parental stress, and a reduction in home injuries (Temsah et al., 2022). By considering similar programmes in Oman, parents can be equipped with the knowledge to create a safe environment for their children and promote child safety. However, to ensure effectiveness any designed parenting programme in Oman must consider the multilevel influences within the SEM (Figure 3-1). The SEM (McLeroy et al., 1988) acknowledges the challenges of behaviour change interventions in achieving change where social norms, inadequate social support, and community culture constrain behavioural changes. Therefore, parenting programmes should verify interventions that are supported by social intervention while considering the need for extensive resources.

To initiate a parenting programme, it is important to consider certain social issues, such as challenges in communication, variations in values and diverse parenting practices (Awan and Butterworth, 2017). For example, many Omani families employ housemaids to participate in childcare and some others live with their extended family. According to the SEM (McLeroy et al., 1988), the community must not be seen as an aggregate of individuals who share common demographic characteristics; rather, it consists of subgroups which are different from each other. Therefore, the SEM suggests that the possibility of success of an intervention is related to how it supports or conflicts with subcultural norms. For example, as shown by the survey, many children live with their grandmothers (24%, n=92), and the findings showed that 37.7% (n=143) of

respondents rely on grandmothers' information on safety practices. In the UK, children co-residing with their grandparents are found to be less likely to sustain injury (Tanskanen and Danielsbacka, 2017), which indicates the beneficial role that grandparents can play in childcare.

McLeroy et al. (1988) saw social relationships as an important mechanism which needs to understand the relational features of communities and how those relationships might be leveraged to support health interventions. This finding is similar to those of Ablewhite et al. (2015), which was conducted in England, where parents favoured getting information on child safety from other parents rather than talking with professionals. Within the interplay between different SEM levels, individuals trust their close relationships (*interpersonal level*), which often stem from shared community norms and practices (*community level*).

Parents' interest in learning from the experience of other parents can be an opportunity to include experienced parents in awareness programmes provided by health workers. Taylor et al. (2023) conducted a safety promotion intervention in high-need areas of Nottingham, UK. The intervention aimed to improve safety practices through messages, activities, and checklists and was delivered by health teams and mentors. The results showed that while there was no significant difference between groups in safety practices, involving parents and mentor groups led to an increase in adopting safety measures such as storing poisons safely. Therefore, community programmes that target the whole family and community may help universal awareness and enhance community behaviour.

However, while Oman may not have a specific parenting programme, it is essential to note that PHC services support parents regarding child development through individual consultations with doctors and nurses (Al Fannah, 2017). As part of the child health programme, HCPs offer guidance and address parents' concerns individually. The current health promotion programme includes some child safety information to be discussed with parents, yet most of the participants said that it is not provided. According to the pink card, safety information should be delivered over the eight visits to the Expanded Program on Immunization room (EPI) along with health promotion information. There are four visits in the first six months of life (at two weeks, two months, four months, and six months). Parents should receive information early within these first visits to get knowledge that can help make needed changes to the environment before the child becomes mobile. Follow-up of changes can be continued all through the following visits. According to the study conducted by Ablewhite et al. (2015) in the UK, some parents found that some information comes late in relation to child ages and stages of development and must be presented in advance in order to benefit from it.

This indicates a need to start safety education in the first few months of a child's life and the EPI room can be a choice along with the antenatal clinic. Further research comparing both settings can provide a better understanding of caregiver preferences and associated health service challenges. Waiting areas can be a potential alternative for health education in busy health centres. Specially designed videos that contain animations of injury mechanisms and prevention strategies can be played on a waiting area TV and repeated every so often for mothers. Videos can be creative to attract the audience's attention to watch and learn. Videos in the waiting room for education have

been employed as teaching methods on different health education topics and showed positive outcomes on participants' knowledge (Katherine et al., 2018), yet environmental factors and patient activity may influence visitor attention (Tamsuri and Widati, 2020). Another limitation is that people might feel reluctant to ask questions due to the unfamiliarity of people in the place. Despite all of these limitations, it remains a good choice for health messages and community teaching. In the USA, Habermehl et al. (2019) examined the effectiveness of individual one-to-one safety education in waiting areas for ten minutes using short messages and distribution of learning materials. It showed a positive change in participants' practice measured two weeks after the intervention. Therefore, this study recommends using short, repeatedly screened videos as an educational intervention for child safety awareness in PHCCs.

It is worth considering additional opportunities for parental education in Omani PHCC settings. Learning through social media and phone applications can be an option for cost-effective and convenient methods that can improve carers' knowledge and practice (Ning et al., 2019; Jones et al., 2020; Feng et al., 2023). Survey findings showed that three-quarters of caregivers get information related to their child's safety from the internet and social media. However, there is not enough data to clarify if they search for this information or come across it opportunistically, yet it is not having a massive impact because of their inadequate use of equipment.

Nowadays, as in other parts of the world, Omani parents use smartphones routinely in their daily lives, which makes them resources for communicating health teaching, which can have a possible impact. The findings of the study survey showed that most of the respondents prefer learning from social media and browsing the internet. The majority of Oman's houses have good internet facilities (fibre broadband), yet it differs

between urban and suburban areas and from one household to another based on family income. This brings us again to SEM interrelated factors, which suggest that communication through the Internet may deprive some individuals and communities of knowledge. In addition, the study did not provide any information on the sites parents usually access for learning, indicating a need to include this point in future studies. The best outcome from using social media can be achieved if programmes allow interaction with the participants and follow-up of changes in knowledge and practice (Feng et al., 2023). When parents share their experiences with other group members in communication apps, they develop their anticipatory knowledge and apply safety measures (Ablewhite et al., 2015). In a study undertaken in Jiading, China, by Feng et al. (2023), education using WeChat, a Chinese app for communication, showed positive findings. The group discussion was facilitated by a doctor to ensure optimum interaction.

However, not all people may have the facilities and skills to access the internet (Bol et al., 2018; Borg et al., 2019), and a group of people prefer not to use it. In addition, not all individuals possess a natural enthusiasm for acquiring new knowledge. Overall, varying learning approaches can help to facilitate parents' learning. However, health information posted on social media such as 'Instagram' can lack accuracy and quality (Manganello et al., 2021). This suggests that clinicians and experts must be involved to make sure that the learning materials are of high quality (Fitzgerald and McClelland, 2017). Additionally, any information that is shared with the community should be monitored by the Health Education Department within the Ministry of Health (MOH). The Health Education Department has the resources and can collaborate with MOH experts to develop materials appropriate for the Omani context.

The successful implementation of parenting programmes in Oman, either at the individual level only for parents or for the community through campaigns, would require adequate allocation of resources to ensure the availability, accessibility, and effectiveness of these programmes for new parents. A potential approach that showed good outcomes and success within Oman at the community level is the community participation approach, which involves leaders and community volunteers for community awareness through empowering community members, proper networking, and dissemination of knowledge. This approach was implemented during the COVID-19 pandemic and showed a positive outcome for health promotion (Al Siyabi et al., 2020). In the UK, there is a charity that works to reduce UCI by providing safety advice using different approaches such as digital media and campaigns (Patel et al., 2017). Employing a community approach can help to overcome organisational challenges. Within the organisation (health centres), time constraints and a lack of staff training are identified as challenges within the current study that could impede the effective implementation of a health education initiative such as a parenting programme.

This study recommends integrating parental programmes within the child health promotion programme, starting in the antenatal period throughout the first year of the child's life. Classes can be organised by healthcare providers for a group of parents during their pregnancy. This should be combined with community participation approaches that involve volunteer communities. Careful mentoring and preparation must be considered to ensure the best learning experience and sustainability of the initiatives.

6.2.2 Perception of the inevitability of injury

The survey findings revealed that respondents often view injuries as unpreventable, attributing them to fate or God's will. HCPs observed that these perceptions are typically expressed after an injury occurs, and attribution of accidents to God's will could be a way to deflect responsibility for injuries. This belief may differ from one individual to another and possibly influenced by interrelated factors including the severity of injury. One of the possible factors that influence preventability perception is the type of accident (for example, fall versus poisoning) and severity (minor versus severe) (Ablewhite et al., 2015; Morrongiello, 2018). The findings of this study showed that the perception of preventability has no association with the type of injury a child experienced.

In a qualitative study by Ablewhite et al. (2015), 64 parents in England were interviewed. The findings showed that some injuries are perceived by parents to be inevitable and part of child development. The perception of inevitability was observed to be associated with the injury severity. However, Ablewhite et al. (2015) did not provide information on ethnic background to include indicators about cultural beliefs. People are more likely to blame fate when the accident is serious and the consequence is severe, since it helps alleviate feelings of guilt or responsibility, allowing them to cope with the distressing situation. Hemenway (2013) identified three common beliefs related to injury: 1) the belief that nothing bad is going to happen, 2) if something bad had happened, nothing could have been done to prevent it, and 3) if the injury happened to someone else, they deserve it. This suggests that the perception of injury preventability is influenced by individual beliefs and the circumstances where that injury happened. Nothing bad is going to happen and that nothing could have been

done may influence parents' approach towards child safety. Further study may help to understand these beliefs clearly within the Omani context.

Interestingly, the preventability of child injuries evokes perspectives among HCPs as well, with beliefs in fate and destiny shaping these views. While they claim that all injuries are preventable through proactive measures, some of the participants in the interview see injury as unpredictable, occurring in brief moments beyond human control, absolving parents of blame. These findings suggest that HCPs navigating this continuum acknowledge the complexity of injury preventability. While they recognise that some injuries are unexpected, they primarily advocate for preventive strategies. However, despite these dual opinions, most participants acknowledge UCI as an issue and that prevention awareness is needed.

The inevitability of injury and the attribution of injuries to fate and God could have been influenced by some individual religious beliefs. In Islam, which is the predominant religion in Oman, the concept of destiny (Qadr) emphasises that everything, including accidents and injuries, is ultimately decreed by God. This belief in fate can shape the perception that child injuries are part of God's plan, potentially reducing the emphasis on preventive measures alone. However, Islamic teachings also emphasise the responsibility of humans as trustees (*khalifa*) on Earth, entrusted with the duty of caring for themselves and others. This includes protecting children from harm, as highlighted in a verse from the Quran (2: 195) (Qur'an, 2020) that advises believers not to throw themselves into destruction. Additionally, Prophet Muhammad is reported to have said, *'Every individual is a guardian, and each person is responsible for those under their care.'* This saying underscores the importance of personal responsibility and accountability in human relationships. Islamic ethics stress the fulfilment of moral

obligations, and safeguarding children is considered a fundamental ethical duty. Moreover, Islam encourages seeking knowledge, including knowledge about child safety, as a means of prevention. While Islamic beliefs provide a framework, individual interpretations and cultural influences may shape attitudes and practices regarding child injury prevention among Omani Muslims.

This verse of the Quran and the teachings of the prophet Mohammed can be utilised by HCPs to inspire and encourage parents to prioritise safety measures for preventing child injuries. By incorporating these religious teachings into educational programmes, caregivers can be motivated to adopt proactive safety approaches. There are some health promotion initiatives where messages from the Quran were employed in promoting a healthy lifestyle for patients with diabetes and for the management of depression (Gupta, 2015; Toghyani et al., 2018). Gupta (2015) suggested that by incorporating these messages, HCPs can provide culturally sensitive health education that promotes positive behaviour changes among Muslim patients. An example from Oman of the use of verses of the Holy Quran in child health promotion is seen in teaching materials on the promotion of breastfeeding including the child health booklet discussed in section (1.11). There are no particular studies that have evaluated the effectiveness of the use of Islamic messages in the outcome of breast-feeding programmes. Hence, further study will help to determine the role of Islamic messages in motivating parents to implement health teaching.

However, it is important to remember that parents and family members are not always the only ones responsible for caring for children. Sometimes households hire housemaids or domestic helpers with different cultural or religious backgrounds. Acknowledging the diversity within a household and understanding how caregivers,

including housemaids, may impact injury prevention measures for children is crucial. Parents must be informed to be realistic and not ask the housemaid to supervise their child while doing other tasks at home at the same time. By being culturally sensitive and communicating openly within the household, everyone involved can work together to ensure the safety and wellbeing of infants and toddlers, considering all perspectives and beliefs. Healthcare providers can use this knowledge to create health education programmes that are tailored to the unique caregiving dynamics and cultural influences of each household, promoting a comprehensive approach to child safety that involves all caregivers.

Cultural values and spiritual beliefs can be a factor in adhering to healthcare advice in PHCCs in Oman (Abdulhadi et al., 2013). Hence, changes in these beliefs need time and an appropriate approach that targets society and individuals' beliefs. Attitudes shaped by beliefs can be modified using behavioural change theories. The research on the outcome of these health promotion theories has been shown to be successful in modifying people's behaviour in injury prevention (Gielen and Sleet, 2003). For example, a study conducted in Oman looking at the effectiveness of the theory of planned behaviour on breastfeeding practice by new mothers showed a significant positive change (Zeidi et al., 2015). The SEM appreciated the role of behavioural change theories at the individual level, yet it recommended that the real effect will not be achieved without a consideration of social and environmental factors at other levels. Nevertheless, behavioural change requires time and a structured follow-up process. Thus, considering the venue and timing is crucial for the success of an intervention.

Studies on child injury education (Cheraghi et al., 2014; Fardazar et al., 2016; Afshari et al., 2017; Ning et al., 2019; Amini et al., 2021) have recommended using

psychological and behavioural change theories for health education, compared to interventions targeting knowledge. These approaches deliver teaching in a series of sessions, group interaction, and follow-up to consider diverse learning styles, foster active engagement and reinforce safety messages for maximum understanding and behaviour change. Therefore, parents can be invited to attend parental education that prepares them for the parenting role, including child safety practice.

They must consider a need for behavioural change using psychological theories in some situations as discussed in Chapter two of this thesis. It must be suitable to engage with parents and support them to enhance their knowledge, attitudes, and behaviours. Such attitudes relate to beliefs about the preventability of injury (Rimer, 2005; Bodkin and Hakimi, 2020). Decisions on the ways to be used to enhance caregivers' knowledge and practice must be tailored to address the complexities of the influencing factors (Machin et al., 2018; McKenzie et al., 2022). Therefore, programmes should include various approaches that provide education at the individual, organisational, or community level (Barat et al., 2017; Kendrick et al., 2017; Schwebel et al., 2017; Hogan et al., 2018). The study's findings propose developing a parental education programme utilising specific theoretical frameworks to address parental attitudes, particularly concerning fatalistic views regarding the preventability of injuries.

Considering Omani society, in which the results of this study showed the absence of awareness programmes related to child safety, comprehensive behavioural change programmes may provide a valuable opportunity to modify behaviour towards injury behaviour. Since these programmes require a lot of resources, it may be better to start with health education for parents using pamphlets and videos. It is possible to prepare

comprehensive programmes that target societal and individual behaviour change with the availability of the necessary resources for these programmes, especially since the results of the interview showed that HCPs need to be prepared to educate the community in the right way and equally for all parties in society.

6.2.3 Inadequate and interrupted supervision (complex care environment)

The survey findings showed that adequate child supervision is affected by various factors within the SEM, such as the number of children, working mothers and multiple caregivers and availability of suitable nurseries. Within the interpersonal level, the number of children taken care of by caregivers may be associated with higher injury incidents. Having children of similar ages in one family can distract caregivers from adequate supervision and expose young children to the risk of injury (Committee on Injury Violence and Poison Prevention, 2010; Akturk and Erci, 2016). The study findings of the survey showed that supervision distraction increases when taking care of several children. Both caregivers and healthcare professionals noted that injuries occurred when parents were occupied with the care of another child. A similar result was identified in Iran by Younesian et al. (2016) and in Turkey by Akturk and Erci (2016). Support from the family should be considered to help in childcare. In addition, parents must be aware of the services provided by the nurseries to consider sending older children to nurseries. Family and community support for parents is essential within SEM to achieve better change in attitudes and behaviour.

Moreover, children of working mothers are perceived by caregivers and HCPs to be at higher risk of injury compared to those of non-working mothers. HCPs and caregivers stated that some injuries, such as burns, happen when mothers are absent from home

for work. The survey findings showed no significant difference between working mothers and non-working mothers, with a slight non-significant increase in injury among children of working mothers. Unlike the finding that was reported in Lebanon by Al-Hajj et al. (2020b), who showed that children of working mothers were three times more likely to sustain an injury compared to those of non-working mothers. In addition, a study conducted in Iran by Younesian et al. (2016) showed that the incidence of UCI injuries was observed to be high among children whose mothers were absent for eight hours per day from home. Injuries also happened when the mother was in charge, as reported by half of the questionnaire respondents, regardless of whether they were employed or not. Similarly, this observation has been reported in a study conducted in Canada by Morrongiello et al. (2021). They observed that most home accidents happen when mothers are in charge. This could be because the mother is the primary caregiver, and they are the most present with the child.

This association between mothers' employment and risk of injury could be due to multilevel influences within the SEM. At the individual level, the dual demands of professional and domestic roles may lead to increased stress, reducing supervision of children and increasing injury likelihood. As shown in the survey results, there is a significant association between mothers' employment and perception of inadequate time to supervise children. In addition, working mothers perceived fatigue as a factor in the risk of child injury. There are many working women in Oman, constituting 32% of total employees in the country and around 41.9% of employees in the government sector (National Centre for Statistics and Information, 2022). Approximately 16.29% of Omani women are employed outside the home, with 231,745 out of 1,423,765 women participating in the workforce (National Centre for Statistics and Information, 2022).

The minimum working hours in the government sector is seven hours for five days a week, while in the private sector it is ten hours per day. The maternity leave allowance in Oman is 50 days although it is expected to be increased to 96 days by July 2024 as part of the new manpower law (Social Protection Fund, 2024). Therefore, there are many working mothers in Oman, and their childcare needs require exploration to determine the best support approaches. The majority of workplaces in Oman lack nursery services, and some parents take their children to private nurseries. The findings of this study showed that 8.4% of respondents send their children to nurseries while they were at work. There is insufficient data to understand why few parents use nurseries.

There is a low number of public nurseries in Muscat, and nursery fees are too high for some families, especially if there is more than one child. To address social disparities, the Ministry of Social Development has taken steps to bridge the gap by offering nursery facilities within women's association facilities across the country (Al-Saadoon et al., 2021). However, there needs to be more awareness for families about these support opportunities, and it is essential to note that these nurseries need a monthly fee, albeit at a lower cost, compared to private alternatives, where prices range from 80 to 400 OMR a month (£120–800) depending on geographical location. There is an additional cost if the child is kept in nursery beyond 2 pm, with additional charges for parents whose work finishes at 5 pm. This might not be feasible for low-income families (< 500 OR) and for mothers who work for more than nine hours. Almost 20% of survey respondents work for more than nine hours. Additionally, it is important to note that some preschools have operating hours as short as four hours, which can be

inconvenient for parents who have full-time work commitments spanning seven hours a day.

At the interpersonal level, findings from the interviews showed that injuries increased among children of working mothers when children were taken care of by housemaids. Survey findings showed that 12.2% of injuries happened when the housemaid was in charge. Burns are the most common injuries noted when children are taken care of by housemaids. A possible explanation of this issue might be that many children in Omani society are taken care of by a housemaid; in the study, 13% of respondents said they leave their children with the housemaid. In addition, compared to mothers, housemaids might not have as much experience with childcare, especially when working mothers are more familiar with the principles of injury prevention and safety measures.

There is not enough data from this study to draw a clear conclusion about this issue such as housemaid attitudes towards childcare. Most housemaids employed in Omani houses are non-Omanis from other cultures and backgrounds. They earn OMR 100–170 (£200-340) per month, and they live in a family house during their working contract; 35% of survey respondents said housemaids reside with them. In addition, in many cases, housemaids are obliged to take care of children and to complete many household chores, including cooking, in the absence of the parents, which affects their ability to take care of children.

Similarly, the study by Al-Hajj et al. (2020b) in Lebanon showed that supervision of children is compromised with alternative caregivers in the mother's absence, including the housemaid, especially if they are obliged to do other household tasks. Being fatigued and overwhelmed with work can compromise child supervision. According to

the questionnaire findings, 11.5% of employed mothers kept their children under housemaid supervision compared to 8.4% who took them to nurseries. The study suggests that housemaids have a big role in childcare, and parents need to have realistic expectations for housemaids when taking care of children.

Within the interpersonal level of the SEM, many parents live with or next to their extended family; 24% of the survey respondents said grandparents reside with them. At the same time, many parents find it an opportunity to get grandparents' and other family members' help to supervise their children in their absence. In such cases, it is common for grandmothers to take on a more active role in child supervision; as shown in this study, most employed mothers' children (28%) are taken care of by grandmothers in the mother's absence. Tanskanen and Danielsbacka (2017) undertook a study in the United Kingdom for the purpose of examining the risk of home injuries in children living with or without grandparents in three-generational households. Analysing data from 12,319 children (aged nine months to three years) in the British Millennium Cohort Study, researchers found that those co-residing with grandparents had a lower risk of home injuries. This protective effect was more pronounced in boys than in girls, highlighting the potential positive role of grandparents in reducing injury risks for their grandchildren. Therefore, healthcare professionals must consider whether parents live in an extended family and, in such cases, prioritise providing comprehensive safety education for the whole family.

The study findings showed that 13.7% of fathers supervised the children while the mothers were at work. Additionally, a relatively small proportion of child injuries occurred in the presence of fathers when compared to occurrences where mothers were present. A possible explanation for fathers providing less frequent child

supervision compared to grandmothers might be that most fathers are at work as well as mothers, limiting their availability in the mother's absence.

While, as in many countries, traditional gender roles may influence caregiving expectations in Oman, there is increasing recognition of the importance of fathers' involvement in childcare duties and thus supporting the mother through shared responsibility. The SEM interpersonal level emphasises the positive social effects of more involvement of family members, fostering supportive family dynamics. Support of the primary caregiver through shared responsibilities and the contribution of a partner can play an important role in childcare and supervision (Brussoni et al., 2013) and the presence of a cooperative father can reduce child injury (Nepomnyaschy and Donnelly, 2015).

However, no studies in Oman and neighbouring countries have explored fatherhood roles and contributions to childcare. An in-depth study on childcare and supervision dynamics within Omani households is a recommendation from this study. Such a study could offer a valuable understanding of shared responsibilities among parents. Such a study could guide the development of more targeted interventions to enhance child safety and wellbeing and promote shared responsibility among parents to foster a more effective approach to child safety within the family household. Both parents must learn about childcare and safety knowledge and the father must be invited as well as the mother to attend any educational classes about parents and childcare.

Moreover, findings showed that injury also happens when children are supervised by their siblings while playing. This suggests that older children play a role in the care of their younger children. Supervision by older siblings, when parents are not around, is

a social norm within some Omani communities. This practice is commonly seen in lower socio-economic families (Ruiz-Casares et al., 2018). The age and maturity of the sibling need to be considered; however, this doctoral study does not include additional information on sibling age, making it difficult to make a meaningful conclusion. However, Kramer and Hamilton (2019) argue that keeping children under the supervision of other children and young people exposes them to a risk of injury. Alternative childcare support is important to ensure that children are adequately supervised, and families are supported in this task (Ruiz-Casares et al., 2018). Factors behind this practice need to be explored, and tailored education must be provided. Community education through media or social media could raise awareness of the risk of sibling supervision.

The intersection of individual, interpersonal, community, and societal factors highlights the need for comprehensive support systems to mitigate injury risks for families with a number of children and when the mother is employed. In some cases, housemaids and elder siblings are alternative caregivers. Supervision by these alternative caregivers may be challenging. There must be a system that ensures affordable childcare and flexible work arrangements which can alleviate difficulties associated with raising multiple children and mother employment to ensure child safety.

6.2.4 Barriers to modifying the home environment

Adapting to a safe environment at home is influenced by intertwined interpersonal, community, and societal factors. For example, the findings showed that falling from height is the most common mechanism of injury. Falling from a height includes falling from furniture, stairs, and play equipment. Safety measures through environmental

modification using equipment such as stair gates to minimise falls from stairs can reduce the occurrence of injury. The possible explanation, as indicated by survey findings, is lack of familiarity with the safety equipment that needs to be installed to minimise the risk of injury. The findings indicate a need for targeted campaigns and suggest implications for initiatives to ensure widespread dissemination of information on safety equipment.

The findings of the survey also showed that some respondents find safety equipment unaffordable, and this perception was significantly associated with low household income. The average cost of a stair gate is OMR27, which can be affordable, considering this cost compared to the cost of injury, raises a question that need to be investigated in further study. Family income has been cited in the literature studies as a factor in increasing the risk of injury (Laursen and Nielsen, 2008, Alnababtah et al., 2016). However, the fact that 42.3% of respondents answered that they are unfamiliar with safety equipment suggests poor knowledge and intertwined interaction between factors affecting parents' decisions. Ablewhite et al. (2015) said that mothers in England perceive the cost of safety equipment as a challenge to child injury prevention. (Kendrick et al., 2012) argued that providing accessible or affordable equipment can help to enhance parents' safety practices.

Therefore, to help families who cannot afford safety resources they should be provided with safety equipment. This intervention has been shown to be effective in caregiver safety practice for example. Studies looked at the effect of providing less advantaged parents with safety equipment (Habermehl et al., 2019; Furman et al., 2020) and showed significant post-intervention changes ($p < 0.001$) in using safety equipment at home. However, no information was provided about its effect on injury occurrence and

there was no information on long-term changes in practice. Hill et al. (2022) evaluated the impact of the UK national equipment scheme after two years of intervention and found a significant reduction ($p<0.001$) in injury-related hospital admissions among children aged under five years. England's national equipment distribution scheme provided free safety gates, fireguards, window restrictors, non-slip bath/shower mats, kitchen cupboard locks, corner cushions and blind cord shorteners, which showed a significant reduction in UCI treatment costs (Hill et al., 2022) .

The distribution of equipment samples to families that cannot afford to buy them can be considered when promoting child safety in Oman. However, the available financial resources and funding must be ensured by identifying funding bodies. Spending on such initiatives can reduce the country's spending on treatment and long-term rehabilitation of injured children. For example, an average safety gate costs OMR 27, while the cost of hospital care might cost OMR 30-100/day (Ministry of Health, 2023). Which indicates a need to consider this intervention in Oman. In addition, considering the factor of inadequate knowledge distribution this equipment can raise community awareness of the importance of proactive interventions. Overall, alongside equipment distribution, educational programmes are vital to ensure proper utilisation of the provided devices (Hill et al., 2022). Evaluating the long-term effectiveness in relation to injury incidence, equipment utilisation can provide a better understanding of its long-term effectiveness.

However, in addition to the family's financial status is the lack of availability of some safety equipment in local stores. HCPs sometimes avoid making recommendations for safety equipment to parents as these are unavailable in the stores. There are some community initiatives by volunteers, such as Muscat Mums, a website that lends

equipment. However, the website is in English and not popular with everyone. These initiatives need good marketing plans so everyone is aware of their services.

The HCPs' role is not limited to providing safety messages, and they must advocate for the availability of safety equipment in stores to enhance child safety. In the UK, Watson and Errington (2016) made the point that improvements in child safety have benefited from the involvement of doctors who provided advocacy at local and national levels. This benefit was observed when they worked with media during a campaign by the Child Accident Prevention Trust advocating child safety.

There must be coordination between the Ministry of Health and the Ministry of Commerce and Industry and Investment Promotion (MOCI) with the Directorate General for Specifications and Measurements (DGSM) to consider importing or banning some devices on the market. Therefore, the study recommends a need for coordination with other sectors to ensure that child safety equipment is available and accessible to all families. A number of actions can be undertaken including encouragement to local shops to stock key items, improvement in access, and disseminating information about the service provided by the equipment lending libraries.

In addition, some parents perceive as more convenient alternative methods to modify the environment. For example, some parents use resources at home and convert them into safety equipment. Some of the examples provided are of sofas, chairs, boards, or other suitable objects that are used as alternatives to safety gates. While these alternatives may demonstrate resourcefulness, it is important to note that parents must exercise caution when modifying ordinary furniture for child safety. Despite their well-

intentioned efforts, it is unlikely that most furniture can provide the same level of protection as purpose-built child safety equipment. Parents must be informed that homemade safety equipment may pose increased risks for UCI. For instance, when considering stair gates professionally manufactured ones adhere to safety standards, ensuring the proper width between railings.

Another finding that limited the ability to apply safety measures was living with extended family in one house. The survey findings showed that 48% of participants lived in a house with six to ten people. Living in an extended family is common among young couples and those with low income, limiting opportunities to modify the home environment. This issue is also seen in Canada among low socio-economic families (Damashek et al., 2021). This constraint may arise due to factors such as limited space, the influence of other family members, or a perception that modifications are unnecessary, attributes of other children at home and the perception of other home members about injury prevention (Smithson et al., 2011). Further exploration into these specific reasons would provide a better understanding of individuals' challenges in these living arrangements.

The study revealed that the environment surrounding the home is a concern due to the absence of a safe play environment, particularly in older neighbourhoods. In such areas, there is limited space for children to play, forcing many to utilise alleys and streets for their playtime activities. Some HCPs stated that unsupervised playing outside the home can be risky due to the absence of a designed play area, bullying, and simulation of risky behaviour observed in peers. The safety and maintenance of streets and playgrounds in Muscat is the responsibility of Muscat Municipality, which must ensure the health and safety of the community. Despite their efforts, there are

geographical variations in children's play areas and maintenance of streets. To promote change space for playing should be offered. Within the SEM, safety standards for streets, playgrounds, and neighbourhoods must be enforced to contribute to changes in practice.

On the other hand, some parents from urban and old areas do not allow their children to play outside, instead choosing to set up play equipment within their yards. The interview data showed that many of these play structures are constructed from unsafe and heavy materials that can potentially harm children. For instance, swings made from substandard materials and lacking proper safety standards could lead to injuries.

Overall, an unsafe environment can significantly increase the risk of injuries. This underscores the need for consideration of home safety, the safety of outdoor play areas, adherence to safety standards for play equipment, increased parental supervision, community engagement, healthcare guidance, policy advocacy and media campaigns. It underlines the need for a socioecological approach to safety promotion as it is clear that the risk factors and putative solutions are on all SEM levels. Interventions across the SEM levels can help to minimise child injuries. Injury prevention efforts in developed countries enhance prevention practices through environmental interventions (Bhatta et al., 2020). They involve the modification of products that may come into the hands of children, such as safety specifications in child toys (Watson and Errington, 2016). An example of environmental modification is using child-resistant containers in medication and detergents (Bhatta et al., 2020; Vander Hoeven, 2022). Such advancements in environmental modification have helped to reduce injuries all around the globe.

In summary, healthcare providers can play a role in supporting families to adapt to the home environment. They can discuss available safety equipment and potential alternatives with parents/caregivers. Less advantaged families should be supported by the Ministry of Social Development. More equipment libraries are required to lend equipment to those in need. This initiative can be supported by the Ministry of Social Affairs with collaboration from the community and volunteers. Healthcare professionals can play a crucial role in advocating for the availability of safety equipment in the market by collaborating with other sectors and raising safety concerns to ensure the accessibility of safety equipment to parents.

6.2.5 Limited health education interventions that raise child safety awareness

The study findings revealed that there is an absence of health education programmes related to child safety. The findings from the interviews with HCPs showed that the current approach within health institutions involves offering health advice in specific clinical situations, relying on doctors' or nurses' clinical observations and judgments. For some parents this is particularly evident in emergency room settings following accidents. Emergency room counselling can be considered good practice for raising parents' awareness of safety measures, but it is limited to a small group within the population (Siva and Tatebe, 2020). Another limitation is that it is provided after the occurrence of injury, whereas it is meant to be preventive. It could not be an approach for primary prevention to raise community awareness but might be needed to prevent future injuries and the experience of going through the injury and hospital attendance. According to the findings from the interviews, one of the indicators used by doctors and nurses of the need for counselling is recurrent visits to the health centre for injury treatment. In the course of providing post-injury counselling the HCPs form an opinion

of, and understanding of, caregivers' level of knowledge and attitude towards injury prevention. One of the observations is that some parents consider injuries as normal in child development and nothing can be done. So, based on what HCPs said in the interviews, parents need post-injury advice and education to help them prevent future injuries.

In addition, as discussed in section 1.11 the child health booklet, the Pink Card includes some messages to orient caregivers about some safety measures. According to the interview findings, not all HCPs discuss these educational messages with caregivers during child visits to the well-child clinic. Some participants in the study interviews mentioned a possible explanation, that documenting health education regarding home accidents in the child health registry is not requested. In contrast, other important topics, such as an exclusive breastfeeding programme, are a high health education priority in the well-child clinic. The prioritisation of health education topics is led by Ministry of Health (MOH) promotion strategies. An example is breastfeeding health initiative (BFHI), which is a national initiative led by the MOH in a collaboration with the WHO (Sinani, 2008). A mother's practice of breastfeeding is recorded and documented in the child health registry on every visit to the well-child clinic.

The MOH approach to promoting breastfeeding through health education and regulation and regular assessments offers a valuable example that can be adapted to raise awareness of child safety in the Omani context. By integrating similar strategies and emphasising the importance of routine assessments, the MOH can play a pivotal role in educating parents and caregivers about the various aspects of child safety, fostering a holistic and informed approach to child wellbeing. Yet the success of the BFHI programme in Oman is still faced with many cultural and social factors that have

contributed to fluctuations in BFHI over the last three decades since the start of the health promotion initiative (Al-Ghannami et al., 2021).

Another critical finding is that the learning materials are limited, either in health centres or online, that can help self-learning and raise safety awareness. There is a booklet about child injury on the MOH website (Ministry of Health, 2013). However, there were no printed copies of this booklet available in the health centres where data were collected. In addition, the search on the internet shows no available and accessible online resources in the Arabic language, contrasting with the many learning resources in other developed countries (Peden et al., 2009; Center for Disease Control, 2012a; NHS, 2022). In the United Kingdom, there are many guidelines published considering the safety of children under five (Watson and Errington, 2016), such as the guidelines developed for public health by (Public Health England, 2014) and health education by the NHS (2022), RoSPA (2022) and Baby Centre (Polly, 2022). These websites provide accessible online learning resources for parents and other caregivers. The lack of such learning resources for Omani caregivers deprives them of learning about appropriate safety measures. Child safety initiatives must provide learning resources that can be accessible to parents. Within the SEM, considering the Omani population, introducing such web pages either formally from the MOH or through volunteer organisations could support community awareness and provide access to all. However, caregivers and the community would need to be signposted to these resources.

The lack of child safety education may contribute to the high prevalence of UCI (Kendrick et al., 2012). Caregivers who are not motivated to take a more active role in applying safety measures may be more likely to neglect child safety measures. The

absence of child safety education may also perpetuate disparities in child safety among different groups of families. Low-income families, for example, may have an unsafe home environment, and may therefore be at higher risk of injury (Sengoelge et al., 2019). Without access to health education on how to apply safety measures, these children may remain at higher risk of injury. Hyder et al. (2009) and (Sethi et al., 2008) have encouraged prioritisation of child safety within child health programmes. The national safety programme in England, Stay Safe at Home, was effective in reducing the national cost associated with child admission and treatment (Jones et al., 2023).

In summary, this study has identified a notable gap within existing public health initiatives that is the absence of a dedicated health education programme that promotes child safety and injury prevention. To rectify this deficiency implementation of targeted interventions and comprehensive health education campaigns tailored for both parents and the broader community is proposed. These initiatives should underscore the importance of child safety by adopting necessary preventive measures. Recognising the current lack of awareness, I advocate for the launch of educational campaigns. Policymakers within the Directorate of Maternal and Child Health are urged to prioritise and execute programmes that address child safety, encompassing risk assessment and preventive measures.

6.2.6 Absence of guidelines

The findings of this study showed that HCPs presented positive attitudes towards promoting injury prevention. However, there is a need for clear guidelines to organise health education activities within health centres. The finding showed a lack of coordination including the lack of clarity about who is responsible for health education,

and when and where education should take place. The lack of clear guidelines to facilitate child safety education can create discrepancies in the quality of the information provided to caregivers. This finding implies a potential gap in standardised approaches to health education within the healthcare system.

The Pink Card provides guidance to nurses and doctors on their shared responsibilities for documenting discussion of health messages with parents during their visits to the EPI room. However, the findings showed that the discussion of health messages in the EPI is not as comprehensive as it should be. According to the interview findings, child health promotion involves time and organisation to ensure all topics are covered. The findings indicated that the EPI room is not perceived as suitable for comprehensive parental teaching due to many difficulties related to HCPs, the health centre environment, and parents. The time available for HCPs to teach is perceived as limited and compromised because of busy health centres, especially in Al Amarat and Al Seeb, which are the most populated areas in Muscat. HCPs report that the available time is hardly sufficient to provide care to the child (e.g., immunisation and checking height and weight). Doctors and nurses said giving short messages to parents while examining the child in an EPI room or clinic is more practical and does not affect the waiting time for visitors. However, a short message may not be sufficient to address educational requirements that aim to alter beliefs and attitudes. Structured sessions and follow-up support are imperative to facilitate substantial change, as suggested by the systematic review findings of this thesis.

There is greater time pressure in PHCCs due to their multidisciplinary nature and high patient volume. In a study conducted in Oman by (Al Rashidi et al., 2020), the workload in PHCCs was identified as a factor that compromises the quality of consultation

provided to patients. Similarly, a study conducted by Abdulhadi et al. (2013) found that workload, time constraints and lack of teamwork were factors that affected their work in PHC in Oman. Therefore, despite the available opportunities in the PHCCs, time constraints and heavy workloads hinder the realisation of these opportunities. Well-child visits in the USA encounter challenges related to time constraints, leading to variations in the amount of time dedicated to health education among different families. There is a trend for less time to be allocated to health education during these visits (Halfon et al., 2011; Hammig and Jozkowski, 2015).

Another difficulty is that some mothers may find it inconvenient to receive health information in the immunisation room due to the distraction of infant discomfort after injections or feeding demands. The lack of breastfeeding facilities within health centres adds to this challenge. In some situations, as shown by the findings from HCPs, some parents find it difficult to stay after child immunisation due to their work commitments. Parents bringing their children to the immunisation room may be primarily focused on changes in their child's weight and height, as well as the immunisations their child is receiving. Therefore, informing parents in advance about the possibility of a longer appointment for the purpose of discussing child health and safety is recommended. Another issue is the difficulty of having both parents for health education as sometimes the child is brought up to the EPI room by only one of them. All the potential challenges discussed must be recognised to make education more engaging and effective. In addition, information about a family's socio-economic status and child supervision arrangements must be noted by the healthcare provider to provide a tailored educational programme that considers parents' challenges.

Moreover, the findings from the interviews showed that health education was perceived as primarily the duty of health educators as they were the designated employees for this task. This perspective suggests a potential classification of roles within the healthcare system. There is one designated health educator in every health centre, usually present in the morning shift, who is responsible for organising and coordinating educational activities, and educating all patients and visitors about various health conditions. However, the Pink Card clarifies the shared responsibility between doctors and nurses in relation to the delivery of child health messages. Therefore, to enhance health education efforts, doctors and nurses should coordinate child health promotion that can be played on the waiting-room TV or organise a session for a mother in the waiting room or distribute learning materials. A guideline that clearly defines roles and responsibilities must be developed and implemented to simplify the process of education delivery.

In addition, health centres should strive to create a more integrated approach that leverages the expertise of doctors, nurses, and health educators to promote suitable guidelines to be implemented in health centres. This could involve joint training programmes, workshops, or even regular meetings to share insights, strategies, and resources related to facilitating better parental education and child safety awareness. It is worth mentioning here, as explained in the first chapter, that health centres in Oman work under the MOH, which is responsible for setting health strategies for health institutions and suggesting action plans. To address this, it is recommended that the Ministry of Health develop a comprehensive health education guideline that can assist in providing standardised safety education to all. HCPs advocated for this guideline to provide more coordination and avoid poor practices associated with thinking that

someone else is doing the work. Such guidelines could provide clear direction and best practices, fostering consistency in healthcare providers' efforts to deliver effective health education and child safety promotion. However, it will still depend on staff understanding the importance of this and what the impact will be on the health of the population. This synthesis underscores the importance of establishing a structured framework to enhance the quality and impact of health promotion initiatives across healthcare settings.

6.2.7 Resources and funding

Resources and funding are needed for designing and printing pamphlets and making videos. Funding is also needed to develop a web page or smartphone app that includes a comprehensive guide to safety issues, strategies to prevent them and information about online shopping and stores selling child safety products. A Health Education Department in the Ministry of Health, Oman, is the assigned department for providing health education resources to all health institutions. It designs, prints, and publishes health education materials for the public in healthcare facilities or electronic copies on official MOH channels (X, Instagram, and MOH platforms). Therefore, the maternal and child health department in the MOH, which sets child health promotion plans and strategies at the country level, coordinates and collaborates with the Health Education Department to design and print pamphlets that can be used for health teaching and distribution to healthcare institutions under the MOH. However, the importance of reviewing and updating them regularly must be considered. The last version of the Child Home Injury Booklet was published in 2013. In terms of smartphone apps, they need resources and expertise in designing, operating, and maintenance, which can be coordinated with the MOH Information Technology Department to provide logistics and

expertise to develop an app. Other social media platforms and MOH website could be used for health education, yet group discussion and interaction must be considered to maximise better understanding and support change.

6.2.8 Inadequate legislation, enforcement and collaboration between government sectors

The findings of this study indicated that there are inadequate child safety regulations in the country. Some participants in the interviews raised a concern about preventable injuries associated with unsafe toys, furniture, and buildings. Recently, the GCC countries collaborated and issued regulations for the safety of children's toys, the GCC Safety Standards for Toys and Play Equipment. The Ministry of Commerce and Industry and Investment Promotion (MOCI) (GSO, 2021) approved them for implementation in Oman. There are some recommendations issued by the Civil Defense and Ambulance Authority (2024), yet there is limited enforcement in the country that can help with safety recommendations. For example, only 30% of respondents had fire extinguishers in their homes due to lack of enforcement laws. Enforcement is a part of the promotion and raising awareness of child safety along with education, environmental modification, and empowerment (Patel et al., 2017). However, insufficient regulations may hinder effective enforcement, thereby contributing to preventable incidents of child injury (Watson and Errington, 2016). Some items within UK households are subject to laws and enforcement mechanisms, such as toys and furniture standards (Watson and Errington, 2016), while in the context of Oman, there is a lack of evidence regarding similar legislation or enforcement measures governing these products. Patel et al. (2017) mentioned that the General Product Safety Regulations 2005 in the UK mandate overall product safety, with a

specific focus on protecting children. The Toys (Safety) Regulations 2011 further ensure safety during intended and foreseeable toy use. In addition, household safety is addressed by the Building Regulations 2000, ensuring wellbeing around structures, and the Housing Health and Safety Rating System (England) Regulations 2005, covering hazards like electrical risks and falls (Patel et al., 2017). However, despite the long-term effect, enforcement is a costly and time-consuming approach that needs a contribution from various sectors (Patel et al., 2017).

The Child Law (Ministry of Social Development, 2014) in Oman emphasises the importance of child safety (Ministry of Social Development, 2014). Effective health promotion should not be done by health sector alone and needs coordination between different governmental, voluntary, media and private sectors (Cross et al., 2021). There must be a coordination between governmental sectors, including civil defence, the Directorate General for Specifications and Measurements (DGSM) at the Ministry of Commerce and Industry and Investment Promotion (MOCI), the Ministry of Health and others to tackle different safety issues and reinforce safety practice that can all contribute to ensuring child safety promotion in the country. There is no evidence of cooperation between these sectors relating to child safety. The collaboration between these sectors will help to promote meaningful and sustained improvements in safety practice (Nutbeam and Lloyd, 2021). Health professionals can have a supportive role in preventing child injury, yet the lack of national actions and collaboration poses a constraint on efforts made by HCPs (Barat et al., 2019). Overall, this theme indicated inadequate safety regulation and its hindrances to effective child safety measures, which needs societal collaboration to achieve better outcomes.

6.3 Strengths and limitations of the study

In the three phases of this research, several strengths were evident. However, as with all research, there are a few limitations. Throughout the study, efforts were made to minimise bias by taking necessary action whenever possible. This study is the first to examine unintentional child injury health education and prevention in Oman. The use of mixed methods and multiple perspectives approach to look at the opportunities for health education, and challenges provided a breadth of understanding of the contextual needs. The results broadened the understanding of the complexity of factors that may influence changes in parents' behaviour towards safety measures. The use of cross-sectional surveys for parents allowed opinion gathering from a large sample of parents with different socio-demographic backgrounds. The use of semi-structured interviews allowed more understanding of the health centre context and why and how current and future health education can be implemented.

However, despite the strengths evident in the use of the survey, there are some limitations. The cross-sectional nature of the survey to study parents' perspectives makes it difficult to establish a causal relationship between socio-economic factors and safety practices. The study relied on self-reported data which may be subject to bias and inaccuracies. Finally, the study was conducted in Muscat and the findings highlighted in this study could potentially be generalisable to other areas within Oman as there is a similar culture and context. In addition, all PHCCs in Oman are under the umbrella of the Ministry of Health, which considers equality in health promotion initiatives.

Despite the breadth achieved with the use of the SEM (McLeroy et al., 1988), there are some findings which need further understanding, such as the support of working mothers in relation to childcare. The preventability of injury needs further exploration using the Health Belief Model.

In addition, a potential limitation is that the definition of injury in the survey may not have been clear and perceived differently, and respondents may have replied relating to minor injuries such as bumps and bruises inherent in normal development. Focusing the survey solely on injuries requiring medical treatment, rather than encompassing all injuries, could have provided more precise information and facilitated more effective targeting of prevention measures. While this approach was chosen to provide a comprehensive overview of the injury landscape in Oman, it prevents examination of preventability and causative factors of major injuries. In addition, including caregivers of children who did not experience injury allowed understanding safety practices among different groups of those who experienced injury or not. This intentional design aimed to capture a spectrum of responses, ranging from no injuries to minor incidents like bumps and bruises, as well as injuries requiring medical attention. This approach allowed for a broad exploration of differences and relationships with various factors that may contribute to injury. Future research could address this limitation by stratifying the data to emphasis particularly on severe injuries, allowing for a more targeted understanding of their causing factors and prevention strategies.

The questionnaire and the interview guide items aimed to cover a broad range of topics related to injury prevention awareness, challenges, and opportunities. Some perspectives or factors may not have been adequately addressed. I may not have

explored every relevant aspect comprehensively due to time limitations and the need to maintain participant engagement.

6.4 Implications of the study

The findings from this study have several important implications for research, theory, and practical interventions in the field of child injury prevention.

6.4.1 Implications for theory

The study contributes to the overall evidence base for the prevention of injuries to children at home, addressing the lack of child injury research conducted in the Omani setting. The existing literature has identified a range of influences on child safety practice; however, understanding the complexity of these factors remains limited.

This study finds that careful exploration of contextual factors using the health promotion model is essential to predict the outcomes of health education. The SEM showed a process that looks at the phenomena from different aspects. It allowed for careful consideration of the factors. The use of the model levels of individual, interpersonal, community, organisational and societal levels helped in this study to analyse the factors influencing parents' attitudes and practices related to injury prevention. This suggests that the SEM model can be a valuable model for future research in the field of childhood safety promotion.

6.4.2 Implications for practice

In addressing the objective of identifying opportunities and challenges for integrating safety education into child health promotion, the study showed some suitable opportunities available in PHCC settings. Child safety education needs enhancement.

This might be seen as an additional responsibility with challenges such as time constraints and workload seen in PHCCs. However, as shown in Table 1-3, child safety is a component of child health promotion but often receives less attention than other child health topics such as breastfeeding. Therefore, integrating it within current health promotion activities conducted at the PHCCs could present a valuable opportunity. There are opportunities for integration in ante-natal clinics, during the visits to the EPI room, in the waiting area, and in other clinics and as community outreach in district halls, schools, parks, and elsewhere. Learning materials and interactive sessions can also be communicated online through social media, websites, or mobile applications. HCPs are the key to providing and coordinating injury prevention awareness (McDonald et al., 2018; Siva and Tatebe, 2020; Hazazi et al., 2021). In Oman, PHCCs are located in every residential area (Al-Mahrezi and Al-Kiyumi, 2019) that can offer settings for health education accessible to the public, allowing HCPs to provide equal learning opportunities to a large population.

6.4.2.1 Targeted educational programmes

The findings of this study highlight the need to enhance safety education in Oman. Inadequate adherence to preventive practices, diverse perceptions regarding the preventability of child injury, and the absence of educational programmes collectively underscore the necessity for comprehensive initiatives. These initiatives should facilitate acquiring and exchanging knowledge among parents, families, and the community, thereby addressing the gaps identified in the study. The programme must be tailored to the needs of the Omani context (Table 6-2). Therefore, the study suggests utilising available opportunities in health centres and providing information in a cost-effective and timely manner. Policy changes and safety education campaigns

for UCI prevention could effectively improve Omani caregivers' safety measure practice. The development of a programme that encourages parents to take more safety measures is suggested. In addition, families, including grandparents and domestic helpers need access to resources and guidance to promote a safe environment for children within their families. Injury prevention campaigns tailored to the Omani community's needs could have a significant impact on child injury prevention.

6.4.3 The proposed initiative for an educational programme

Injury prevention programme can be delivered at national level through MOH. The following are the proposed actions to develop child safety education provided by MOH.

- Establish a task force comprising policymakers (including a representative from the Ministry of Health, Maternal and Child Health Department and Primary Health Directorate), doctors, nurses, health educators, social workers, and selected parents. This task force must play a pivotal role in leading the child safety programme initiative.

Table 6-2: Tailoring health promotion interventions with causal factors and challenges as identified by this project

SEM	Targeted factors/challenges	Suitable HE method
Parent level	Inadequate knowledge	Parenting classes in health centres on safety measures and supervision HE in the waiting areas (videos, pamphlets, lectures)
	Belief in injury inevitability	Parental education programme Employ a behavioural change model Use of quotes from the Quran in learning resources
Family level	Supervision in a complex environment (working mothers)	Discussion of available supervision alternatives Advocate for quality and affordable childcare nurseries Health education on safety measures Strategies targeting family and community using media, social media, and pamphlets Parent mentoring and volunteer group communities
	Number of children (large family)	Tailored education on sibling-related injuries and supervision Mother empowerment and support
	Multi-family households	Education on shared space safety and community meetings
	Adjusting home environment	Workshops and advocacy for an improved housing environment using animation and videos in health centres and through social media.

SEM	Targeted factors/challenges	Suitable HE method
Organisational level	Inadequate coordination and guidelines on health education in health centres	Develop health education guidelines to ensure equality and sustainability Integrate child safety into the child health programme
	Lack of resources	Collaboration between MOH departments to develop learning resources and publish them through MOH's official social media channels
Community level	Neighbourhood environment	Community outreach programme to encourage child supervision and collaboration for safe play
	Inadequate safe play areas	Advocate for safe play areas and maintenance
	Limited safety education programmes	Integrate it with current health education programmes and reinforce it through media, social media, and community outreach
	Low-income families	Advocate for affordable safety devices, empowerment, and collaboration
Societal level	Regulation to consider safety in home structure	Advocate for regulation enforcement
	Regulation for safe toys and play equipment	Advocate for safe child toys Enforcement to implement child toy safety
	Unavailability of equipment	Equipment lending libraries Advocate for equipment availability in the market

The interdisciplinary composition of the group, coupled with their collective expertise in child health, will facilitate effective communication and feedback mechanisms, laying the groundwork for successful collaboration. The task force meetings must be held in the Maternal and Child Health Department in the Ministry of Health to facilitate communication of the initiative as well as communication with task force members.

- Develop educational materials by collaborating with initiative task members and the Health Education Department within the Ministry of Health. The Health Education Department, as an entity responsible for health promotion, will play a key role in this initiative. This department is entrusted with the task of creating and disseminating learning resources through diverse channels, encompassing printed materials and various social media platforms, which are Instagram and X. By joining the collective expertise of clinicians and experts, combined with the strategic outreach capabilities of the Health Education Department, the initiative aims to produce educational materials that are medically accurate and accessible through multiple media, ensuring effective dissemination and broad community impact.
- Design a child safety webpage in collaboration with the Health Education Department, Royal Oman Police (ROP), and Information Technology Department of the MOH. The webpage must include all the information related to child safety and injury prevention. The webpage can be integrated into the MOH website, and information about it must be communicated to all parents before and after the child's birth through learning materials and MOH health education social media channels. The webpage should feature functionality for

parents and the community to ask questions and get consultations to allow more interaction with the public.

- Develop a simulated online home environment within the child safety programme that can provide a visual example of a safe home environment.
- Promote child safety through posting child safety messages on posters within the PHCC to ensure accessibility for all visitors. These posters must be among learning materials made collaboratively by the task force and Health Education Department. In addition, it can be played in a short video in the waiting area of the health centre.
- Organise a community outreach campaign in the catchment area for each health centre, facilitated by trained health care professionals and trained volunteers. Collaborate with the local Wali (governor) office and women's association in each area to coordinate efforts and arrange appropriate venues. The campaign aims to provide health education and distribute educational materials. This initiative seeks to empower the community with valuable knowledge to protect children from preventable injuries.
- Offer new parents a session that involves comprehensive education of child health and safety. These sessions must be organised at every health centre to provide appropriate knowledge for parents before childbirth and encourage them to arrange a home environment for the child.

6.4.3.1 Policy advocacy

The findings from this study suggest a call to action for policymakers to prioritise the availability of safety equipment on the market. Additionally, there is a pressing need for a comprehensive policy framework that oversees the quality of children's toys on

the market. Moreover, advocating for the development of building regulations that place a strong emphasis on safety standards is crucial.

6.4.4 Implications for future research and direction

The prevention of child home injury is a new area of research in Oman, and there are limited studies that have been done on the prevalence of child injuries in Oman. This study was undertaken to identify the needs, opportunities, and challenges for educational programmes from the perspective of healthcare professionals and caregivers. The study looked at the problem from different perspectives and showed detailed findings that can be used to guide the initiation or enhancement of educational programmes at individual and community levels. However, some points require further investigation for more understanding. Therefore, this study opens the door to various avenues for further research on this topic.

Researchers can examine the effectiveness of specific interventions designed to improve UCI prevention practices. This includes assessing parents' safety knowledge, attitudes, and practices before and after the intervention and comparing injury rates. Changes can be assessed in the short- and long-term post-intervention to understand sustainable change better. In-depth qualitative research is necessary to comprehend parents' experiences and the social factors influencing their practices. Future research can also focus on developing strategies to increase parent involvement in more sustainable practices.

In addition to assessing the feasibility, accessibility, and effectiveness of the technology-based health education proposed to be used, assessing the benefit of multi-disciplinary collaboration involving decision makers, doctors, nurses, health

educators, social workers, and representatives from police to enhance the reach and impact of educational programmes could be appropriate.

Overall, the implications of this study extend across theory, practice, policy advocacy, and future research, offering valuable insights for stakeholders and decision-makers. The findings underscore the importance of implementing targeted educational programmes to enhance child safety practices and reduce unintentional injuries in Oman. Policymakers can leverage these insights to develop regulations and policy that can support the implementation of child safety measures. Furthermore, the study suggests avenues for future research. These implications collectively contribute to a more comprehensive understanding of UCI prevention, guiding practical educational interventions, shaping policy initiatives, and setting the agenda for further scholarly inquiry in this important topic. Researchers, health professionals, and policymakers can work collaboratively to develop more effective strategies for addressing and preventing child home injuries.

6.5 Summary

In summary, this chapter has discussed the key findings of this study, examining the factors, challenges, and opportunities associated with injury prevention in Oman. The study shows that inadequate safety practices are intricately entwined with complex socio-economic factors such as supervision arrangements due to mothers' work commitments outside the home, big families, and low income. Furthermore, it identifies a lack of regulatory measures, particularly in enforcing safe practices, extending to overseeing child toy safety and building structure regulations.

The inadequacy extends beyond safety practices to involve support structures for families. This deficit includes insufficient health education and limited access to information provided by health institutions, particularly a lack of clear child safety education and promotion guidelines and role conflicts within health centres. Notably, health safety education about children receives less attention within existing programmes compared to breast feeding and immunisation. As a result, caregivers may encounter difficulties mitigating risks and ensuring their children's wellbeing. Addressing these resource limitations is crucial to promote equitable access to child safety information, education, and products. This will enable parents to implement adequate safety measures and protect their children from preventable injuries. In addition, collaboration between governmental agencies, community organisations, and healthcare providers can improve resource availability and promote comprehensive child safety initiatives.

The chapter identified various opportunities for enhancing safety education by healthcare professionals in PHC in Oman. These include potential interventions during visits to health centres for EPI clinics. However, the study strongly advocates for early education, particularly during the antenatal period and then to be continued in EPI clinics. Social media and apps include many advantages and can be an alternative under HCPs' supervision. To provide public awareness, community outreach at different sites within each residential area must be considered as part of child health promotion. Despite these opportunities, the chapter outlines several challenges contributing to healthcare professionals' conservatism in adopting safety education responsibilities. Therefore, integration of safety education within child health needs cooperation from HCPs. These challenges range from time constraints to professional

overload. Exploring avenues for resource utilisation, the chapter suggests utilising the Ministry of Health's (MOH) resources, specifically in health education and IT facilities. This strategic use of available resources can facilitate the design and dissemination of information to a larger population.

Acknowledging certain limitations discussed in the chapter underscores the numerous implications for practice, research, and policy. These implications are placed as key contributors to the overall wellbeing of children, promising long-term impacts by alleviating the burden on the Ministry of Health. The chapter provided a comprehensive overview of the study's findings, emphasising challenges and potential pathways to improve child injury prevention.

The following chapter discusses the recommendations of the study.

Chapter 7 Conclusion and Recommendations

In conclusion, despite the success of the child health programme in Oman, it lacks adequate educational interventions for the promotion of child safety and injury prevention. This study has undertaken a systematic review and adopted mixed methods research, which has revealed valuable information regarding the need for educational interventions to raise awareness, empower, and support parents, families, and the community to promote child safety. It recommends approaches to integrate it with current health promotion programmes using context-related interventions that respond to community needs. The following are the recommendations of the study for future research, practice, and regulations.

7.1 Recommendations

The findings of this study highlighted a number of recommendations that the PHCPs should address, including the Health Education Department and the Primary Health Department at the Ministry of Health, Civil Defence and Directorate General for Specifications and Measurements (DGSM).

7.1.1 Recommendations for future research into UCI prevention

Since this study is the first of its kind in Oman, future research should consider these important areas:

- Qualitative research to understand social and cultural factors influencing caregivers' practice of child safety. The findings of the study showed that some parents attribute UCI to their child being naughty. Further exploration of what is meant by this expression by different groups would help us to understand if this

is a social norm or an avoidance of responsibility. In addition, a perception that injuries happen because they are God's will need more information to understand this perception.

- A qualitative study to explore and compare the experience of working and non-working mothers in relation to child supervision, and supervision arrangements within the Omani context, including the role of the housemaid in child supervision.
- Pre-and post-evaluation after health education intervention of the changes in safety knowledge, attitudes, and practice and comparison of UCI rates. A longitudinal study is needed to assess the long-term effect and better understand the sustainability of intervention and outcomes.

7.1.2 Recommendations for the Ministry of Health to integrate safety education into the child health programme

- Integrate child safety education within women and child health programmes.
- Parent education should be started before childbirth for both parents.
- Initiate a parental education programme for young parents that includes child growth and development, child health and safety starting from the antenatal period and continuing through the child's first two years.
- Utilise the parent's presence during EPI visits to deliver health education. Displaying short videos and distributing leaflets for the parents while they are waiting for immunisation is recommended.
- Interactive apps and web pages should be designed and employed to educate families about child safety measures to be taken at home and its surroundings.

Parents must be informed about this in their visits to health centres for antenatal care, and the importance of these materials must be reviewed at birth and in the following visit to health centres.

- Health education materials developed by MOH should be culturally appropriate considering Omani context and tailored to community values. It can incorporate relevant and insightful quotes from the Quran and Hadith.
- Development of child safety guidelines that include a checklist for the HCPs to guide them in child safety education within PHCCs.

7.1.3 Recommendations for the Ministry of Commerce and Industry and Investment Promotion (MOCI)

- The specification of child toys and play equipment quality is to be emphasised through legislation by the Directorate General for Specifications and Measurements (DGSM) in collaboration with the Consumer Protection Authority and Muscat Municipality.
- Ensure child safety equipment is provided in stores, available across all children's speciality stores, coordinate with healthcare centres to direct parents where to find them, and monitor their prices.
- Establish well maintained lending equipment libraries in each Wilayat.

7.1.4 Recommendations for municipalities (local government/authorities)

- Monitor child play equipment on the market to ensure it meets safety standards.
- Make designated safe places for children to play that are well maintained.

7.1.5 Recommendations for the Ministry of Social Affairs

- Review regulations for nurseries and preschools on working hours and fees to provide suitable services for parents with work commitments.
- Support low-income families with safety equipment.

7.2 Dissemination of research findings

The findings from this study are of special relevance for all HCPs working in child health, particularly PHCCs. As this study is the first of its kind in Oman, it is important to disseminate the findings as soon as possible. A report on this PhD study will be prepared, for presentation by MJ at a meeting with the director of women and child health in the directorate of PHC. The aim will be to plan a child safety campaign. This meeting will be important as it will facilitate data-driven decision-making, strategic alignment, operational efficiency improvement, and risk mitigation. Additionally, it will foster innovation, enhance accountability, promote collaboration, and ensure transparency. Sharing these findings with key stakeholders will be a critical step towards leveraging the study's insights to enhance the organisation's performance and effectiveness in preventing injuries among young children.

A seminar will be led by MJ, to an invited group including HCPs, representatives from Civil Defence, the Royal Oman Police, the Directorate General for Specifications and Measurements (DGSM), Department of Women and Children at the Ministry of Social Affairs. The seminar will present the study findings and recommendations and coordinate efforts to develop a standard child safety campaign with support from

different authorities. The aim is to develop a task group involving members from different sectors mentioned in the recommendations.

To maintain transparency, feedback on the research results in a one-page report to the participants will be completed by MJ. This feedback report will be shared through two channels: the hospital's communication board and the study webpage (*Unintentional Child Injury in Oman: Health promotion of child safety - University of Birmingham*). These platforms will serve as accessible means for participants to stay informed about the study's outcomes and their potential impact on healthcare practices.

MJ is committed to sharing this research's valuable insights and knowledge with the broader professional and academic community. To achieve this, the findings of this study will be published in peer-reviewed journals, conferences, or other appropriate academic platforms. By disseminating this research MJ will contribute to the ongoing discourse in the field and impact the understanding of prevention of child injuries.

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Appendices

Appendix A Published systematic review

CHILD CARE IN PRACTICE
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REVIEW

OPEN ACCESS

Health Education, its Methods and Effects on Parents' Knowledge, Attitudes, and Behaviours to Prevent Unintentional Child Injuries at Home: A Systematic Review

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ABSTRACT

Thousands of young children die or sustain life changing disabilities every year because of unintentional child injury (UCI) at home. Many injuries could be prevented if parents and caregivers were more aware of risks and accident-avoidance strategies. The aim of this review was two-fold. First, we explored whether health education modified parent or caregiver knowledge, attitudes, or behaviour related to injury awareness and prevention. Our secondary aim was to describe strategies used when delivering health education. Intervention studies using quantitative methods published after 2010 were included. The participants were caregivers or parents of children younger than six years of age. A systematic search of multiple databases yielded twelve studies. The risk of bias (ROB) was assessed using the Cochrane ROBINS-I for non-randomised and ROB-2 for randomised studies. Data synthesis was performed following the steps described in the SWiM guideline. We followed PRISMA guidelines to report the process and results. Interventions were usually one-off, multifaceted, and interactive using printed materials, discussion, didactic teaching, video, and games. Improvement of knowledge ranged from 12.5% to 85%. Attitude improvement was noted in five studies and ranged from 6.6% to 28%. Self-reported behavioural change was noted in six studies. Follow up duration varied from less than one month to six months. The observed changes have not been linked to the numbers or severity of UCI. Health education is beneficial, but the true long-term impact has yet to be fully explored. Studies that provided the greatest improvements used theories of behaviour change and interventions that were designed for the specific needs of the target population. Our review provides health care professionals with evidence of the potential benefits of health education in enhancing parents' awareness regarding preventing UCI and information about how to deliver health education, that can guide the review of prevention practices of UCI.

KEYWORDS

Child accidents; child safety; health education; health promotion; home; prevention; unintentional child injury

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Introduction

Unintentional child injury (UCI) in children under five years of age is considered one of the most disturbing public health issues globally (Peden et al., 2009). It causes the death of thousands of children daily (Hyder & David, 2012; Sleet, 2018) and the hospitalisation of millions (Adeloye et al., 2018; Hogan et al., 2018). The time and resources needed for rehabilitation (Polinder et al., 2010) and management of psychological consequences (De Young et al., 2014; van Meijel et al., 2020) place a social and economic burden on the family (Dalal & Svanström, 2015).

The financial consequences impact health systems. The United States of America (USA) has a population of more than 23 million under-fives. It costs more than 15 billion US Dollars per year to manage the consequences of 1.6 million injuries in children between 0–4 years (CDC, 2020). The United Kingdom (UK) has a population of 3.7 million children under 5 years with 100,000 annual admissions due to UCI costing £150 million per year (Patel et al., 2017). A rapidly developing country such as Oman, a country in the Middle East with a population of 382,000 children under 5 years, has observed a significant number of UCI, reporting 86 deaths and 2614 hospital admissions in 2018 (Mehmood et al., 2018; MOH, 2018).

Nearly three-quarters of UCI occur at or close to home (Hashemi et al., 2017; Mehmood et al., 2018; Wynn et al., 2016). Socio-economic, environmental, and behavioural factors influence the rate of UCI at home (Baron-Epel & Ivancovsky, 2015). Good child supervision and maintenance of a safe environment reduce the risk of UCI (Falcone et al., 2016; Kendrick et al., 2016; Schnitzer et al., 2015; Watson & Errington, 2016). Caregiver knowledge, attitudes, beliefs, and behaviours influence their approach to UCI prevention (Al-Hajj et al., 2020; Ince et al., 2017; Younesian et al., 2016) increasing the complexity and challenge of promoting adherence to preventive practices (Ince et al., 2017; Lafta et al., 2014; Sutchritpongsa et al., 2013).

Health professionals have a considerable role in educating and raising caregiver awareness of child safety (Hanna et al., 2022) through health education; a health promotion approach using different strategies and models to enhance knowledge and attitudes (Glanz et al., 2008). Health education can take place in the community, primary care centre, or home (Habermehl et al., 2019; Silva et al., 2016) and may involve individual, group, or online training. High-income countries such as the UK and US have well-developed programmes with demonstrable impact on rates of injury (Duffee et al., 2017; Kendrick et al., 2013; Patel et al., 2017). However, in rapidly developing countries like Oman (Al Rumhi et al., 2020) and other neighbouring countries (Alkhamis & Abdulkader, 2020), where there is no established parenting programme or home visit, an alternative context-related programme, needs to be considered. Countries that look forward to establishing or developing the UCI prevention programme need evidence to guide their decision on approaches. Pooled knowledge concerning its effectiveness and ability to influence caregiver knowledge, behaviour and attitudes is lacking. Health practitioners who want to start health education programmes need to be able to evaluate the different approaches so that they can choose the suitable method for their population.

Aim

The purpose of our review was to identify the effect of health education on parental knowledge, attitudes, and behaviour towards UCI prevention. We identify the

methods used to undertake and evaluate health education, including settings, length of the intervention, tools, and assessments to provide evidence toward developing educational guidelines for child safety and injury prevention by healthcare practitioners.

Methods

Review process and design

The review is reported according to PRISMA guidelines (Page et al., 2021), and conducted according to Cochrane Handbook for Systematic Reviews of Interventions (Higgins et al., 2008). The protocol was registered in the International Prospective Register of Systematic Reviews (PROSPERO 2020 CRD42020200183).

Information source

A preliminary search was undertaken to identify keywords through indexed terms, text words and controlled vocabularies in each database. A systematic search was undertaken in September 2020 and updated in June 2022 using CINAHL Plus, MEDLINE, Cochrane Library, PsycINFO, ProQuest Central, ERIC, SCOPUS and Embase. In addition, the reference lists of each eligible paper were hand-searched for relevant research reports. Search operators were used to broaden the search, including truncation, stemming, wildcards, exact phrase searching, and word adjacency proximity strategies. Keywords were combined or excluded for advanced search using “Boolean operators” such as “and”, “or”, and “not”. An example search was undertaken in Medline (Ovid) and is presented in Table 1.

Eligible studies for inclusion were defined as any interventional primary research study conducted after 2010 and published in English or Arabic. The eligibility concerning population was limited to parents or caregivers of children under the age of six years. Studies conducted on disabled children and children of parents with mental illnesses were excluded from the review to provide a homogenous population for the synthesis.

Assessment of risk of bias

Each study was assessed independently by MJ and BD for risk of bias using ROBINS-I for non-randomised studies of interventions (Sterne et al., 2016) and RoB2 for randomised trials (Sterne et al., 2019). The results were collated, and discussion was used to achieve consensus. Additional reviewers were available to mediate should consensus not be readily achieved but this was not needed.

Data extraction

Data extraction was carried out using a tool adapted by the reviewers from “Cochrane data collection tool” (Li et al., 2019). It included two parts: first, for the study information necessary to determine the study’s eligibility for final analysis. Second, to collect details about publication, researchers, study purposes, design, participants, settings, context, interventions, outcome measures, outcomes, and results. Our review focused specifically

Table 1. Example search using Medline.

Medline (OVID) Search terms
1. unintentional, child, injury/
2. unintentional, child, accidents/
3. unintentional, child, home injury/
4. "unintentional child injury"
5. "child home accidents"
6. "child home injury"
7. (unintentional adj3 child injur*).ab,ti.
8. (unintentional adj4 child injur*).ab,ti.
9. (unintentional adj5 child injur*).ab,ti.
10. (child adj3 accident*).ab,ti.
11. (child adj4 accident*).ab,ti.
12. (child adj5 accident*).ab,ti.
13. injury or unintentional injury or domestic injury or home injury or home accident or trauma or preventable injury.
14. injur* or unintentional injur* or domestic injur* or home injur* or home accident* or trauma or preventable injur*
15. children or pediatric or child or childhood
16. child* or p?diatric
17. "health education"
18. (health adj3 education).ab,ti
19. (health adj4 education).ab,ti.
20. health education or health awareness or health teaching or child safety education
21. 1 or 2 or 3 & 15 & 19.
22. 5 or 6 & 17
23. 17 & 18
24. 13&16&19

on changes in the caregivers' knowledge, attitudes, behaviour relating to UCI prevention and health education approaches. An Excel spreadsheet (Microsoft Corporation, 2021) was used to record and organise the extracted data.

Data synthesis

There was heterogeneity in the outcome measures used in the studies that prevented meta-analysis. Therefore, descriptive analysis and synthesis were undertaken and reported following the Synthesis Without Meta-analysis (SWiM) reporting guidelines (Campbell et al., 2020). This guidance has been developed to provide a robust reporting method for synthesis when meta-analysis is not possible and can be used as an extension to PRISMA. There are nine reporting items included in this method that ensure that authors provide a rationale for grouping the studies, selection of a standardised metric across the studies and how transformation were conducted, description of the synthesis methods used, prioritisation of studies in creating results and drawing conclusions, methods used to explore heterogeneity, assessment of the certainty of the findings, description of data presentation methods, reporting or results and limitations.

In our review grouping allowed comparison of the method of health education delivery, the use of health psychology models, and knowledge, attitudes, and behaviour outcomes according to the authors definitions. Mean and standard deviation were extracted as provided when possible. In one case the overall mean and standard deviation for knowledge, attitudes and behaviours were created from the individual items reported in the results (Ihalahewage et al., 2018) using an online statistics tool. We also calculated the percentage change in knowledge, attitude, and behaviours using the formula (post-measure – pre-

measure/pre-measure)*100. The results for knowledge, attitude and behaviours were tabulated for each study and then presented as a descriptive summary and identification of notable examples such as greatest and least change. These results are considered in terms of the approach to development of the intervention, the method of delivery of the intervention and the context including cultural factors.

Risk of bias

The risk of bias was moderate to severe in most studies (Table 2). The most significant issue was participant selection. Two RCTs were included, one of which had no description of the randomisation process (Cheraghi et al., 2014) and the other used cluster randomisation with the unit being pre-schools (Ning et al., 2019). Participants were recruited using convenience methods and often from a health centre in all other studies.

Most studies relied on parents' self-reports to assess knowledge, attitudes and behaviour changes, potentially biasing outcome quality and overestimating the interventions' effect. Additionally, most reports made no discussion of engagement with educational materials following the introductory session, meaning that the dose of education and compliance was not identified.

Many studies evaluated the impact of the intervention using a self-designed questionnaire that was piloted and provided validity and reliability data (Afshari et al., 2017; Cheraghi et al., 2014; El Seifi et al., 2018; Fardazar et al., 2016). In some cases, a validated questionnaire was used (Kahrman & Karadeniz, 2018; Ning et al., 2019; Silva et al., 2016). However, some studies used self-designed questionnaires and did not report validity of reliability data (Amini et al., 2021; Furman et al., 2020; Habermehl et al., 2019; Ihalahewage et al., 2018; Setien et al., 2014). A lack of psychometric data introduces a high risk of bias (Paterson & Britten, 2005; Scott, 1997).

Some studies used psychological health theories in the design of questionnaires and interventions. This provides a transparency and theoretical basis for decision-making relating to data collection and reporting of results that can reduce bias in interpretation and help to avoid other forms of bias such as those resulting from social pressure leading to reporting bias (van der Steen et al., 2019).

Duration of follow-up ranged from immediately after the intervention (Silva et al., 2016) to six months (Ning et al., 2019). Loss to follow up ranged from zero (Afshari et al., 2017; Cheraghi et al., 2014; Ihalahewage et al., 2018; Setien et al., 2014) to 40% (Furman et al., 2020; Ning et al., 2019), but some studies did not provide data about this and it was not possible to infer the loss to follow up from the data presented in the report (Amini et al., 2021; El Seifi et al., 2018; Fardazar et al., 2016; Kahrman & Karadeniz, 2018).

Results

Four hundred and fifty-four research papers were retrieved (Figure 1) and exported to reference management software (EndnoteTM 20, Clarivate), where 77 duplicates removed. A further 377 papers were exported for inclusion-exclusion screenings to the Rayyan online systematic review platform (Ouzzani et al., 2016). Two reviewers (MJ/BD) independently screened the papers by title and abstract, which resulted in

Table 2. Risk of Bias (ROB) summary.

ROB 2 for RCT	Bias arising from the randomisation process	Bias due to deviations from intended interventions	Bias in classification of interventions	Bias due to deviations from intended interventions	Bias due to missing outcome data	Bias in measurement of the outcome	Bias in selection of the reported result	Overall ROB
Cheraghi et al. (2014)	Moderate	High			Low	Some concern	High	High
Ning et al., 2019	Some concern	Low			Low	Low	Some concern	Some concern
ROBINS-I for Non-RCT	Bias due to confounding	Bias in selection of participants into the study	Bias in classification of interventions	Bias due to deviations from intended interventions	Bias due to missing data	Bias in measurement of outcomes	Bias in selection of the reported result	
Ihalahewage et al. (2018)	Low	Moderate	Low	Low	Low	Low	Low	Moderate
Afshari et al. (2017)	Low	Moderate	Low	Low	Moderate	Low	Moderate	Moderate
El Seifi et al. (2018)	Low	Moderate	Low	Low	Moderate	Low	Moderate	Moderate
Furman et al. (2020)	Low	Moderate	Low	Low	Low	Low	Low	Moderate
Setien et al. (2014)	Low	Moderate	Low	Low	Low	Low	Low	Moderate
Habermehl et al. (2019)	Low	Moderate	Low	Low	Low	Low	Low	Moderate
Silva et al. (2016)	Low	Moderate	Low	Low	Low	Low	Low	Moderate
Kahrman and Karadeniz (2018)	Low	Moderate	Low	Low	Low	Low	Low	Moderate
Fardazar et al. (2016)	Low	Moderate	Low	Low	Low	Low	Low	Moderate
Amini et al. (2021)	Low	Moderate	Low	Low	Low	Low	Low	Moderate

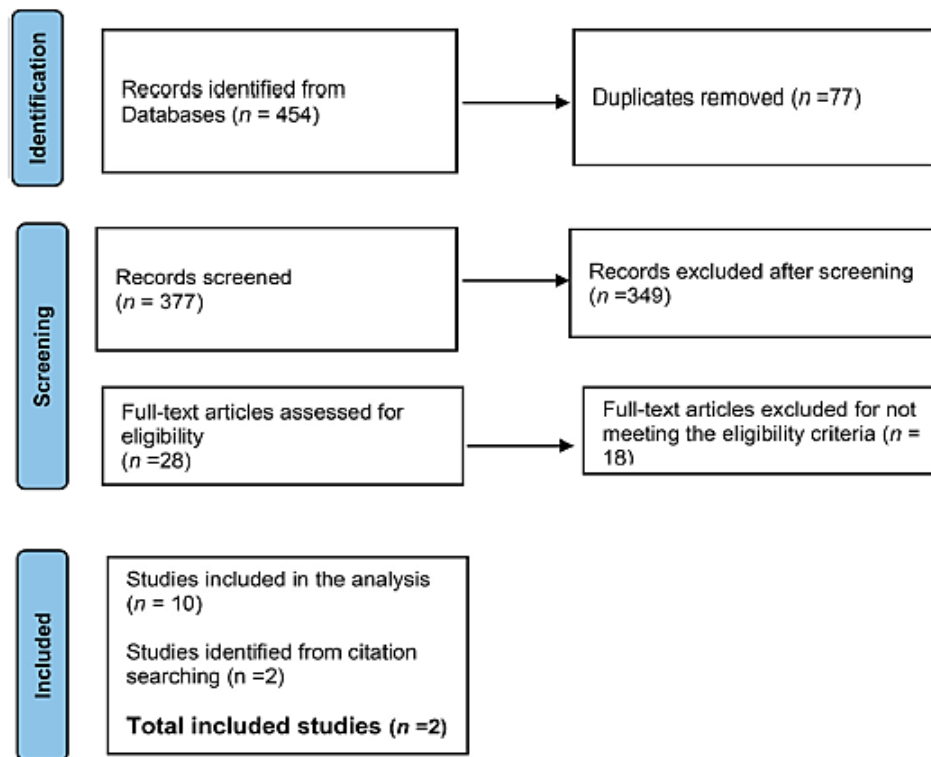


Figure 1. PRISMA flow chart of the search process.

identification of 28 papers. Full-text screening led to a final total of ten articles. Scrutiny of reference lists identified a further two papers.

All were published in English between 2010 and 2020 and were conducted in Iran ($n = 4$), the United States of America ($n = 3$), Turkey ($n = 1$), Egypt ($n = 1$), Sri Lanka ($n = 1$), Brazil ($n = 1$), and China ($n = 1$) (Table 3). There was a mix of urban and rural settings, and most studies focused on low-income families and education interventions delivered in the community (El Seifi et al., 2018; Furman et al., 2020; Ihalahewage et al., 2018; Kahriman & Karadeniz, 2018).

The interventions were delivered to families, caregivers or parents. In several studies, the gender of the caregiver(s) or parent(s) were not provided (Furman et al., 2020; Habermehl et al., 2019; Ihalahewage et al., 2018; Ning et al., 2019; Setien et al., 2014). However, most studies only recruited mothers (Afshari et al., 2017; Amini et al., 2021; Cheraghi et al., 2014; El Seifi et al., 2018; Fardazar et al., 2016; Kahriman & Karadeniz, 2018; Silva et al., 2016).

The time spent on education varied between ten minutes (Habermehl et al., 2019) to four hours (Afshari et al., 2017; Amini et al., 2021; Cheraghi et al., 2014). The delivery method was not well described in any of the studies (Table 4) but usually included some form of information delivery and a discussion or question and answer session. Most studies provided the participants with materials to take home in the form of written pamphlets. Two studies also provided the participants with child safety equipment such as socket protectors and cabinet clips (Furman et al., 2020; Habermehl et al., 2019).

Table 3. Summary of included studies.

Author, year & Country	Design + population	Sample and setting	Outcome measure(s)	Study duration/ Follow up (Drop out from follow up %)	Findings summary
Atfshari et al. (2017) Twisarkan, Iran	Design: Pre- and post-intervention study	Mothers of under 5 children: Intervention group $n = 36$ Control group $n = 36$ Settings: Health House ¹ Rural	Tool: Pre-post-test three parts questionnaire: Part 1: sociodemographic factors Part 2: Injury history Part 3 (based on PRECEDE) Knowledge: 14 MCQ Attitudes: 15 Likert scale range from (very much agree to – not at all agree) Behaviour: 30 Q (YES-NO). Validation: Validity: Pilot study on 30 mothers Reliability: alpha coefficient used to measure reliability	2 months (0%)	Effective in improving mothers' awareness of injury prevention
Amini et al. (2021) Hamadan, Iran	Design: Pre- and post-intervention study	Mothers with toddlers. Intervention $n = 58$ Control $n = 58$ Setting: Comprehensive health centres ² Urban	Tools: Awareness assessed using 23 items- 2-point score (correct – incorrect answer) Behaviour: Perceived behaviour: assessed using 10 items- 4-point scale ranging from 1 (little control) to 4 (complete control). Behaviour intention: 9 items- 4 points scale ranging from 1 (strongly disagree) to 4 (strongly agree) Attitude: measured using 16 items 4-point scale ranging from 1 (strongly disagree) to 4 (strongly agree).	2 months (No data given)	Training using TPB is effective in making changes on mother behaviour towards prevention of UCI.
Cheraghi et al. (2014) Hamadan City, West Iran	Design: Randomised controlled trial	Mothers of children <5 years. Intervention $n = 60$ Control $n = 60$ Settings: Local Health Centre ² Urban	Tool: three parts questionnaires: Part 1: sociodemographic Part 2: mother knowledge (15) MCQ + 20 Yes/No question + 23 Q based on Health Belief Model designed using six points Likert scale (agree to disagree) Validation: Validity assessed by experts Reliability measured using Cronbach's alpha coefficients of 0.84	Two months (0%)	Education health programme based on HBM can be used to promote safety in children aged <5 years

El Seifi et al. (2018) Zagazig district- Egypt	<i>Design:</i> Pre-post-test design	Mothers with at least one child <5 years <i>n</i> = 244 <i>Settings:</i> Home visit Rural	<i>Measurement:</i> Pre- and post-test self-administered questionnaire adopted from questionnaire used in previous studies. Part 1: sociodemographic characteristics Part 2: Knowledge measured with 25 Y/N/Don't know questions Attitudes: an eleven 3 points Likert scale questions (agree-neutral-disagree). <i>Validation:</i> Validity: Pilot study done on 24 participants Reliability: Questionnaire reliability was measured in previous studies with a Cronbach's α coefficient equal to 0.82 & 0.85 for knowledge and attitude respectively. <i>Tool:</i> A questionnaire designed by the researcher. Knowledge: 23 questions based on Motivation Protection Theory. Behaviour: 15 questions. <i>Validation:</i> Validity checked using content analysis method. <i>Reliability</i> checked using Cronbach's alpha • <i>Tool:</i> Questionnaire modified from an assessment tool used to evaluate home safety knowledge at a hospital at the university of Pittsburgh, USA. It included: 12 Q demographics • 5 Q: MCQ home safety knowledge • 17 Q: home safety behaviour	Two months (no data given)	Health education improves knowledge and attitudes of home injury
Fardazar et al. (2016) Joibar city, Iran	<i>Design:</i> Controlled interventional study.	Mothers of children <5 years. Control <i>n</i> = 95 Interventional <i>n</i> = 95 <i>Settings:</i> Two Health centres ² Urban	<i>Tool:</i> A questionnaire designed by the researcher. Knowledge: 23 questions based on Motivation Protection Theory. Behaviour: 15 questions. <i>Validation:</i> Validity checked using content analysis method. <i>Reliability</i> checked using Cronbach's alpha • <i>Tool:</i> Questionnaire modified from an assessment tool used to evaluate home safety knowledge at a hospital at the university of Pittsburgh, USA. It included: 12 Q demographics • 5 Q: MCQ home safety knowledge • 17 Q: home safety behaviour	Two months (no data given)	Health education guided by Motivation Protection Theory can improve injury prevention behaviours among mothers.
Furman et al. (2020) Pittsburgh, USA	<i>Design:</i> interventional study	Parents or guardians aged over 18 of children <18 years. <i>n</i> = 50 <i>Setting:</i> community events open to the public. Low-income neighbourhoods. Urban	1: 4 weeks (42%) 2: 6 months (40%) Education programme through Mobile Safety Centre improves mother knowledge and behaviour.		
Habermehl et al. (2019) Cleveland, Ohio, USA	<i>Design:</i> Interventional study	Caregivers of children aged 1–4 years. <i>n</i> = 200 <i>Setting:</i> waiting area in paediatric primary care	<i>Tool:</i> Survey administered post intervention 1st part immediately after intervention: demographic data, session satisfaction, new knowledge. (Other information not they	Two weeks (16%)	93% of participants made safety changes at home

(Continued)

Table 3. Continued.

Author, year & Country	Design + population	Sample and setting	Outcome measure(s)	Study duration/ Follow up (Drop out from follow up %)	Findings summary
Ihalahewage et al. (2018) Sri Lanka	<i>Design:</i> quasi experimental <i>Population:</i> 71 families. <i>Intervention group:</i> 36 families	clinic Urban Families with children <5 years. Control <i>n</i> = 36 Intervention <i>n</i> = 36 Setting: home visits Rural	would like to learn). 2nd part: to evaluate changes made at home <i>Tool:</i> Pre -post-test questionnaire Knowledge: questionnaire. Injury incidence: a history record index Household practice: a 30 Q Likert scale checklist (very attentive – not attentive at all)	Three months (0%)	1/3rd of caregivers reported and improve of UCI prevention knowledge, practice, and attitudes
Kahriman and Karadeniz (2018) Turkey	<i>Design:</i> A quasi-experimental single group	Mothers of children <6 years. <i>n</i> = 300 Setting: primary health centre Urban	Measurement Tools: Tool 1: 33 items questionnaire for sociodemographic factors Tool 2 attitudes: 40 items 5 points Likert scale - "The 0–6-year-old Children's Mothers' Identification Scale of Safety Precautions for the Prevention of Paediatric Injuries" (Cinar 1999). Cronbach's alpha 0.78. Tool 3 a checklist- The Risk Assessment Form for Paediatric Injuries (no author details, possibly Cinar).	One month (No data given)	Training was effective to raise mother's awareness of child safety at home.
Ning et al. (2019) Changsha, China	<i>Design:</i> RCT	Primary caregivers of children aged 3–6 years. Control <i>n</i> = 1285 Intervention <i>n</i> = 1406 Setting: Home Urban	Scales Adapted from the Injury Behaviour Checklist (IBC) (Morrongiello and House 2004). Worry Assessment and Risk Estimation (WARE) (Will et al. 2009). <i>Validation.</i> Test-retest reliability Attitudes: <i>rs</i> =0.69, behaviours: <i>rs</i> =0.64, Tool: Self-administered True/False questionnaire post-test: 10 questions	Three months (Intervention 23% Control 24%) Six months (Intervention 31%, Control 39%)	Health education using phone app significantly improved caregiver's safety behaviours. The intervention had no significant change in attitudes.
Setien et al. (2014) Hidalgo County, Texas, USA	<i>Design:</i> Pre-post-test intervention.	Hispanic family with child aged 1–14years. <i>n</i> = 88 households Setting: Community centres. Urban.		Two months (0%)	Changes in safety behaviours reported

Silva et al. (2016)	Design: quasi-experimental intervention study- pre and post-test- no comparison group	Mothers of children <5 years. n = 155 Setting: Primary Care Centre ² Urban	1. Tools: self-administered questionnaire MCQ for sociodemographic 2. Knowledge and attitudes: Pre-post- "Mortality Reduction by Accidents and Violence" (Brazilian Ministry of Health 2001) Validation: Pilot Study	Immediate (0%)	Significant changes in participants knowledge

^aA health house is a local centre shared by a small number of villages in rural Iran focused mainly on health promotion and illness prevention. These are the first point of contact with the Iranian health service for most people.
^bComprehensive health centres and/or local health centres affiliated with a university are primary care settings that manage greater complexity than a health house.

Table 4. Summary of Education Intervention

Study ID	Duration (group size)	Framework used in design or delivery of education	Delivery methods	Aim of intervention when discernible	Content if discernible
Afshari et al. (2017)	4 h	PRECEDE (Green and Kreuter, 2005)	Lecture Group Discussion Q&A Instructional booklet	To motivate and modify inappropriate performance.	Factors associated with injury in the home identified from Rezapur-Shahkolai et al. (2017)
Amini et al. (2021)	4 h (10–15)	Theory of Planned Behaviour (Ajzen 1991)	Lectures, Group discussion Q&A Instructional booklet		Developmental stages of toddlers, common injuries, preventative strategies, ability to control risk factors.
Cheraghi et al. (2014)	4 h	Health Belief Model (Rosenstock et al., 1988)	Lecture Group Discussion	To present factors affecting mothers' practices and knowledge. To address perceived severity, perceived barriers, cues to action and self-efficacy regarding child safety.	Safety promotion and injury prevention informed by the scientific literature.
El Seifi et al. (2018)	45 min (8–10)	–	Lecture Group discussion Q&A Videos Instructional booklet	Increasing knowledge and self-efficacy.	Scientific message based on Centres for Disease Control and Prevention child safety and injury prevention guidance (Centres for Disease Control and Prevention 2019). Risk factors for injuries and methods of prevention.
Fardazar et al. (2016)	90 min (15)	Protection Motivation Theory (Rogers and Prentice-Dunn, 1997)	Lecture Q&A Video	Increase perceived vulnerability and severity in children under 5 years. Increase self-efficacy and behaviours in injury prevention.	Child development and injury risks, prevention strategies.
Furman et al. (2020)	20 min (Small groups or one-to-one)	Standardised curriculum developed by the Safety Centre at UPMC Children's Hospital, Pittsburgh, US.	No detail of teaching method. Provision of safety equipment (smoke detector, outlet covers, doorknob covers, cabinet latches, gun lock).	Increased used of safety equipment including that provided as part of the programme	

(Continued)

Table 4. Continued.

Study ID	Duration (group size)	Framework used in design or delivery of education	Delivery methods	Aim of intervention when discernible	Content if discernible
Habermehl et al. (2019)	10 min(One to one)	American Academy of Pediatrics recommendations.	No detail of teaching method but it involved a learned script. Provision of safety toolkit (handouts, poison control magnet, window locks, outlet covers)	Provision of age-specific injury prevention information	Car safety, fall safety, home safety, injury prevention, poison control.
Ihalahewage et al. (2018)	Two occasions, no duration given. (18)	Health Belief Model (Rosenstock et al., 1988)	Discussion stimulated by use of visual aids. Collation of knowledge	Improved understanding of the determinants of poor safety.	Risks in the home, role of family support, attitudes and beliefs relating to injuries.
Kahrman and Karadeniz (2018)	One occasion, no duration given. (One to one)	–	Discussion stimulated by use of visual aids.	Raising awareness and knowledge of prevention of injury	Dangerous situations and how to prevent them.
Ning et al. (2019)	No duration given. (One)	Theory of Planned Behaviour (Ajzen 1991) Haddon Matrix (Barnett et al., 2005) Framework for Rational Analysis of Mobile Education (FRAME) (Yin et al., 2013)	Information delivery (text, cartoons, video). Interactive games.	Effectiveness of using an app-based mobile phone intervention to prevent unintentional injury.	Parenting skills, unintentional injury prevention, paediatric disease risk.
Setien et al. (2014)	2 h.	Raising Safe Kids: One stage at a Time (Safe Kids USA 2009)	No detail	Improvement of knowledge and behaviour in parents.	Burns, falls, household fires, choking, suffocation, drowning, falls, vehicular accidents, poisoning, hazardous household products, firearms, sports.
Silva et al. (2016)	30 min	–	Information giving. Discussion with use of visual aids.	Understanding mothers' knowledge about prevention of accidents.	Prevention of burns, poisoning, drowning and falls.

Change in knowledge, attitudes, and behaviours in response to health education.

Pre- and post-measurement of knowledge, attitudes, and behaviours (Table 5) were conducted using structured questionnaires with some also using a checklist.

Changes in knowledge

Eight studies reported a statistically significant increase in caregivers' knowledge relating to child safety and injury prevention in the intervention group but not the control group (Afshari et al., 2017; Amini et al., 2021; Cheraghi et al., 2014; El Seifi et al., 2018; Furman et al., 2020; Setien et al., 2014; Silva et al., 2016) (Table 5). The greatest change in knowledge was a 110% improvement (Ihalahewage et al., 2018) who used the framework of the Health Beliefs Model (Rosenstock et al., 1988) to design their intervention as well as using a co-production approach with caregivers. The intervention took the form of a practitioner-facilitated discussion group where caregivers identified poor safety practices and ways to reduce injury. The least change in knowledge was 4% (Setien et al., 2014) where the researchers designed the intervention alone based on risks associated with each developmental stage of the child. The intervention was a two-hour training session delivered by trained members of the Latino community (promotoras).

This is a small number of studies and so it is difficult to tell whether the use of a theoretical framework makes a difference to the outcomes. Two studies used the Health Beliefs Model and produced a 56% improvement in knowledge (Cheraghi et al., 2014) and a 110% improvement in knowledge (Ihalahewage et al., 2018). One study used the Theory of Planned Behaviour and identified a nine percent improvement in knowledge (Amini et al., 2021).

Changes in attitudes

When attitude was measured, an improvement was demonstrated. A statistically significant improvement was identified in six studies (Afshari et al., 2017; Amini et al., 2021; El Seifi et al., 2018; Ihalahewage et al., 2018; Ning et al., 2019; Setien et al., 2014) (Table 5). Ihalahewage et al. (2018) created the greatest improvement with their small group discussion process. El Seifi et al. (2018), also demonstrated a large improvement in attitudes, with a mean difference of 98%. Their intervention was a 45-minute lecture and discussion with a booklet to take home for groups of 8–10 women who lived with or near each other in a rural village setting. The intervention was based on 2016 guidelines from the Centers for Disease Control and Prevention (CDC, 2019) and no theoretical framework was described.

Generally, the change in attitudes was smaller than the changes in knowledge. Four of seven studies providing attitude change scores described improvements less than 15% (Afshari et al., 2017; Kahriman & Karadeniz, 2018; Ning et al., 2019; Setien et al., 2014). There was no consistent difference in approach between that group and those who saw a change of more than 30%.

Changes in behavior

Safety practice behaviour was reported in seven studies (Afshari et al., 2017; Fardazar et al., 2016; Ihalahewage et al., 2018; Kahriman & Karadeniz, 2018; Ning et al., 2019; Setien et al., 2014) (Table 5). Safety modifications made at home in response to the knowledge gained were confirmed through home visits (Ihalahewage et al., 2018; Kahriman & Karadeniz, 2018), phone follow up (Furman et al., 2020; Habermehl et al., 2019;

Table 5. Change in parent/caregiver knowledge, attitudes and behaviours associated with health education intervention.

Intervention (I) Control (C)	KNOWLEDGE					ATTITUDE					BEHAVIOR				
	Pre-Mean (SD)	Post Mean (SD)	% change	Within group p	Between group p	Pre Mean (SD)	Post Mean (SD)	% change	Within group p	Between group p	Pre Mean (SD)	Post Mean (SD)	% change	Within group p	Between group p
Afshari et al. (2017)	I 10.00 (2.44)	12.67 (0.99)	26	<0.001	<0.001	67.06 (5.77)	72.31 (3.12)	8	<0.001	<0.001	22.31 (4.30)	29.17 (0.775)	30.7	<0.001	<0.001
Amini et al. (2021)	C 9.47 (3.26)	9.75 (1.67)	3	0.439		61.75 (6.35)	65.42 (5.3)	6	0.040		23.81 (5.35)	22.81 (4.452)	0	0.194	
Cheraghi et al. (2014)	I 18.4 (1.5)	20.2 (2.27)	9	<0.001	0.004	17.86 (3.62)	23.2 (6.82)	30	<0.001						
El Seifi et al., 2018	C 18.84 (1.73)	18.86 (1.85)	0	0.058		19.33 (5.86)	18.7 (5.68)	0	0.089						
Fardazar et al. (2016)	I 8.43 (3.77)	13.15 (1.09)	56	0.001											
Furman et al. (2020)	C 7.17 (2.26)	7.90 (2.27)	10	0.028		4.05 (1.1)	8.05 (1.5)	99	<0.001						
Ihalahewage et al. (2018) ^a	I 15 (46.16)	31.57 (87.35)	110			13.66 (43.42)	31.83 (87.96)	133			7.89 (2.36)	12.91 (2.11)	63.6	0.001	
Kahrman and Karadeniz (2018)	C 18.57 (58.66)	19.85 (63.20)	7			18 (53.49)	20 (62.05)	11			8 (2.46)	8.07 (2.38)	0.87	0.3	
Ning et al. (2019)	I 165.81 (16.36)	176.76 (12.97)	7	<0.001							14.6 (9.8)	8.0 (2.0)	-	0.362	
Setien et al. (2014)	C 12.4 (0.85)	12.9 (0.63)	4	< 0.001							47	48.9	4.04		
Silva et al. (2016)		78.16%	90.7%	13	≤ 0.05						47.2	48	1.6		
											83%	96%	13		

^aBlank cells denote that a technique was not directly mentioned or implied. A series of blank cells indicates that no methods of delivery were given.

^b[(post- pre)/pre] *100 (rounded to nearest integer).

^cReasons for injury occurrence combined means and standard deviations using online software (http://www.obg.cuhk.edu.hk/ResearchSupport/StatTools/CombineMeansSDs_Pgm.php).

Setien et al., 2014) or self-administered questionnaire (Ning et al., 2019). In the Habermehl et al. (2019) study, 60% of the participants' used the products provided by the researchers, and 40% of them bought new child safety items. Similarly, in the study of Furman et al. (2020), a free safety device was distributed to study participants, and they responded positively and installed the devices at their homes.

The greatest improvement in behaviour was seen in Fardazar et al. (2016) who used the Protection Motivation Theory (Rogers & Prentice-Dunn, 1997) as their framework. Their intervention was delivered in two 45-minute sessions spaced one week apart with five mothers in each group session. In the first session perceived vulnerability and perceived severity of accidents in children aged younger than five years was the focus. The second session focused on self-efficacy, response-efficacy and prevention behaviours of the mothers.

Discussion

This review aimed to identify health education interventions and their effects on caregivers' knowledge, attitudes, and behaviours of preventing unintentional child injury (UCI) in and around the house. Twelve interventional studies were identified, analysed and synthesised. This review shows that a range of approaches to health education positively affect caregivers' knowledge, attitudes, and behaviours towards UCI prevention. There are too few studies to determine whether one approach is better than another and the choice of how to deliver education will depend on the target population and local factors. The review suggests that the interventions that make the greatest contribution to positive change use of behavioural change theories to guide interventions and ensure that the intervention is designed with the target population in mind in terms of materials, environment and education strategies.

The use of behavioural change theories

Behavioural change depends on personal knowledge and attitudes, which are usually influenced by social and cultural norms. For example, parental child safety behaviours such as inadequate supervision (Schnitzer et al., 2015) may happen due to socioeconomic factors such as parents' age and level of knowledge (Mayes et al., 2014; Morrongiello et al., 2006). Low education attainment in caregivers is an often-cited risk factor in unintentional injury (Eren et al., 2019; Morrongiello et al., 2006; Morrongiello & House, 2004; Nour et al., 2018; Thein et al., 2005; Villalba-Cota et al., 2004). The strong links between poverty and education (Liu et al., 2021) make it unsurprising that low income is also a common risk factor, cited alone or in conjunction with education (Chowdhury et al., 2009; Karb et al., 2016; Vecino-Ortiz et al., 2018). Young mothers, especially those with low educational levels (Morrongiello et al., 2006; Nour et al., 2018), and those of low or moderate socioeconomic status, were identified as a high-risk group (Campbell et al., 2019).

It is difficult to draw conclusions from such a small number of studies, some of which have limitations due to the lack of validation of their data collection instruments and reliance on self-reported improvement by the participants. However, the strategies demonstrating the greatest change tended to make use of theoretical frameworks. The

Health Beliefs Model (Rosenstock et al., 1988) emerged from the work of a group of social psychologists in the 1950s and 60s who were looking for solutions to public health problems (Rosenstock, 1974). The focus of this work was to develop an understanding of preventive health behaviour. It was rooted in the principle that to avoid an illness the person must believe that they are personally susceptible to it, that having the disease was worth avoiding due to the likely negative impact of it, and that taking action would be beneficial despite the costs in terms of pain, embarrassment, or convenience. The appropriateness of this model is clear. The two studies that used this model (Cheraghi et al., 2014; Ihalahewage et al., 2018) focused their education on perceived severity, perceived barriers, cues to action and self-efficacy. The application of the HBM to the educational intervention and questionnaire was more transparent in the Cheraghi et al. study, and improvements in all areas were seen.

Two studies (Amini et al., 2021; Ning et al., 2019) use the Theory of Planned Behaviour (Ajzen, 1985, 1991). The principle behind this theory is that most volitional human behaviour is goal directed such that actions are largely governed by intentions. There are causal links between beliefs, attitudes, intentions, and behaviours, which Ajzen terms a theory of reasoned action. This theory is extended by a second component of the model which explores goal-directed behaviours that are influenced by internal and external factors. This is termed the theory of planned behaviour which considers perceived and actual control an individual may have over their behaviour. It allows consideration of constraints on action and models why intentions do not always lead to actions (Armitage & Conner, 2001). Like the HBM this model allows the researchers to examine the relationship between knowledge, attitudes, and actions and the two studies included in this review that used this model evaluated behavioural changes by parental self-report.

Fardazar et al. (2016) used Protection Motivation Theory in their design and evaluation. This theory, developed by Rogers (1975) explains how fear of the consequences of ill-health can act as a motivation to alter behaviour. Similar to HBM and TPB this model explains a relationship between the perceived severity of the threat, the probability of its occurrence and the efficacy of the recommended coping response (Maddux & Rogers, 1983). The training in the reviewed paper comprised of two 45-minute sessions. In the first the mothers were educated about the severity of injury and vulnerability of children. In the second session the focus was on effective prevention strategies and involved an attempt to increase their self-efficacy in preventative behaviours.

The final model employed in the reviewed studies was the PRECEDE-PROCEED model (Green, 1974; Green & Kreuter, 2005). The use of this model requires the development of an understanding of the community in which the eventual intervention will be used. Thus Afshari et al. (2017) based their intervention on a study undertaken in a similar population (Rezapur-Shahkolai et al., 2017) and a preintervention collection of data in the study. In keeping with the behavioural health theories already mentioned, this model makes use of our understanding that beneficial behaviour change is influenced by several factors that enable, predispose, or reinforce behaviours that may or may not be preventative. One of the ways of maximising the effect of education using this model is to show concern for the needs of the target audience and structure communications so that they agree with their motivations. In one of the early descriptions of this model Green (1974, p. 44) identifies one of the motivational factors as fear, one the fundamental factors that appear across all the models described thus far.

The theoretical basis of behaviour change is explicit in the studies we have discussed so far. While others have not been explicit, they all use strategies that are likely to bring about positive change. One of the common features of all interventions in the reviewed studies was the use of discussion in small homogenous groups. The degree of participant generation of discussion topics and problem solving is difficult to tell from most studies. However, Fardazar et al. (2016); Ihalahewage et al. (2018) emphasised the role of the participants in setting the agenda and this will lead to a focus on the most relevant issues for those groups. Both studies produced high levels of change as might be expected when education content is tailored to the needs of the community where change is desired. Social networking and learning in a group have a positive impact as this allows the exchange of expertise and concerns and can add social pressure to motivate change (Khanom et al., 2013; Machin et al., 2018).

In some of the populations that were targeted in the reviewed research fatalism has an influence. Fatalism is defined as a sense that the person has a lack of control over events, and there is a connection between fatalism and a lack of taking preventative action (Perfetti, 2018). Fatalism is associated with an increased risk of UCI (Santagati et al., 2016) and may be resistant to change. Fatalism contributes to low self-efficacy for injury prevention and a behavioural health model can help to target the components of fatalism such as low self-efficacy, helplessness, meaninglessness, and inevitability.

Materials and design of education delivery

The content delivered to improve knowledge was usually identified from research or policy relevant to the local population. Previous research studies conducted to explore UCI causal factors recognised inadequate caregiver knowledge of child safety at a baseline (Akturk & Erci, 2016; Lafta et al., 2014). Inadequate knowledge of UCI prevention can be a risk factor that may lead to poor anticipation of injury risks and increase the risk of injury (Simpson et al., 2009) and low levels of pre-intervention knowledge were identified in this review.

One study in this review used a mobile phone application (app) to deliver the educational strategy (Ning et al., 2019). Phone apps have been used widely for different health education purposes (Jeffrey et al., 2019; Kang et al., 2019; Taki et al., 2019), and can positively change child safety attitudes and behaviour (McKenzie & Roberts, 2016; Ning et al., 2019; Omaki et al., 2017). However, clinicians' opinions must be sought when designing a relevant app (Fitzgerald & McClelland, 2017).

The use of apps is attractive given the interactive nature and immediacy of the messaging. However, there are a few accessibility and inclusivity issues with many people unable to access the hardware or broadband to make good use of the app, which can exacerbate health inequalities (Bol et al., 2018; Borg et al., 2019). The design of the app must also skilfully take into consideration the multitude of platforms used to access the app and the attributes of the target population including learning disabilities and digital literacy (Galinski & Giraldo Perez, 2017) and inclination to use an app for health purposes (Powell & Deetjen, 2019).

The settings for education delivery were designed with the local population in mind and were community rather than hospital based. Home visits have the advantage that

they allow assessment of behavioural changes as well as equipment installation and other home safety modifications. Many studies in this review used primary health care centres to deliver education interventions. When combined with other visits, for example, immunisation clinics, this can be a way to reach the target population. However, while Furman et al. (2020) found mobile centres were effective and helped the researchers to reach an otherwise inaccessible urban population, this increases the cost of the intervention considerably.

Two studies included safety equipment in their intervention (Furman et al., 2020; Habermehl et al., 2019). Equipment is considered a passive health promotion intervention compared to health education. The systematic review by Abbassinia et al. (2019) suggested that the use of safety equipment did not lead to a greater effect size of the intervention; the greatest effect was made by changing attitudes and knowledge, which led to changes in behaviour in terms of vigilance and self-efficacy.

Strengths and limitations

The findings of this study are relevant and applicable to children under the age of six and can be cautiously extrapolated beyond that age. We reviewed studies from different countries, which allowed some comparison of methods and results in different cultures. The outcome measures and data presented in the report did not allow for more than narrative synthesis and this means that comparison between studies is incomplete.

A lack of detail about educational intervention in most of the reports does not allow us to comment fully on the value of theoretical frameworks to guide interventions nor the method the researchers used to derive the content and delivery method of the sessions. In many cases the cultural and spiritual profile of the community may have influences their baseline and response to education and this was not well described in the studies. The review also included studies reported in English, if other languages were considered it could add additional knowledge.

Implication for practice and research

Education interventions can improve knowledge, attitudes, and behaviours in unintentional child injury prevention. The interventions can be simple and inexpensive and will work best when they are developed with a specific community in mind. The review's findings can be used as supporting evidence to assist primary health care workers on issues to be considered when initiating or reviewing UCI health education programmes. Current health education initiatives can be reviewed and updated to develop a new health education guide on child injury prevention. By implementing relevant and resourceful health education initiatives, child safety culture will be sustainable in the long term. This in turn will help to spread safety awareness within the community.

Many of the studies in this area used self-designed questionnaires based on behavioural and health beliefs models. Further work is required to create robust questionnaires that can be across different studies to allow greater comparison of results and meta-analysis.

Conclusion

Health education interventions delivered in various ways and settings will improve knowledge, attitudes, and behaviours. Simple and replicable methods are used to deliver information and answer the questions of caregivers. The published studies tended to be conducted in low-income areas where it is likely that the educational attainment of the caregivers contributes to the baseline problem. There is a cost associated with delivering health education to reduce unintentional child injury. Well conducted studies that include larger samples and cover geographical areas would determine the impact of the improvements in knowledge, attitudes, and behaviours on the incidence of injury.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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Appendix B Ethical approval from the University of Birmingham

Application for Ethical Review ERN_20-1328

Samantha Waldron (Research Ethics, Governance and Integrity) <s.m.waldron@bham.ac.uk>

Wed 01/09/2021 08:30

To: Julie Taylor (Nursing and Midwifery) <[REDACTED]>
Cc: Muna Al Mushaikh (PhD Nursing 80000 word F1 B/00) <[REDACTED]>; Amelia Swift (Nursing and Midwifery) <[REDACTED]>

Dear Professor Taylor,

Re: "Unintentional Child Injury Prevention and Health Promotion in Sultanate of Oman: A Research Proposal"

Application for Ethical Review ERN_20-1328

Thank you for your application for ethical review for the above project, which was reviewed by the Science, Technology, Engineering and Mathematics Ethical Review Committee.

On behalf of the Committee, I confirm that this study now has full ethical approval.

I would like to remind you that any substantive changes to the nature of the study as described in the Application for Ethical Review, and/or any adverse events occurring during the study should be promptly brought to the Committee's attention by the Principal Investigator and may necessitate further ethical review.

Please also ensure that the relevant requirements within the University's Code of Practice for Research and the information and guidance provided on the University's ethics webpages (available at <https://intranet.birmingham.ac.uk/finance/accounting/Research-Support-Group/Research-Ethics/Links-and-Resources.aspx>) are adhered to and referred to in any future applications for ethical review. It is now a requirement on the revised application form (<https://intranet.birmingham.ac.uk/finance/accounting/Research-Support-Group/Research-Ethics/Ethical-Review-Forms.aspx>) to confirm that this guidance has been consulted and is understood, and that it has been taken into account when completing your application for ethical review.

Please be aware that whilst Health and Safety (H&S) issues may be considered during the ethical review process, you are still required to follow the University's guidance on H&S and to ensure that H&S risk assessments have been carried out as appropriate. For further information about this, please contact your School H&S representative or the University's H&S Unit at healthandsafety@contacts.bham.ac.uk.

Kind regards,

Ms Sam Waldron (she/her)
Research Ethics Officer
Research Support Group
C Block Dome (room 137)
Aston Webb Building
University of Birmingham
Edgbaston B15 2TT
Tel: 0121 414 8101
Email: [REDACTED]

(available on Skype/Microsoft Teams)

Please remember to submit a new [Self-Assessment Form](#) for each new project. Click [Ethical Review Process](#) for further details regarding the University's Ethical Review process.

Click [Research Governance](#) for further details regarding the University's Research Governance and Clinical Trials Insurance processes, or email researchgovernance@contacts.bham.ac.uk with any queries

Appendix C Ethical approval from the MOH, Oman

Sultanate of Oman
Ministry of Health
Directorate General of Planning and Studies



سلطنة عُمان
 وزارة الصحة
 المديرية العامة للتخطيط والدراسات

Ref : MoH/DGPS/CSR/PROPOSAL_ APPROVED/74/2021

Date : 14/09/2021

الرقم :

التاريخ :

الموافق :

Muna Juma Amur Al-Mushaikh
Principal Investigator

Study Title: Unintentional Child Home Injury and Child Safety Health Promotion In Sultanate of Oman: A Research Proposal.

Proposal ID: MoH/CSR/21/24481

After compliments,

We are pleased to inform you that your research proposal 'Unintentional Child Home Injury and Child Safety Health Promotion In Sultanate of Oman: A Research Proposal' has been approved by the Research and Ethical Review & Approval Committee, Ministry of Health.

Kindly note that you may initiate the implementation of your research study only after obtaining an approval from the National Centre for Statistics and Information. You may apply through their website at <https://www.ncsi.gov.om>, provide the necessary information, and upload this proposal approval letter.

The RERAC should be notified in case of any changes or significant deviation from the approved proposal, otherwise this approval will be deemed invalid. On completion of the study, you are required to provide a copy of the final report within 2 months to the Centre of Studies and Research in Ministry of Health.

Regards,

[Redacted Signature]

Acting Director General of Planning and Studies
Acting Chairman, Research and Ethical Review & Approval Committee
Ministry of Health, Sultanate of Oman



Cc: Day file

P.O. Box : 393, Postal Code: 100, Muscat

E-mail: [Redacted]

ص.ب : ٣٩٣ الرمز البريدي : ١٠٠
 مسقط ، هاتف : ٢٢٣٥٧٢٥٤ ، فاكس : ٢٢٣٥٧٢٦٠

Appendix D Approval from the NCSI

رقم القيد: ٢١٤٢١٠٧٥١

التاريخ: ١٤ / صفر / ١٤٤٢ هـ

الموافق: ٢١ / سبتمبر / ٢٠٢١ م

المحترمة

الفاضلة/ منى بنت جمعة المشايخية
طالبة دكتوراه بجامعة برمنجهام بالمملكة المتحدة

تحية طيبة وبعد،،،

الموضوع: الإصابات غير المقصودة في المنزل للأطفال وتعزيز سلامة الطفل في
مراكز الصحة الأولية بسنطنة عمان

بالإشارة إلى طلبكم حول الموافقة على الموضوع أعلاه ، يسرنا إفادتكم بعدم
ممانعة المركز من إجراء الدراسة، مع تأكيدنا عليكم بضرورة المحافظة على
سرية البيانات الفردية للمشاركين واستخدامها لأغراض الدراسة فقط وليس
للنشر العام على أي مستوى آخر. كما نود التنويه بأن المركز لن يتحمل أية
مسؤولية أو تبعات قانونية ناجمة عن قيامكم بهذه الدراسة.
وننوه أيضا إلى أن هذه الموافقة على جمع البيانات سارية حتى نهاية شهر
فبراير ٢٠٢٢م، وفي حال رغبتكم في إعادة تنفيذ هذه الدراسة مستقبلاً أو أي
دراسات أخرى تتطلب جمع بيانات من المجتمع يرجى التكرم بالتقدم بطلب جديد.

وتفضلوا بقبول فائق التقدير والاحترام

يوسف بن عبد الله العجمي
مدير دائرة قياس الرأي العام

Appendix E Facilitation letter from DGHS, Muscat to PHCCs

Sultanate of Oman
MINISTRY OF HEALTH
Directorate General of Health Services
GOVERNORATE OF MUSCAT
Director General Office



سلطنة عُمان
وزارة الصحة
المديرية العامة للخدمات الصحية
لإحافضة مسقط
مكتب المدير العام

MoH/DGHS/MR 160

Date: 10/10/2021

Sub: Facilitation letter

To: Heads of Al Amerat H/C, Al Nahdha H/C, Al Hajir H/C, Bausher H/C, Muttrah H/C, Al Ghubra H/C, Al Mawaleh H/C, Al Mabeela H/C, A'Seeb H/C, Wattayah H/C and Al Ansab H/C

After compliments

Kindly be informed that Muna Juma Al Mushaikhi (PhD student, University of Birmingham, UK) is conducting a research on "Unintentional Child Home Injury and Child Safety Health Promotion in Sultanate of Oman" which was approved by the Research and Ethical Review & Approval Committee, Ministry of Health on 14/9/2021. She is planning to conduct interviews with both the staff and parents of children visiting the health centers for vaccination or other medical issues from 10/10/2021 to 28/2/2022.

We expect the following:

- 1- No interference with the smooth running of the daily service.
- 2- Share the results with Directorate General of Health Service, Muscat once the research is completed.
- 3- Acknowledge the Directorate General of Health Services, Muscat if the results are going to be published.

With kind regards



Chairperson of Regional Research Committee
Director General of Health Services-Muscat

P.O. Box : 358, Mina Al-Fahal
Postal Code : 116, Sultanate of Oman
Fax [Redacted]

ص.ب : ٣٥٨ ميناء الفحل
الرمز البريدي : ١١٦، سلطنة عُمان
فاكس : ٢٤٧٨٢١٠٤ - فاكس : ٢٤٧٨٢١٠٢

Appendix F Pilot study feedback

PILOT STUDY FEEDBACK QUESTIONNAIRE

Thank you very much for taking the time to participate in my research's pilot study. Your feedback on this questionnaire will assist me in making improvements before the main study.

If you require clarification, please do not hesitate to contact me at 00968 93533819 or MJA993@student.bham.ac.uk.

THANK YOU

1. How long did it take you to complete the questionnaire?

2. What is your opinion of the length of the questionnaire?
 - About right
 - Too short
 - Too long
3. What is your opinion of the clarity of the questions?
 - Poor
 - Satisfactory
 - Good
 - Very good
 - Excellent
4. What is your opinion of the structure and format of the questionnaire?
 - Poor
 - Satisfactory
 - Good
 - Very good
 - Excellent
5. Does the questionnaire omit any issues you consider important to child home accidents?
 - Yes
 - No If "YES," provide details:

6. Did you have any difficulties completing the questionnaire?
 - Yes
 - No If "YES," provide details:

Thank you for your valuable feedback.

Appendix G Questionnaire in English



Research Questionnaire

Title of the study: Unintentional Child Injury and Child Safety Health Promotion in Oman

Date: -----

Code number:-----

-

We value your kind participation in this online questionnaire. This questionnaire is part of a PhD project about preventing unintentional child injury in Oman. It seeks your personal view, knowledge and practice towards child safety and ways to protect your children from home accidents. If you have a child or you are taking care of a child younger than six years of age, you can participate in this study.

Instruction:

Kindly read the information sheet carefully and sign the consent form before completing the questionnaire.

It is not a test. You do not need to refer to literature when responding to questions. Your input is highly valued. It will take you no longer than 40 minutes to answer the questionnaire.

Participation in this study is voluntary. You can withdraw from participation before you submit the completed questionnaire.

We would like to assure you that your participation in this questionnaire is anonymous.

You don't need to write your name or any personal details, e.g., phone number, address

The survey findings will offer new information that can support child injury prevention in the country.

If you have any clarifications or questions related to this questionnaire, please contact the researchers at this email: [REDACTED]. **Or call** [REDACTED]

The questionnaire has three parts:

Part A: Question about you, your residence and family members

Part B: Questions about any history of child injuries, intervention provided and how you can prevent them.

Part C: Safety devices at home, safety practice and attitudes towards injury prevention

Part D: health promotion and source of knowledge.

Part (A):

Answer the questions as they relate to you by ticking the box(es).

Q.1 Where do you live?

- A. Al Amerat
- B. Mutrah
- C. Al Seeb
- D. Bowsher
- E. Muscat
- F. Others (Specify)

Q.2 Pls complete the following table for the number and gender of your children/ children you take care of?

Total number of children	Male	Female	Number of children under five years

Q. 3 Are you?

- A. The mother of a child/ children
- B. The father of the child/children
- C. The grandmother of child/children
- D. Sister of the child's mother/father
- E. Other (specify) -----

Q.4 Currently, your age ranges between:

- A. 18-20
- B. 21-30
- C. 31-40
- D. 41-50
- E. Above 50
- F. Other (specify)

Q5. What is your highest educational qualification?

- A. Postgraduate degree
- B. Bachelor's degree or equivalent
- C. University diploma
- D. High school/ secondary certificate
- E. Less than high school
- F. Others, please specify.

Q.6 Marital status of the child's parents?

- A. Married
- B. Divorced
- C. Widow
- D. More than one wife
- E. Other than that.....

Q.7 Child's/ children mother is a:

- A. Housewife
- B. Morning shift worker
- C. Shift duty worker
- D. Private work that keeps her away from home for long hours
- E. Working woman from morning to evening
- F. Other than that, (Specify).....

Q.8 Mother working hours:

- A. Less than 6 hours
- B. 6 hours
- C. 7-8 hours
- D. 9-10 hours
- E. 10-11 hours
- F. 12 hours
- G. More than 12 hours

Q.9 The monthly income of the family in Omani Rial is:

- A. More than 2000
- B. 1500-2000
- C. 1000-1500
- D. 500-1000
- E. Less than 500
- F. Others, (Specify)

Q10. Is your family income adequate for essential family expenses?

- A. Yes
- B. No
- C. Other, -----

Q 11. When the mother is not at home, who supervises and cares for the child/children?

(You can put more from a mark if there is more about a person)

- A. Grandmother (mother of father/mother)
- B. Child/children's father
- C. Housemaid
- D. Mother/father's sister

- E. Nursery
- F. Baby siblings
- G. Other than that, (Specify).....

Q12. Who else lives in the house where you currently stay?? (You can choose more options)

- A. Husband/wife
- B. Child grandfather/grandmother
- C. Brothers and sisters of the child's father/ mother
- D. Housemaid
- E. Friends
- F. Children of brothers/ sisters
- G. Other, (Specify).....

Q. 13 The total number of people living with you in the same house?

.....

Q. 14 Is the place you live?

- A. More than one floor rented house
- B. One floor rented house
- C. More than one-floor house owned by the family
- D. One-floor house owned by the family
- E. An apartment owned by the family.
- F. Rented apartment.
- G. Attachment in the family home
- H. Others Specify

PART (B) PREVIOUS INJURIES AND INTERVENTION

This part of the questionnaire is about home injuries that have been experienced by one of your children who is under the age of five years *One child*

Q15. Child's age? *

- A. less than one year
- B. Between one and two years
- C. Between two and three years
- D. Between three and four years

Q 16. Baby gender?

- A. Male
- B. Female

Q. 17 Has your child ever had a home injury/accident? *

A. Yes B. No (if there was no previous injury or accident, go to question Q26)

Q. 18. Has the child ever been involved in any of the following accidents/injuries? You can select more than one option.

-
☐ Falling from stairs	☐ Burning with hot drinks
☐ Choking by food	☐ Swallowing toxic substances
☐ Slip in the kitchen, bathroom, or home floor.	☐ Suffocation with bed covers
☐ Swallowing/ choking with pieces of playing equipment.	☐ Cut with sharp objects.
☐ About to be submerged or drowned	☐ Bite of poisonous insects and reptiles
☐ Falling from sofas, tables, and beds	☐ bumping into the edges and corners of the furniture
☐ fall from the window	☐ Finger stuck in the door
☐ Fall from the baby walker	☐ He has never had an injury before
-

Q19. Other accidents, (Specify).....

Q 20. If your child was injured before, what was the worst injury that happened to him? What is the cause of injury from your point of view?

.....
.....

Q21. The injury needed?

- A. First aid at home
- B. Going to the hospital for examination and treatment
- C. Admission to hospital
- D. Use of traditional medicine
- E. Other than that, (Specify).....

Q 22. Was it possible to prevent the child from this accident? *

- A. Yes
- B. No
- C. Other than that, specify

Q23. Clarify if your answer is NO.....

Q24. When the accidents happened, the child was under the supervision of? *

- A. His/ her mother
- B. His/ her father
- C. grandmother
- D. housemaid

E. Other than that, ...
.....

Q25. Do you find enough time to supervise your child and pay attention to him constantly while playing or eating? Clarify?

.....
.....

Q26. Why do you think children tend to get an injury? (tick all that apply)

- A. Inadequate supervision.
- B. Interrupted supervision due to distractions (e.g. phone, TV).
- C. Caregiver fatigue and pressure of older sibling
- D. Unsafe playing environment around the house and neighbourhood
- E. Inadequate safety measures
- F. Taking care of more than one child
- G. Working mother
- H. Big family
- I. Inattention while supervision
- J. Naughty/disobedient child
- K. Other please (specify)-----

Comments -----

Q27. How many times have you visited health institutions after any of your children were injured during this year?

- A. Not once
- B. Once
- C. Twice
- D. Three times**

Q28. Do you believe yourself is skillful with first aid procedures?

- A. Yes
- B. No
- C. Others, specify

Q 29. Did you receive any first-aid training?

- A. Yes
- B. No

Q 30. If yes, where did you receive it? _____ -

Q31. Injury to a child is preventable?

- A. Always
- B. Often
- C. Sometimes
- D. Never

PART (C) CHILD SAFETY PRACTICE

Q 32. Below is a list of some safety tools/equipment/furniture. Please indicate “Yes” next to each if available in or around your house.

Equipment	Available at your home?	
	yes	No
Secured cupboard to store a toxic substance		
Fire extinguishers		
Window safety rails		
Window locks		
Impact - absorbent surface (e.g. sand) to cover playground		
Anti-slip mat		
Night lights		
Child-resistant containers		
Child car seat		
Cycle head helmet		
A safe place equipped for children to play in the yard of the house		
Stair gate		
Stairs covered with carpet.		
First aid box		
Door finger guards		

Q33. The reason for not having any of the home safety equipment mentioned in the above list could be that (*You can tick for more than an option*)

- A. The cost
- B. The time
- C. Lack of information
- D. Not available in nearby markets
- E. Not important
- F. We are not used to it
- G. Other reasons (specify).....

Q34. Comments.....

Q35. Are baby safety products available in the market at an affordable price? *

- A. Yes
- B. No
- C. Others, ...

Q 36. Please keep (Yes) or (No), where it represents your practice.

At your home.....?	Yes	No
Electricity points are covered or placed high on the wall.		
Basins and buckets are always kept empty after use.		
Furniture kept away from windows.		
The water heater temperature was adjusted to 50-60 celsius degrees.		
Detergent, chemicals and drugs are stored in a high and locked cabinet.		
Sharp kitchen tools are stored in high areas, and the kitchen is closed when not in use.		
Toys are appropriate for my child's age and made from safe materials.		
I do not give small candy and bubble gum to my young kids under three years.		
I do not give hard, small fruits or nuts to children to eat without my supervision.		
Avoid drinking hot drinks when holding the baby in your arms or playing with him.		
Avoid using a baby walker.		
Store plastic bags out of children's reach.		
Leaves the little child alone while taking a bath to bring something		

Q37. The street in front of your house? (You can choose more about an option) *

- A. It has been maintained from potholes and what could be dangerous to children.
- B. It has signs to limit the speed of cars.
- C. It has speed bumps (bumps)
- D. Children's play areas away from the street
- E. None of the above
- F. Other.....

Q38. How far do you agree or disagree with the following statements?

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
	5	4	3	2	1
Protection of children from injury is predominantly the responsibility of the parents					
An injury that happens due to inadequate supervision is a negligence					

Comment.....

Q41. Did a healthcare professional (for example, a nurse) offer you any health education/ guide about child/ home safety?

- A. Yes, a nurse.
- B. Yes, a midwife.
- C. Yes, health educator.
- D. Yes, a doctor.
- E. Other (please specify)
- F. No

Q42. Where did you get information about home child safety? (Tick all that apply)

- A. TV and other media
- B. Newspapers or magazines
- C. Social media
- D. Grandparents
- E. Friends and neighbours
- F. Health professionals
- G. Children's school
- H. Search on the internet
- I. Other , ...

Q43. Which of the methods in the previous question is your favourite for obtaining information?

.....
.....

Q44. Do you have a guide on child safety, eg. A book, a brochure, a list of instructions?

- A. I have never received any brochure on child safety.
- B. I had previously obtained it from one of the exhibitions or awareness campaigns.
- C. I got it from a hospital.
- D. I bought it from a bookshop.
- E. I got it from one of my kids' schools.
- F. From the websites
- G. Other

Q45. If you have any brochure on home safety, who issued that guideline?

.....

Q46. Safety awareness about child safety is one of the responsibilities. *

- A. Parents
- B. The government
- C. The society

- D. All of the above
- E. Other.....

Q47. Which of the home accidents do you think there must be a great societal interest in raising awareness about them?

Q48. Is there anything you like to add?

End of Questionnaire

Thank you for your valuable participation

If you wish to learn about public safety, including home safety, visit

<http://pacdaoman.gov.om/?cat=23>.

Or visit the following link for child health, including injury prevention

<https://www.moh.gov.om/documents/17796/3139290/child-health2019-new/de51ad2f-64c8-09ed-264d-6545c555c5aa>

Submit

Appendix H The questionnaire in Arabic



أستبيان بحثي

عنوان الدراسة: إصابات الأطفال وتعزيز سلامة الأطفال من الحوادث المنزلية في مسقط عمان

الرمز:

التاريخ:

نحن نقدر مشاركتك الكريمة في هذا الاستبيان. هذا الاستبيان هو جزء من مشروع بحث دكتوراه حول الوقاية من الإصابات غير المقصودة في المنزل وحوله في سلطنة عمان. تهدف الدراسة إلى الحصول على وجهة نظرك الشخصية وممارستك تجاه سلامة الطفل وطرق حماية أطفالك من الحوادث المنزلية. إذا كان لديك طفل أو كنت تعتني بطفل أصغر من خمس سنوات ، يمكنك المشاركة في هذه الاستبيان.

تعليمات:

يرجى قراءة ورقة المعلومات بعناية والضغط على موافق قبل البدء بملء الاستبيان. هذا ليس اختبار للمعلومات ولا تحتاج إلى الرجوع إلى أي من المصادر عند الرد على الأسئلة. أرائك ووجهة نظرك ذات قيمة عالية ومهمة لدينا. لن يستغرق الأمر أكثر من 30 دقيقة للإجابة على الاستبيان. المشاركة في هذه الدراسة طوعية. ويمكنك الانسحاب من المشاركة قبل تسليم الاستبيان المكتمل.

نود أن نؤكد لك أن مشاركتك في هذا الاستبيان ستكون مجهولة المصدر.

لست بحاجة إلى كتابة اسمك أو أي تفاصيل شخصية ، على سبيل المثال رقم الهاتف والعنوان. ستوفر نتائج الاستبيان معلومات جديدة يمكنها أن تدعم الوقاية من إصابات الأطفال المنزلية في السلطنة. إذا كان لديك أي توضيحات أو أسئلة تتعلق بهذا الاستبيان ، الرجاء الاتصال بالباحثين على هذا البريد الإلكتروني: أو اتصل على

يتكون الاستبيان من 4 أجزاء:

الجزء أ: أسئلة عنك وعن تركيبة أسرتك وسكنك وعن الإشراف ومراقبة الطفل
الجزء ب: حول أنواع الإصابات التي حدثت ل
ه في السابق.

الجزء ب: أسئلة حول إجراءات السلامة و آرائك وممارستك وموافقك حول سلامة الطفل .
الجزء د: التثقيف الصحي والتوعية وطرق الحصول على معلومات السلامة

للمشاركة :

أوافق على المشاركة في الاستبيان (نعم)

هل لديك طفل أو تقوم بالمشاركة في رعاية طفل دون الخامسة؟ - نعم - لا

(في حال الإجابة بنعم يمكنك تعبئة الاستبيان*)

الجزء (أ)

س 1. تقيم حالياً في ولاية؟

- أ. العامرات
- ب. مطرح
- ت. السيب
- ث. بوشر
- ج. مسقط
- ح. غير ذلك.....

س2. عدد الأطفال؟

عدد الأطفال الكلي	عدد الذكور	عدد الإناث

س3. عدد الأطفال دون الخامسة؟

.....

س4. هل أنت؟

- أ. الأم
- ب. الأب
- ت. الجد/ الجدة
- ث. أخت الأم/ الأب
- ح. غير ذلك (حدد).....

س5. حالياً يتراوح عمرك بين :

- 1 18-20
- 2 21-30
- 3 31-40
- 4 41-50
- 5 فوق ال 50
- 6

س 6 . ما هو أعلى مؤهل تعليمي لديك :

- أ. الدراسات العليا
- ب. درجة البكالوريوس او مايعادله
- ت. دبلوم عالي
- ث. الدبلوم العام/ الثانويه العامه
- ج. أقل عن الدبلوم
- ح. غير ذلك.....

س7. الحالة الزوجيه لوالدي الطفل:

- أ. متزوجين
- ب. مطلقين
- ت. أرمل/ ه

- ج. أكثر غن زوجه
ح. غير ذلك.....

- س8. أم الطفل :
أ. ربة منزل
ب. عامله الفتره الصباحيه
ت. عامله بنظام المناويه
ث. أعمال خاصه تستدعي غيابها عن المنزل ساعات طويله
ج. أمراه عامله من الصباح إلى المساء
ح. غير ذلك.....

س9. عدد ساعات العمل:

- أ. أقل عن 6 ساعات
ب. 6 ساعات
ت. 7-8 ساعات
ث. 9-10 ساعه
ج. 10-11 ساعه
ح. 12 ساعه
خ. أكثر من 12 ساعه

س 10. الدخل الشهري للأسرة بالريال العماني هو :

- أ. أكثر من 1500
ب. 1000-1500
ت. 500-1000
ث. أقل عن 500
ج. غير ذلك.....

س11. هل دخل أسرتك كافٍ لنفقات الأسرة ؟

- أ. نعم
ب. لا
ت. غير ذلك.....

س12.. غالبا ما يكون الطفل أثناء غياب الأم خارج المنزل تحت أشرف و مراقبة؟ (يمكنك وضع أكثر من علامه في حال وجود أكثر عن شخص)

- أ. الجده
ب. الأب
ت. العامله
ث. أخت الأم /الأب
ج. الحضانه
ح. أخوة الطفل
خ. غير ذلك.....
د.

س13. يسكن معك في نفس المنزل؟ (يمكنك اختيار أكثر عن خيار)

- أ. الزوج/الزوجه

- ب. الجد/ الجده
- ت. أخوة وأخوات الزوج والزوجه
- ث. عاملة المنزل
- ج. أصدقاء
- ح. أبناء الأخوه والأخوات
- خ. غير ذلك.....

س 14. العدد الكلي لمن يعيشون معك في نفس المنزل؟

- س 15. ما نوع المسكن الذي تعيش فيه ؟
- أ. منزل مستأجر أكثر عن طابق
 - ب. منزل مستأجر طابق واحد
 - ت. منزل ملك للأسره طابقين
 - ث. منزل ملك للأسره طابق واحد
 - ج. شقه ملك للأسره
 - ح. شقه مستأجره
 - خ. ملحق في بيت الأسره
 - د. غير ذلك.....

الجزء (ب)

هذا الجزء من الاستبيان حول الحوادث والأصابات المنزليه التي وقعت لأحد أطفالك ممن دون الرابعه من العمر
طفل واحد

- س 16. عمر الطفل؟*
- أ. اقل من سنه
 - ب. بين سنه إلى سنتين
 - ت. بين سنتين إلى ثلاث سنوات
 - ث. بين ثلاث سنوات إلى أربع

- س 17. جنس الطفل ؟
- أ. ذكر
 - ب. انثى

س 18. هل أصيب طفلك بأي أصابه/ حادث منزلي من قبل؟*

- أ. نعم
- ب. لا (إذا لم تكن هناك أي أصابه أو حادث سابق أنتقل إلى السؤال س 26)

19. أي من هذه الحوادث/ الأصابات قد تعرض لها الطفل؟ بإمكانك اختيار أكثر عن خيار؟

○ السقوط من السلالم	○ حرق بالمشروبات الساخنة
○ أختناق بالطعام	○ ابتلاع مواد سامه
○ أنزلاق في أرضية المطبخ أو الحمام أو المنزل	○ أختناق بأغطية السرير
○ بلع و أختناق بقطع من أدوات اللعب	○ جرح بأدوات حاده
○ على وشك الغمر بالماء أو الغرق	○ لدغ حشرات وزواحف سامه
○ سقوط من الأرائك والطاولات والأسره	○ ارتطام بحواف وزوايا الأثاث
○ سقوط من الشباك	○ أنحشار الأصبع في الباب
○ سقوط من مشاية الطفل	○ لم يصب بأي أصابه من قبل

س 20. غير ذلك من الجوادث؟

س 21. في حال أصيب طفلك من قبل ماهي أسوء أصابه حدثت له؟ وما سبب الأصابه بها من وجهة نظرك؟

س 22. الإصابه أحتاجت إلى ؟

- الأسعافات الأوليه فالمنزل
- الذهاب للمستشفى للمعاينه والعلاج
- التنويم فالمستشفى
- أستخدام العلاج الشعبي/ التقليدي
- غير ذلك

س 23. هل كان بالإمكان وقاية الطفل من حدوث هذا الحادث؟*

- نعم
- لا
- غير ذلك

س 24. وضح إذا كانت إجابتك لا.....

س 25. أثناء وقوع الحادث كان الطفل تحت أشرف؟*

- الأم
- الأب
- الجده
- العامله
- غير ذلك.....

س 26. هل تجد الوقت الكافي لكي تراقب طفلك والانتباه له باستمرار أثناء اللعب أو أثناء تناول الطعام؟ وضح؟

.....

س 27. لماذا برأيك الأطفال أكثر عرضه لحصول الإصابات؟ (ضع علامة على كل ما يمثل رأيك *)

○ مراقبة غير كافية للطفل أثناء اللعب	○ الإنشغال بالاهتمام بأكثر من طفل
○ الانشغال أثناء المراقبة وقت اللعب بالهاتف	○ عمل الأم خارج المنزل
○ أو التلفزيون	○ الأسره الكبيره
○ إرهاق الوالدين/ المربيه/الجليسه من أعباء الحياه	○ الغفله أثناء المراقبه
○ بيئة اللعب الغير آمنه حول المنزل وجواره	○ شقاوة الأطفال
○ عدم كفاية تدابير السلامة	

س 28. كم مره زرت المؤسسات الصحيه بعد تعرض أي من أطفالك لأصابه خلال هذا العام؟

- أ. ولا مره
ب. مره
ت. مرتان
ث. 3مرات
ج. غير ذلك

س 28. هل تجد نفسك ملم بإجراءات الأسعافات الأوليه؟

- أ. نعم ملم بجميع مهارات الأسعافات الأوليه
ب. ملم ببعضها
ت. لا لست ملم بأي منها
ث. غير ذلك

.....

س 29. هل حصلت على أي تدريب/ ورشه في الأسعافات الأوليه؟

- أ. نعم
ب. لا

س 30. إذا نعم أين كان ذلك؟

.....

س 31. هل يمكن منع حدوث إصابات الاطفال الصغار؟

- أ. دائما
ب. عادة
ت. غالبا
ث. بعض الأحيان
ج. أبدا

الجزء (ج) السلامه في المنزل

س32. فيما يلي قائمة ببعض أدوات/معدات / إجراءات السلامة . من فضلك ، أشر بنعم في جوار كل منها إذا كانت متوفرة في منزلك أو حوله.

الأدوات/ المعدات		متوفر في منزلك
		نعم لا
خزانة لحفظ المواد السامة		
طفاية حريق		
قضبان أمان للنوافذ		
أقفال النوافذ		
بساط ماص للصدمات أو رمل في أماكن لعب الأطفال		
سجاد مانع للانزلاق		
أضواء ليلية		
علب مقاومه للفتح لحفظ المواد السامة		
كرسي الطفل للسيارة		
خوذة الرأس لركوب الدراجات أو العجلات		
مكان آمن مجهز للعب الأطفال في فناء المنزل		
أبواب خاصة للسلام		
السلام مغطاه بالسجاد		
صندوق أسعاف		
واقي يركب فالأبواب لحماية أصابع الأطفال من إصابات الأبواب		

س33. قد يعود سبب عدم وجود اي من معدات السلامة المنزليه المذكوره إلى؟ (بإمكانك الإشارة لأكثر من خيار)

- التكلفه
- الوقت
- عدم الدرايه
- عدم توفرها في الأسواق القريبه
- عدم أهميه وجودها
- لم نعتد على وجودها
- أسباب أخرى

س34. وضح لماذا؟

س35. منتجات سلامة الأطفال متوفرة في السوق بأسعار في متناول الجميع؟

- نعم
- لا
- غير ذلك.....

س36. يرجى الإشارة بنعم أو لا بما تراه يمثل ممارساتك في المنزل

في منزلك.....؟		نعم لا
نقاط الكهرباء مغطاه أو موضوعه في مكان مرتفع على الحائط		
أحواض الماء والدلو تحفظ دائما فارغه		
الأثاث موضوع بعيدا عن النوافذ		

		درجة حرارة سخان المياه ضبطت على درجة 50-60 درجة مئوية
		المنظفات والمواد الكيميائية والأدوية موضوعة في خزانة مرتفعة ومغلقة
		أدوات المطبخ الحادة موضوعة في أماكن مرتفعة ويكون المطبخ مغلق عندما لا يكون قيد الاستخدام
		الألعاب والدمى في المنزل مناسبة لعمر الطفل و مصنوعة من مواد آمنة وغير قابله للتفكيك
		الحلوى الصغيره الصلبه والعلكه لا تقدم للأطفال دون الثالثة
		أ الفواكه الصغيرة كالعنب والكرز أو المكسرات الصلبة لا تقدم للأطفال دون الثالثة دون أشرف ومساعد
		تجنب تناول المشروبات الساخنة عند حمل الطفل بين ذراعيك أو اللعب معه.
		تجنب استخدام المشاية (الجلاسه) لطفلك
		تخزين أكياس البلاستيك بعيدا عن تناول الأطفال
		ترك الطفل الصغير وحيدا أثناء تحميمه

- س 37. الشارع أمام منزلك؟ * (يمكنك اختيار أكثر من خيار)
- أ. تمت صيانتته من الحفر وما يمكنه أن يكون خطرا على الأطفال
- ب. يوجد به علامات لتقييد سرعة السيارات
- ت. يوجد به كاسرات سرعه (مطبات)
- ث. أماكن لعب الأطفال بعيدة عن الشارع
- ج. لا شيء مما ذكر
- ح. غير ذلك

س 38. إلى أي مدى توافق على العبارات التالية؟

أوافق بشده	أوافق	لا أوافق ولا أعارض	أعارض	أعارض بشده	
1	2	3	4	5	
					الوقاية من الإصابات/ الحوادث للأطفال الصغار في الغالب مسؤولية الوالدين
					الإصابة التي تحدث للأطفال بسبب عدم كفاية الإشراف/ المراقبه هو إهمال وتقصير
					إذا أصيب طفلي ، فهذا خطأي
					إن الإصابة ليست خطأ من الوالدين والأسره ، وتحدث بسبب القدر وإرادة الله
					يجب إلقاء اللوم على الوالدين في حال أصيب الطفل في المنزل
					المراقبة المباشره للطفل الصغير أثناء اللعب يمكن أن يمنع حدوث الإصابات
					يجب عدم ترك الطفل مع أشقائه الآخرين للإشراف عليه أثناء غياب الأبوين
					سيتعرض الأطفال دائماً للإصابة بغض النظر عما نفعله لحمايتهم
					تقع على عاتقي مسؤولية تعلم كيفية الحفاظ على سلامة طفلي/ أطفالي
					استخدام معدات السلامة في المنزل خيار يرجع للوالدين

					الآباء مسؤولون عن تدريب أطفالهم على كيفية حماية أنفسهم من المخاطر
					من الحكمة إنفاق بعض من الدخل على شراء لوازم السلامة.
					يجب أن تدعم الرعاية الاجتماعية الأسر التي لا تستطيع تأمين احتياجاتها من أدوات السلامة.
					سلامة الطفل أولويه عند تصميم بناء المنزل.
					من واجبي التصرف أو إخطار الجهات الحكومية المعنية عند ملاحظة أي شيء لم تتم صيانته في جوار المنزل وأماكن لعب الأطفال.
					من المناسب مسألة ولي الأمر مسائله قانونية عند وقوع أي أصابه للطفل بسبب الإهمال

س 39 هل سبق وأن حضرت ورشة تثقيفيه حول سلامة الأطفال وحمائيتهم من الحوادث؟
أ. نعم ب. لا

س 40 هل تمت مناقشة سلامة الطفل معك في مايلي؟ يمكنك وضع علامة على كل أكثر من اختيار
أ. نعم ، في عيادة صحة الطفل / التطعيم
ب. نعم ، عند الخروج من المستشفى بعد ولادة طفلي
ت. نعم ، في زيارة عيادة ما بعد الولادة
ث. نعم ، في موعد الطفل مع طبيب الرعاية الأولية أو الممرضة
ج. نعم ، في قسم الطوارئ بعد إصابة الطفل
ح. لا لم أحصل على أي نصائح حول سلامة الطفل
خ. آخر.....
.....

س 41 هل قدم لك أحد أعضاء مهنة الرعاية الصحية (على سبيل المثال الممرضة) أي تثقيف / دليل صحي حول سلامة الطفل / المنزل؟
أ. نعم ممرضة
ب. نعم قابلة (مولده)
ت. نعم الطبيب
ث. نعم المثقفه الصحيه
ج. غير ذلك (حدد من؟).....
ح. لا أحد

حدد أين

كان.....

س 42 من أين تحصل على المعلومات حول سلامة وأمان الطفل في المنزل وحوله؟ (ضع علامة على كل ما ينطبق)
أ. التلفزيون والوسائط الأخرى
ب. الصحف والمجلات
ت. وسائل التواصل الاجتماعي
ث. الجد والجدة
ج. الأصدقاء والجيران
ح. المهنيين الصحيين

- خ. حملات التوعيه
- د. المحاضرات التثقيفيه بالمراكز الصحيه
- ذ. تبادل المعلومات مع الآخرين
- ر. البحث في المواقع الألكترونيه
- ز. غير
- ذلك.....
- ..

س 43. أي من الوسائل في السؤال السابق المفضله لديك للحصول على المعلومات؟

.....

- س 44. هل لديك دليل إرشادي حول سلامة الطفل على سبيل المثال .كتاب ، كتيب ، قائمة بالتعليمات؟
- أ. لم يسبق لي أن حصلت على أي كتيب حول سلامة الأطفال
 - ب. سبق لي وأن حصلت عليه من أحد المعارض أو الحملات التوعويه
 - ت. حصلت عليه من أحد المستشفيات
 - ث. اشتريته من المكتبه
 - ج. حصلت عليه من مدرسة أحد أطفالي
 - ح. من المواقع الألكترونيه
 - خ. غير
 - ذلك.....
 - ..

س 45. إذا كنت تفتني أي كتيب حول السلامه المنزليه فهو من إصدار؟

.....

- س 46. التوعيه وثقافة المحافظه على سلامة الطفل تعد من مسؤوليات**؟
- أ. الوالدين
 - ب. الحكومه
 - ت. المجتمع
 - ث. كل مما ذكر
 - ج. غير
 - ذلك.....

س 47. أي من الحوادث المنزليه ترى أن يكون هناك اهتمام مجتمعي كبير بالتوعيه حولها؟

.....

س 48. هل هناك شيء تود إضافته؟

.....

نهاية الاستبيان

شكرا لك على وقتك و مشاركتك القيمة
إذا كنت ترغب في معرفة المزيد عن السلامة العامة ، بما في ذلك السلامة في المنزل ، فنفضل بزيارة
[cat=23.؟http://pacdaoman.gov.om/](http://pacdaoman.gov.om/cat=23)
أو قم بزيارة الرابط التالي لصحة الطفل ، بما في ذلك الوقاية من الإصابة
<https://www.moh.gov.om/documents/17796/3139290/child-health2019-new/de51ad2f-64c8-09ed-264d-6545c555c5aa>

تسليم

Appendix I Participation survey advertisement in English



Invitation to Participate in a Research Study “Home Accidents and Children Safety”

You are invited to participate in a study about preventing child accidents and injuries in Oman. The study findings will- help us to understand the prevention of injury and enhance child safety at home in Oman.

Who can participate?

- ✓ Omani
- ✓ Parents/carers of a child/children under the age of five years.
- ✓ Visitors to child and immunisation clinics in Health Centers
- ✓ Can allocate 30 minutes for an online survey.
- ✓ Willing to participate.

For Study Information, click on the URL:

<https://www.birmingham.ac.uk/documents/college-mds/clinical-sciences/unintentional-child-injury-in-oman/pis-parents-arabic-version.pdf>

For participation, Scan the Barcode for the Questionnaire :



Or Click on the URL:

<https://forms.office.com/Pages/ResponsePage.aspx?id=z8oksN7eQUKhXDyX1VPp8-yvwsvUB29Am21MUdKAFYhUQ1RaUUc2TENETVkyME8xOjJPSzhFVkm5VC4u>

For more details or inquiries, you can contact:

Muna Al Mushaikhi, PhD researcher
School of Nursing, University of Birmingham

Email: [REDACTED]

Telephone Number: [REDACTED]

Webpage: (*Unintentional Child Injury in Oman: Health promotion of child safety - University of Birmingham*)

Thank you for your participation in promoting child safety




دعوه للمشاركة في دراسته بحثيه حول "سلامة الأطفال من الحوادث المنزليه"

ندعوك للمشاركة في دراسة حول سلامة الأطفال من الحوادث والإصابات المنزليه وذلك بتعبئة الاستبيان في الرابط أدناه. ستساعدنا نتائج هذه الدراسة على فهم الممارسات المنزليه لحماية الأطفال من الإصابات و التي ستساهم في تعزيز الوعي بالحفاظ على السلامة من الحوادث.

من يمكنه المشاركة في تعبئة الاستبيان؟

- ✓ عمانيون
- ✓ الآباء والأمهات أو الذين يقومون بالأهتمام بطفل أو أطفال دون سن الخامسة
- ✓ المراجعين لعيادات الأطفال والتطعيم في المركز الصحيه بمحافظة مسقط
- ✓ لديك 30-40 دقيقة لتعبئة الاستبيان الإلكتروني
- ✓ تود المشاركة في تعبئة الاستبيان

لصفحة المعلومات أتبع الرابط:

<https://www.birmingham.ac.uk/documents/college-mds/clinical-sciences/unintentional-child-injury-in-oman/pis-parents-arabic-version.pdf>

للمشاركة أمسح رمز الباركود:



أو أتبع الرابط أدناه:

<https://forms.office.com/Pages/ResponsePage.aspx?id=z8oksN7eQUKhXDyX1VPp8-yvwsvUB29Am21MUdKAFYhUQ1RaUUc2TENETVkyME8xQjJPSzhFVkm5VC4u>

للتفاصيل **الاستفسار**

منى بنت جمعا
البريد الإلكتروني
أو الاتصال علي
الموقع الإلكتروني: (*Unintentional Child Injury in Oman: Health promotion of child safety - University of Birmingham*)

شكرا للمساهمة في تعزيز سلامة الطفل

Appendix K Participants information sheet (English Translation)

Information sheet for parents/caregivers of children

Research project: ‘Unintentional Child Injury and Child Safety Health Promotion in Oman.’

This information sheet is about a research project being undertaken by:
Muna Al Mushaikhi a PhD researcher at the University of Birmingham, United Kingdom, and a Nursing Tutor at the Higher Institute of Health Specialities, Oman. Supervised by Professor Julie Taylor and Dr Amelia Swift, University of Birmingham, UK.

Invitation: We would like to invite you to participate in a research study we are conducting. Before you decide, it is important that you understand why the study is being done and what it would involve. Please read this sheet of information and discuss it with others if you wish. If there is anything unclear, or if you would like more information, please contact Muna at the address provided at the end of this sheet.

What is research and why is it so important? Research is a systematic process of discovering new information and solving problems. It can be done in many ways, but this project hopes to obtain your opinion through an anonymous online questionnaire. Research is vital in healthcare as the information collected can help teach and guide health professionals about developing what they do.

What is the project about? This project looks at the child injury prevention and health promotion of safety in the home and surrounding areas. Example of injuries to children include falls from height, burns, drowning, suffocation and poisoning. We want to know what parents, caregivers and nurses think about preventing child injury in young children and how they do it. It will help improve health promotion to prevent injuries to meet the needs of Omani families like yours.

Why have I been asked to take part? You are invited to participate in this study because you are a mother, father, or caregiver taking care of a child/children under the age of six years and are willing to complete a research questionnaire. We hope to have around 365 respondents take part in this online questionnaire.

Do I have to take part? It is up to you to decide if you want to participate. If you decide to participate, you will be free to withdraw from the study at any time without giving reasons. If you participate, you may withdraw at any time before or while completing the form. However, since we only collect anonymous information through the online evaluation form (i.e. you are not asked for your personal details or given a participant number), you cannot withdraw your data once it is submitted.

What will happen if I decide to take part? If you would like to share your opinion and participate in the study, please follow the weblink (details to be inserted). Once you click on *agree to participate*, the page will take you to the questionnaire. It consists of closed-ended questions with space for your comments. You will need around 30 minutes to complete the questionnaire. Once the questionnaire is complete you can click the *submit* button.

What will happen to the information that is collected? Your participation in this online questionnaire is completely anonymous (you do not need to write your name or address). Any information gathered will only be seen by Muna and her two supervisors. We will keep all information safe and secure in a secure account at the University of Birmingham.

What are the possible disadvantages and risks of taking part? It is possible that some questions may trigger concerns or unpleasant memories, and you may feel distressed. If this happened and you felt you want to talk, you can in the first instance talk to the research team at the contacts described at the end of this information sheet. However, please note that the research team cannot advise you about your personal situation. If your distress increased following completing the survey and felt you need professional psychological consultation, contact your health centre (GP) or polyclinic. For any general health inquiry, you can call the Ministry of Health Call Center at 24441999.

If you have any concern about any hazard in your neighbourhood dangerous for the public, you must immediately call and inform the proper authority: Municipality emergency at 1111 and Royal Oman Police at 9999. Any observed child abuse or negligence can be reported at child protection hotline 1100.

There are two websites at the end of the questionnaire that may help you learn some information about injury prevention.

What are the possible benefits of taking part? This study offers you the opportunity to reflect on your knowledge about unintentional child injury and explore your attitudes and behaviours. By taking part, you will allow the researchers to understand injury prevention practices better. It will also allow them to recommend changes if needed to the unsafe practice.

Whom should I contact if I have a problem? If a problem arises or you wish to make a complaint about this study's conduct, you may speak to the researcher Muna Al Mushaikhi and contact the lead PhD supervisor Professor Julie Taylor [REDACTED]. You can also contact the Centre of Research and Studies, Ministry of Health, Oman on nfo@mohcsr.gov.om or Call : [REDACTED]

Will my taking part in this study be kept confidential? You will complete the online questionnaire anonymously. The data cannot be traced back to you as an individual and we do not ask you for personal information such as your name, date of birth or address.

What will happen to the results of the study? The study is for fulfilment of a PhD; hence the results will be a part of a thesis. It will be also presented at conferences and published in a peer reviewed journal. A one-page summary (in an appropriate accessible format) will be posted on the study webpage explaining the study findings once the research is complete.

Who has reviewed the study? This study has been reviewed and given a favourable opinion by the Research Ethics and Review Committee at the University of Birmingham and the Ministry of Health Oman.

Whom should I contact for more details? If you would like to know more about this project, to take part or ask questions, please contact:

Muna Al Musahikhi
University of Birmingham, School of Nursing
Email: [REDACTED] or Telephone: [REDACTED]

Thank you for considering taking part.

You can print this participant information sheet or keep a copy on your computer.

Appendix L Participants information sheet in Arabic

ورقة معلومات للمشاركين فالبحث (الآباء أو القاتمين على رعاية الأطفال)

مشروع بحثي: تعزيز الوقاية من الحوادث و الإصابات في الأطفال دون سن السادسة في سلطنة عمان

ورقة المعلومات هذه تتعلق بمشروع بحث يتم تنفيذه بواسطة:
منى المشايخي، باحثة دكتوراه في جامعة برمنغهام، المملكة المتحدة
ومدرس تمرير في المعهد العالي للتخصصات الصحية، سلطنة عمان
تحت إشراف البروفيسور جولي تايلور والدكتور أميليا سويت، جامعة برمنغهام، المملكة المتحدة

يرجى قراءة ورقة المعلومات هذه لمساعدتك على تحديد ما إذا كنت ترغب في المشاركة بالدراسة

دعوة: نود دعوتك للمشاركة في دراسة بحثية تجريها. من المهم لك قبل أن تقرر المشاركة أن تفهم سبب إجراء هذه الدراسة وما الذي ستضمنه. ولهم ذلك يرجى قراءة ورقة المعلومات هذه ومناقشتها مع الآخرين إذا كنت ترغب في ذلك. إذا كان هناك أي شيء غير واضح، أو إذا كنت ترغب في مزيد من المعلومات، يرجى الاتصال ب منى على العنوان المذكور في نهاية هذه الورقة.

ما هو البحث ولماذا هو مهم جداً؟ البحث هو منهجية عملية لإكتشاف معلومات جديدة وحل المشاكل. يمكن القيام بذلك بعدة طرق، لكن هذا المشروع يأمل في الحصول على رأيك من خلال استبيان عبر الإنترنت. يعد البحث أمراً حيوياً في مجال الرعاية الصحية حيث يمكن للمعلومات التي تم جمعها أن تساعد كل فرد وتوجه المهنيين الصحيين حول تطوير ما يفعلونه.

ما هو المشروع حول؟ يبحث هذا المشروع البحثي في الوقاية من إصابات الأطفال وتعزيز الصحة والسلامة في المنزل والمناطق المحيطة به. تشمل الأمثلة على إصابات الأطفال السقوط من ارتفاع والحروق والغرق والاختناق والتسمم. نريد في هذا البحث أن نعرف ما يفكر فيه الآباء ومقدمو الرعاية والمرضى بشأن منع إصابات الأطفال عند الأطفال الصغار وكيف يفعلون ذلك. سيساعد هذا البحث في تحسين تعزيز السلامة ومنع الإصابات لتلبية احتياجات الأسر العمانية مثل أسرنا.

لماذا نطلب مني المشاركة؟ أنت مدعو للمشاركة في هذه الدراسة لأنك قد تكون أباً أو أما أو تعتني بطفل أو أطفالاً دون السادسة من العمر و موافق للمشاركة في إكمال الاستبيان. ونحن نأمل أن يكون هناك حوالي 365 مشارك في هذا الاستبيان.

هل يجب علي المشاركة؟ الأمر متروك لك لتقرر ما إذا كنت تريد المشاركة. إذا قررت المشاركة، فسيكون لك الحرية في الانسحاب من الدراسة في أي وقت دون إبداء الأسباب. إذا شاركت، يمكنك الانسحاب في أي وقت قبل أو أثناء تعبئة الاستبيان. ومع ذلك، نظرًا لأننا نجمع معلومات مجهولة المصدر فقط من خلال استبيان عبر الإنترنت (أي لا يُطلب منك بياناتك الشخصية أو أي أرقام)، فلا يمكنك سحب بياناتك بمجرد إرسالها.

ماذا سيحدث إذا قررت المشاركة؟ إذا كنت ترغب في مشاركة رأيك والمشاركة في الدراسة، يرجى اتباع رابط الويب (سيتم إدراج التفاصيل). قبل المشاركة في الاستبيان، سيطلب منك قراءة نموذج

تعزيز الصحة والوقاية من الإصابات غير المقصود للأطفال في سلطنة عمان. الإصدار 2021-3-12



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موافقة والتوقيع عليه يوضح أنك تفهم المشروع وأنت على استعداد للمشاركة. بمجرد النقر فوق موافق على المشاركة ، ستأخذك الصفحة إلى الاستبيان. يتكون من أسئلة متعلقة مع مساحة لتعليقاتك. ستحتاج إلى حوالي 30 دقيقة لإكمال الاستبيان. بمجرد اكتمال الاستبيان يمكنك إرساله.

ماذا سيحدث للمعلومات التي يتم جمعها؟ مشاركتك في هذا الاستبيان عبر الإنترنت مجهولة تمامًا (لا تحتاج إلى كتابة اسمك أو عنوانك). أي معلومات يتم جمعها ستطلع عليها منى ومشرفتاها فقط. سنحافظ على جميع المعلومات آمنة ومأمونة في جامعة برمنغهام.

ما هي المساوئ والمخاطر المحتملة من المشاركة؟ من الممكن أن تثير بعض الأسئلة مخاوف أو ذكريات غير سارة ، وقد تشعر بالضيق. إذا حدث هذا وشعرت أنك تريد التحدث ، يمكنك في المقام الأول التحدث إلى فريق البحث في جهات الاتصال الموضحة في نهاية ورقة المعلومات هذه. ومع ذلك ، يرجى ملاحظة أن فريق البحث لا يمكنه تقديم النصيحة لك بشأن وضعك الشخصي. إذا زاد تورطك بعد إكمال المسح وشعرت أنك بحاجة إلى استشارة نفسية مهنية ، فاتصل بالمركز الصحي (GP) أو العبادة الشاملة. لأي استفسار صحي عام ، يمكنك الاتصال بمركز الاتصال بوزارة الصحة على

إذا كان لديك أي قلق بشأن أي خطر في منطقتك بشكل خطراً على الجمهور ، فيجب عليك الاتصال على الفور وإبلاغ السلطة المختصة: الطوارئ البلدية على الرقم 1111 وشرطة عمان السلطانية على الرقم 9999. يمكن الإبلاغ عن أي إساءة معاملة للأطفال أو إهمال يتم ملاحظتها على الخط الساخن لحماية الطفل 1100 .

يوجد موقعان في نهاية الاستبيان تحتوي على كتب توعويه قد تساعدك في معرفة بعض المعلومات حول الوقاية من الإصابة.

ما هي الفوائد الممكنة من المشاركة؟ تقدم لك هذه الدراسة فرصة للتفكير في معرفتك حول إصابة الطفل واستكشاف موافقك وسلوكياتك. بالمشاركة ، ستسمح للباحثين بفهم ممارسات الوقاية من الإصابات بشكل أفضل. سيسمح لهم أيضاً بالتوصية بالتغييرات إذا لزم الأمر حول الممارسات الغير آمنة.

ماذا إذا كان هناك مشكلة ما؟ إذا ظهرت مشكلة أو كنت ترغب في تقديم شكوى حول إجراء هذه الدراسة ، يمكنك التحدث إلى الباحثة منى المشايخيه ، أو الاتصال بمشرف الدكتوراه الرئيسي البروفيسور جولي تابلور على [redacted] . يمكنك أيضاً الاتصال بمركز البحوث والدراسات ، وزارة الصحة ، عمان على info@mohcsr.gov.om أو الاتصال على: (+968)

هل ستبقى مشاركتي في هذا المشروع سرية؟ لن يطلب منك أي بيانات شخصية كأسمك أو عنوانك. لذا لن يتمكن أحد من تحديد هويتك في أي تقارير أو منشورات لاحقة .

ماذا سيحدث لنتائج مشروع البحث؟ الدراسة لنيل درجة الدكتوراه. ومن ثم ستكون النتائج جزءاً من الأطروحة. سيتم تقديمه أيضاً في مؤتمر علمي وسيتم نشره في مجلة محكمة. بمجرد اكتمال البحث سيتم نشر ملخص من صفحة واحدة (بتنسيق مناسب يمكن الوصول إليه) على صفحة الويب الخاصة بالدراسة لشرح نتائج الدراسة.

تعزيز الصحة والوقاية من الإصابات عبر المقصودة للأطفال في سلطنة عمان. الإصدار 1 2021-3-12



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من راجع هذه الدراسة؟ تمت مراجعة هذه الدراسة وإبداء رأي إيجابي من قبل لجنة أخلاقيات البحث والمراجعة في جامعة برمنجهام بالمملكة المتحدة ووزارة الصحة في عمان.

بمن يجب الاتصال لمزيد من التفاصيل؟ إذا كنت ترغب في معرفة المزيد حول هذا المشروع، للمشاركة أو الاستفسار، يرجى الاتصال على:
الباحثه منى المشايخيه، كلية التمريض، جامعة برمنجهام
البريد الإلكتروني: [REDACTED]
أو الاتصال على:

شكرا لك على النظر في المشاركة

يمكنك طباعة ورقة معلومات المشارك أو الاحتفاظ بنسخة على جهاز الكمبيوتر الخاص بك

تعزيز الصحة والوقاية من الإصابات غير المقصودة للأطفال في سلطنة عمان. الإصدار 1 12-3-2021



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Appendix M Interview guide

Interview Guide (Healthcare Provider) Semi-structured Interview Guide (Health Care Providers) (Version 13/4/2021)

PARTICIPANTS CODE: _____

Consent form read and signed before the meeting Yes No

Interview details.

Date of interview: ____/____/____ Time of interview: _____

Interviewer: _____

Place/platform: _____

Interviewee: ----Doctor -----Nurse

Interviewee's place of work: _____

Interviewee years of experience: _____

Length of interview _____

1. Welcome and Confirm Consent for Participation and audio recording.

Thank you for willing to take part in the interview. I can assure you that your participation is anonymous, and no records and transcriptions of the interview will be kept with your name on them. I would like to ask you for permission to audio record this interview. If you do not have any further questions, I would like to re-introduce you to this interview's main subject briefly.

2. Explain the purpose of the meeting.

This project looks at child injury in the home and surrounding areas and health promotion of child safety. Examples of injuries to children include falls from height,

burns, drowning, suffocation, and poisoning. The project will help us understand the injury prevention practices in the Omani context. It will help improve health promotion to prevent injuries and meet the needs of the Omani community.

3. Switch on the recorder

Key Questions:

Key Questions:

1. What would you like to discuss with me about home accidents in children under five years?
2. How do you find child safety health education guidelines for health professionals in your health institution?
3. Where is the place of unintentional child injury/ **child safety** prevention within the child health promotion?
4. In your opinion, what is the most common cause of child injury/ **child accidents** which comes to hospital?
5. From your point of view, do you consider unintentional injuries/ **accidents** at home a significant concern in Oman?
6. Discuss, from your point of view, the facilitators and challenges of Omani families in keeping children safe at home.
7. What strategies are used by you and other professionals to raise family awareness of child safety?
8. Is there anything else you want to add or go back to?
9. Anything you want to ask me?



Invitation to participate in a research study “Unintentional Child Injuries.”

You are invited to participate in a study about preventing child accidents and injuries in Oman. The study findings will help us to understand the prevention of injury and enhance child home safety in Oman.

Who can participate?

- ✓ Doctors and Nurses who provide healthcare for children under the age of five years.
- ✓ Have 30 minutes to participate in an interview.
- ✓ Willing to participate.

For more details, inquiries and participation, you can contact:

Muna Al Mushaikhi, PhD researcher
School of Nursing, University of Birmingham
Email: [REDACTED]
Telephone Number: [REDACTED]
Webpage: (will be inserted accordingly)

Thank you for your participation in promoting child safety

Participant Information Sheet for Healthcare Professionals

Research project; ‘Health Promotion and Prevention of Unintentional Child Injury in Sultanate of Oman.’

**This information sheet is about a research project being undertaken by:
Muna Al Mushaikhi, a PhD researcher at the University of Birmingham, United Kingdom,
and a Nursing Tutor at the Higher Institute of Health Specialities, Sultanate of Oman.
Supervised by Professor Julie Taylor and Dr Amelia Swift, University of Birmingham, UK.**

Please read this information sheet to help you decide whether you would like to take part.

Invitation: We would like to invite you to participate in a research study we are conducting. Before you decide, it is important that you understand why the study is being done and what it would involve. Please read this sheet of information and discuss it with others if you wish. If anything is unclear, or you would like more information, please contact Muna at the address provided at the end of this sheet.

What is the project about? This project looks at child injury prevention and health promotion of safety practices in the home and surrounding areas. Examples of injuries to children include falls from height, burns, drowning, suffocation and poisoning. We want to know what you think about the prevention of these injuries among children under the age of six years and what you are doing about it. It will help improve health promotion and injury prevention to meet the needs of Omani families like yours.

Why have I been asked to take part? You have been invited to participate in this study because you are working with young children (under six years of age) and their families at a health centre, either in the immunisation room or paediatric clinic. You need to have a minimum of six months of experience and be willing to participate in an interview.

What will happen if I decide to take part? If you would like to take part in the study, please contact me (details at the end of this sheet). I will then contact you to answer any questions you may have and arrange a time for an interview. Interviews can be arranged at a time convenient for you and conducted in person or via online platforms such as Zoom, Skype or Microsoft Teams to suit you. Prior to the interview, you will be asked to read and sign a consent form. Interviews may last between 20 and 30 minutes, but you can talk freely without a time limit. The interview will be attended by you and me only.

What will happen to the information that is collected? The interview will, with your consent, be audio recorded. The recordings will be transcribed and analysed by the researcher. Your identity will be kept confidential at all times, with any information gathered only being seen by the research team.

Within these interviews, there is a potential that what is discussed may be difficult and you may need extra support. If this is the case, the interview can be stopped and your individual preference about resuming the interview will be discussed. I will also ensure access to additional support resources is given to you and encourage you to debrief with your team as appropriate.

Although not a topic within these interviews, if you discuss an intention to harm yourself or others or disclose any previous history of abuse of children or adults or breach of professional standards, the researcher is duty-bound to report this information to the appropriate child protection teams for further investigation and to inform Directorate of Nursing Practice at the Ministry of Health.

How will we use information about you? Codes will be used to identify you in the interview records and the analysis work. Your participation in the interview will be anonymous. Any information gathered will only be seen by Muna and her two supervisors. We will keep all information safe and secure in encrypted format at the University of Birmingham.

Do I have to take part? It is entirely up to you to decide if you want to participate. If you decide to participate, you will be free to withdraw from the study at any time without giving reasons, and you can ask for any information we have gathered about you to be deleted up to 1 week after your interview date. You can find out more about how we use your information by asking Muna any questions you may have.

What are the possible disadvantages and risks of taking part? It is possible that you may feel distressed related to some of the issues you talk about in the interview.

If this happens, you can decide whether to pause or stop the interview. Muna will offer informal support during the interview process, but should you need more formal support, we would encourage you to seek this via your workplace networks.

What are the possible benefits of taking part? This study offers you the opportunity to reflect on your knowledge about unintentional child injury and explore your attitudes and behaviours. By taking part, you will allow the researchers to understand injury prevention practices better. It will also allow them to recommend changes, if needed, to the unsafe practice.

What if there is a problem? If a problem arises or you wish to make a complaint about the conduct of this study, you may speak to the researcher, Muna Al Mushaikhi, or contact the lead PhD supervisor Professor Julie Taylor on [REDACTED]

You can also contact the Centre of Research and Studies, Ministry of Health, Oman on info@mohcsr.gov.om or Call : ([REDACTED])

Will my taking part in this project be kept confidential? All the information that we collect about you during the course of the research will be kept strictly confidential. You will not be able to be identified in any ensuing reports or publications.

What will happen to the results of the research project? The study is for the fulfilment of a PhD; hence, the results will be a part of a thesis. It will also be presented in a conference and published in a peer-reviewed journal.

A one-page summary (in an appropriate accessible format) will be posted on the study webpage explaining the study findings once the research is complete.

Who has reviewed the study? This study has been reviewed and given a favourable opinion by the Research Ethics and Review Committee at the University of Birmingham and the Ministry of Health Oman.

Who should I contact for more details? If you would like to know more about this project, to take part or ask questions, please contact:

Muna Al Mushaikhi

University of Birmingham, School of Nursing

Email: [REDACTED] or Telephone: [REDACTED]

Appendix P Consent form to participate in the interview

Consent Form **for Healthcare Providers Participating in the Interview**

An Exploratory Study of Unintentional Child Injury and Child Safety Health Promotion in Oman

This research project is being undertaken by:

Muna Al Mushaikhi a PhD researcher at the University of Birmingham, United Kingdom,

and a Nursing Tutor at the Higher Institute of Health Specialities, Oman.

Supervised by Professor Julie Taylor and Dr Amelia Swift, University of Birmingham, UK.

You are invited to take part in this research interview. This consent form, along with the information sheet, aims to give you more information so that you can understand more about the purpose and process of the study and thus be able to agree or disagree to be part of the research.

Summary of the project

This project has been designed to look at the prevention of unintentional child injury among children under six years of age in Oman. We will explore your perspective towards injury prevention through a thirty-minute interview via an online meeting platform (Zoom, Google Meet or MS Teams). The interview will be recorded and transcribed as part of the research process. All of the information and data will be kept confidential in a secure place at the University of Birmingham.

Voluntary participation in this study

Participation in this study is entirely voluntary. If you decide to participate, you have the right to change your mind. You can ask for any information we have gathered about you to be deleted before analysis (up to 1 week after your interview date). Please take time to consider the information you have received and ask any questions you may have.

Please indicate below your consent to take part in this study by ticking the boxes to agree to the statements listed

Statement	Please tick below
I have read and understood the information sheet (version number 1, dated 12.03.21)	
I have had the opportunity to ask questions, and they have been answered satisfactorily	
I understand that my participation is completely voluntary and that I do not have to take part in this study	
I understand I have the right to withdraw from the study without any prejudice, and I have one month after the interview to request my data is destroyed.	
I agree to take part in an interview in which my discussion will be recorded, transcribed and analysed.	
I agree for the researcher to use quotes from our interview within research articles, conferences and for the purposes of the researcher's PhD work. I understand these will be anonymised to keep them confidential.	
OPTIONAL - I give permission for my anonymised data to be used in future studies/for further analysis	YES / NO
I agree to take part in the above study.	

Participants name	Participants Signature	Date
Name of person taking consent.	Signature	Date

N.B. ensure that the participant receives a copy of this form.

Appendix Q Example from NVivo 12 codes using Thematic Framework

Interview analysis 2 - Copy.nvp - NVivo 12 Plus

Thematic Framework

Name	Files	References	Created On	Created By	Modified On	Modified By
imitation of cartoons and games		5	7	10/06/2022 01:21	MS.	07/06/2022 04:26
Interpersonal level		11	14	10/06/2022 16:54	MS.	23/06/2022 15:16
big families		5	8	10/06/2022 17:05	MS.	08/06/2022 20:43
birth spacing		7	7	10/06/2022 17:05	MS.	08/06/2022 16:57
busy with house work		8	10	10/06/2022 17:05	MS.	10/06/2022 17:05
Cost		1	1	10/06/2022 17:05	MS.	08/06/2022 02:36
father support		2	2	10/06/2022 17:05	MS.	03/06/2022 22:18
housemaid		9	14	10/06/2022 17:05	MS.	09/06/2022 17:41
it can not happen to their children		1	1	10/06/2022 01:21	MS.	08/06/2022 02:36
level of education		5	8	10/06/2022 17:05	MS.	08/06/2022 20:39
low income		9	14	10/06/2022 17:05	MS.	10/06/2022 17:05
mother age		1	1	10/06/2022 01:21	MS.	04/06/2022 16:21
neighbour support		1	1	10/06/2022 17:05	MS.	28/04/2022 16:02
number of children		14	21	10/06/2022 17:05	MS.	10/06/2022 17:05
parents behaviour		6	10	10/06/2022 17:05	MS.	10/06/2022 17:05
parents sepration		1	1	10/06/2022 01:21	MS.	05/06/2022 14:09
previoues injury		2	2	10/06/2022 01:21	MS.	09/06/2022 13:21
seasonal		5	8	10/06/2022 17:05	MS.	09/06/2022 16:57
Supervision		8	17	10/06/2022 01:21	MS.	08/06/2022 20:50
unavailability of playground		1	1	10/06/2022 17:05	MS.	08/06/2022 13:00
working mother		8	10	10/06/2022 17:05	MS.	09/06/2022 13:25
working parents		1	1	10/06/2022 17:05	MS.	21/04/2022 16:38
Multifactorial		1	4	10/06/2022 01:21	MS.	10/06/2022 18:50
Potential of negligence		2	2	10/06/2022 01:21	MS.	10/06/2022 18:50

MS. 82 Items

28°C Mostly sunny

Search

17:28 06/11/2023

Appendix R Examples of Themes and Extracts:

SEM level (Themes)	Subthemes	Codes	Example of Quotes
Individual and interpersonal level	Inadequate Supervision in a complex care environment Inadequate knowledge of child development and safety Perceived inevitability of child injuries Inadequate safety measures due to socio-economic status (income-work commitment)	1. Level of education 2. Family income 3. Working mother 4. Big family 5. Number of children 6. Child safety knowledge 7. Behaviour (Fatalistic and other cultural beliefs 8. Perceived inevitability of child injuries	Code 5 <i>"In many families, <u>parents work while raising six or seven children, often with the assistance of a maid</u>. The challenge arises in determining who will look after these children. This dynamic differs significantly from the past. <u>All the children are close in age</u>, within a year, without any significant age gaps. There is a crucial need for health education concerning birth spacing, maternity leave, and options for unpaid leave after childbirth. Support is essential, both from the government and within the family unit."</i> Code 1& 3: <i>"Another issue is the <u>level of education</u>, particularly regarding safety awareness. Some might not be aware of measures that could prevent injuries to their children at home. In certain cases, parents might be facing financial constraints, living in cramped conditions such as a two-room house where more than one child shares a single room. These circumstances could be contributing factors to the challenges faced by families."</i> Code 4. <i>"In big families, accidents happen more often than in smaller ones. Kids in big families play together, sometimes on their own, and does not get as much adult supervision. So, you know, things can get a bit more accident-prone...Many accidents happen because of that."</i>

		9. House Design/ construction 10. Safety measures 11. Unsafe play space within home	<i>While the small family they have one to two children, and they are supervised. (HCP 10)."</i> <i>"in Oman, we have big families, for example, each family may have three kids of near age, one year gap between each of them, so this a problem especially for the caregiver, and one caregiver for those kids, it will be a big family with one housemaid taking care of multiple children, which can be difficult (HCP13).</i> Code 6 <i>is essential to emphasise the importance of not leaving the baby alone. Some may dismiss the concern, assuming the baby won't fall, overlooking the possibility that the baby could unexpectedly turn and be at risk of falling (HCP7)."</i> Code 7. <i>"The other reason, as I mentioned, is the type of building. The houses are large, with spacious staircases located far from the rooms. This setup makes it challenging to keep an eye on the child while they are running."</i> Code 7. <i>"Most of the houses are old, and when they were built, there was little consideration for the activities of children."</i> Code 8. <i>The children tend to play on the seesaw with excessive force, sometimes pushing it so hard that it may hit the concrete wall. The limited space for seesaws, an</i>

	Inadequate adaption of a safe child environment at home		<i>unsafe playground, and the absence of supervision raise concerns."</i> Code 7. <i>The mother was inattentive and placed a toxic substance in a water bottle. It becomes uneasy for the young child to differentiate between water and something potentially harmful like Clorox."</i>
Community level	Community socioeconomic status Building and enforcing safety standards for playgrounds, road infrastructure, housing, and other environments)	12. Community awareness and beliefs 13. Environment surrounding the home (Play area, street) 14. Cultural beliefs 15. Behavioural norms	<i>"There are some places where there are no places for kids to play, like for free. Where the kids play on the road, and the road is meant for the cars. Very few areas have designated safe areas for children to play. So where are we going to go? We can't sit at home is too small. The consequences are somewhere safe because there is nothing so. You know it's a hard situation. Yes, some areas now, but it's more in the high-class areas." (HCP6)</i>
Organisational level:	Absence of child safety education Inadequate resources Inadequate coordination	16. Inadequate collaboration of educational efforts between healthcare professionals. 17. Time 18. Resources 19. Unavailability of guidelines	Code 21: <i>"Providing health education in this busy health centre is challenging, as we aim to serve many patients efficiently. Typically, a standard consultation for these patients takes more than five minutes. However, if we incorporate counselling into the session, the time required is doubled." (HCP2)</i> Code 23: <i>"I'm not sure if we have guidelines on child safety. It seems like something we need to address and work on." HCP4).</i>

	Appropriate educational methods	20. Parents' 'preferences	<i>"In the pink card, we focus more on the child's health status but noting related to the child's safety. It is about his health and his growth. These are the things we focus on more. It could be his weight, and at the age of 18 months, we screen them for autism and nutrition status. But child safety is not involved."</i> (HCP 10) Code 24: <i>"Some families seem less interested, and it is challenging to compel their attention from mothers and other family members. They often provide excuses like being busy, unable to listen, or lacking time. In some cases, when you provide them with materials, they take them home but may not fully understand or appreciate their importance, leading to neglect."</i> (HCP 11)
Societal level:	(Disparities between population groups) Inadequate legislation and regulations that reinforce safety standards for environments in which children live and play	21. Unaffordable nursery chargers 22. Unsafe play area in Old residential area 23. Inadequate policy of private swimming pool Inadequate media reinforces	Code 25. <i>"Some parents say they prefer to keep their children at home because of the fee and time conflict with their working hours"</i> HCP 13

Appendix S Presentations & publications associated with this Thesis

Al Mushaikhi, M., Taylor, J., Donagh, B. & Swift, A. (2022). Health Education, its Methods and Effects on Parents' Knowledge, Attitudes, and Behaviours to Prevent Unintentional Child Injuries at Home: A Systematic Review. *Child Care in Practice*, pp.1-26.

Al Mushaikhi M. Prevention of Unintentional Injuries in Children Under the age of five years in the sultanate of Oman. Post Graduate Seminar, School of Nursing. University of Birmingham, September 25, 2023.

Al Mushaikhi M. Prevention of Unintentional Injuries in Children Under the age of five years in the Sultanate of Oman. U21 Health Sciences Nursing and Midwifery Group Research Postgraduate Symposium (online), Hon Kong, March 5, 2024.

Al Mushaikhi M. Prevention of Unintentional Injuries in Children Under the age of five years in the Sultanate of Oman. Post Graduate Seminar, School of Nursing. University of Birmingham, May 5, 2024.

Opportunities for Enhancing Unintentional Injury Prevention in Children Aged Under Five Years in Muscat, Oman: A Mixed Methods Study. U21 HSG 2024 Doctoral Student Forum. The University of Amsterdam, August 26, 2024. (Invitation for poster presentation).