The Health Literacy of Hong Kong Chinese Parents with a Healthy Preschool Child in Seasonal Influenza Prevention and Their Health Promotion Strategies at the Household Level

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Certificate of Original Authorship

I certify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree except as fully acknowledged in the text. I also certify that the thesis has been written by me. Any help I have received in my research work and the preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

Signature of Student

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Statement of Contributions to Jointly Authored Works Contained in The Thesis

A realist review of literature and the results from this thesis have been submitted for publication in peer-reviewed journals through four discrete manuscripts which are presented in Chapter 2 literature review and Chapters 4 to Chapter 6 result sessions. For each of these papers, I have been primarily responsible for determining the research question, undertaking the analysis and drafting the manuscript. Support in all of these areas has been provided by Professor Cathrine Fowler and Dr. Angela Dawson. I take full responsibility in the accuracy of the findings presented in these publications and this thesis.

Published Manuscripts by The Author Incorporated into The Thesis

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Abstract

Background

Seasonal influenza is a public health concern in Hong Kong. The virus is easily transmitted from person-to-person through droplet and direct contact. Yearly influenza epidemics can seriously affect all age groups particularly those with immature or compromised immune systems such as young children and old people with chronic illness. A Hong Kong preparedness plan and response activities for community prevention of influenza epidemics have been developed. However, compliance rates remain low. Many health behaviours are learned during childhood through parental modeling, guidance, supervision, reminders and repeated practice. Therefore, improving the health literacy of parents through supportive activities is critical.

Methods

Mixed methods research employing a multiple-case study approach was used to gain a multifaceted understanding of parents' health literacy, culture influences and parental-child teaching regarding seasonal influenza prevention and related health promotion strategies. Twenty Hong Kong Chinese parents with a healthy three-to-five year old child from three kindergartens were recruited. A qualitative thematic analysis was employed and quantitative survey data were examined descriptively. These data were integrated and comprehensive comparisons were made across cases to identify commonalities and differences.

Results

Hong Kong Chinese parents demonstrated different levels of functional, interactive and critical health literacy to prevent seasonal influenza. Parents used various social connections including family and community members, social media, the internet and television to access and exchange health information. Cultural values and norms influenced parents' functional health literacy in seasonal influenza prevention. In this study, parents applied five major cultural health prevention practices to prevent and manage influenza. These are: sharing beds with family members or a domestic helper when the child is ill; boiling white vinegar to kill air-born germs to ensure a healthy

environment; diet therapy to enhance health; self-prescribed Chinese medication to manage child's cold symptoms; and the co-use of Western and traditional Chinese medication to avoid influenza infection. This study also identified five approaches Hong Kong Chinese parents used to teach their children healthy practices including ways to prevent influenza. These approaches included: processes parents used to teach personal hygiene; parent-child interactions during teaching; approaches to managing children's health behaviours; enhancing children's healthy practices; and parents' perspective of the role of the nurse in health promotion. The findings indicate that there is scope to better support parents to apply interactive approaches to help their children establish healthy behaviours.

Conclusion

This study has provided a comprehensive understanding of parental health literacy and the teaching approaches used by selected Hong Kong parents to protect their children against seasonal influenza that may be transferrable to other Hong Kong settings. The findings highlight the need for community nurses to play a central role in increasing parents' health literacy. Pluralistic health systems need to review seasonal influenza preparedness plans to better engage families to support and comply with health advice before the onset of an epidemic. Positive parent-child interaction and teaching should be integrated into health promotion programmes to enhance children's understanding and compliance with healthy practices.

Chapter 1 Background

1.1 Hong Kong parents with preschoolers: health promotion for seasonal influenza

1.1.1 Chapter introduction

This research presents a critical approach to the examination of the health literacy abilities of Chinese Hong Kong parents with preschool children (3-and-5 years old) in the prevention of seasonal influenza and related health promotion strategies at the household level by applying principles drawn from the field of health promotion. This chapter presents the background to this research study including the prevalence and the impact of seasonal influenza on the Hong Kong community, existing preventive measures implemented by the Hong Kong government to control the spread of seasonal influenza, the potential influence of parental health literacy and the family's contribution to healthy practices and learning in relation to seasonal influenza.

1.1.2 Seasonal influenza a public health concern in Hong Kong

Influenza is an acute illness of the respiratory tract caused by the influenza viruses. There are three types of influenza viruses, namely A, B and C. Types B and C are human viruses mainly affecting those with immature and compromised immune systems such as young children and the older people (Centre of Health Protection of Hong Kong 2016). The Influenza A virus causes cross-species infections. Human swine flu is one of the examples of the Influenza A virus which may cause serious illness in all populations (Centre of Health Protection of Hong Kong 2016; World Health Organization 2003). Influenza usually has a duration of about a week and is characterised by the sudden onset of a high fever, aching muscles, headaches, severe malaise, a cough and sore throat (Centre of Health Protection of Hong Kong 2016; World Health Organization 2009b). The virus is transmitted easily from person-to-person through droplet and direct contact (Centre of Health Protection of Hong Kong 2016; World Health Organization 2009b). Most infected people recover within one-to-two weeks without treatment. Yearly influenza epidemics can seriously affect all age groups particularly those with weakened immune systems such as very young child and the elderly with chronic illness such as Diabetic Mellitus. They are at higher risk of severe complications such as pneumonia and death (World Health Organization 2009b).

In Hong Kong, influenza is significantly associated with increased hospitalization rate of child under five years of age (Chan et al. 2013).

In the last century, three pandemics of human influenza have affected the world population in 1918, 1957 and 1968 respectively. The most infamous pandemic was "Spanish Flu" which is thought to have killed at least 40 million people within 1918-1919 (World Health Organization 2003). Two other Influenza A pandemics occurred in 1957, notably the Asian influenza and in 1968, Hong Kong influenza. Both caused significant morbidity and mortality globally (World Health Organization 2003). More recently, an Influenza A (H1N1) virus occurred and caused illness in humans, subsequently in a pandemic in mid 2009 (World Health Organization 2010). After outbreaks in North America in April 2009, the new influenza virus spread quickly around the world. In total, 74 countries and territories were affected. Unlike typical seasonal flu patterns, this new influenza virus led to patterns of illness and death not normally known as resulting from influenza infections. Most of the deaths caused by this influenza pandemic occurred among the younger population, including those who were otherwise healthy (World Health Organization 2010).

In late February 2003, the outbreak of Severe Acute Respiratory Syndrome (SARS) in Hong Kong began when an infected Chinese physician from the Guangdong Province in China travelled to Hong Kong to visit relatives. He stayed in a hotel and a week later was admitted to hospital; subsequently died. He infected his family members, 12 other hotel guests as well as healthcare workers and patients who were in the same ward where he was admitted (Wong & Hui 2003). A 33 years old man with chronic renal disease was identified as the trigger for the major community outbreak in Hong Kong. He was admitted to the same index ward where the Chinese physician was admitted during the same time period before spreading the infection from hospital to the Hong Kong community. There were 1755 reported cases including 386 health care workers and medical students and 298 deaths including eight healthcare professionals in Hong Kong (Hong Kong Department of Health, 2003). It then, spread rapidly from Southern China to the rest of the world, largely aided by air travel by the infected hotel guests when they subsequently brought the infection back to their home countries. By March 2003, SARS had spread to several other countries, notably Hong Kong, Taiwan,

Singapore, and Canada (Holroyd & McNaught 2008; Thompson et al. 2004). According to the data obtained by WHO in 2003, there were 8,096 probable SARS cases in 29 countries and areas, with 774 fatalities. Although the outbreak affected individuals in many countries, the greatest impact was felt in the Asia-Pacific region, which had more than 95 % of the cases (World Health Organization 2004).

SARS is a new, serious respiratory infectious disease that is highly contagious with significant morbidity and mortality. The cause of SARS is believed to be a Novel Coronavirus that has not been previously identified in human being or animals (Drosten et al. 2003; Lim 2011). It is a form of atypical pneumonia characterized by a high fever, dry cough, breathing difficulties and rapid deterioration. New sub-type variants appear from time to time and at irregular intervals. Thus, it creates a high potential situation for the transmission to close contacts. (Centre of Health Protection, 2012).

The transmission routes of SARS and influenza are similar. Both are transmitted by droplet and direct contact. Their symptoms at the initial stage of the illness are also alike such as fever, dry cough and shortness of breath. After the battle to manage the outbreak of SARS in 2003, it is noted that Hong Kong people are more aware of their personal and public hygiene (Tam 2005). These health practice changes are paramount to prevent unexpected respiratory infection outbreaks including SARS and influenza infection in both family and community level.

In Hong Kong, influenza is usually common in the periods from January to March and July to August (Centre of Health Protection of Hong Kong 2014b). Antiviral drugs are used due to their effectiveness in treating influenza. Vaccination is promoted as one of the most effective ways to prevent the disease or severe outcomes from the illness (World Health Organization 2009b). However, even when people have been vaccinated, they may still become infected because of the constantly changing influenza viruses (World Health Organization 2003). Access to immunization may be affected by, the related expense (Pickering et al. 2009) and concerns with vaccine safety issues such as drug side effects and complications (Lau et al. 2013; Pickering et al. 2009). Non-pharmaceutical interventions, specifically, maintaining high levels of personal hygiene and proper hand washing are recommended as the most effective measures to prevent

the spread of influenza (Centre of Health Protection of Hong Kong 2014a; World Health Organization 2009a, 2009b).

1.1.3 Environmental conditions contributing to the spread of seasonal influenza

The health of an individual is closely related to their physical and social environments (Hancock 1985, 1993). Hong Kong is a small geographical area that is densely populated with seven million people (Hong Kong Census and Statistics Department 2012). Compared to other cities or countries, housing size in Hong Kong is small, with a restricted internal floor area per person (Mesthrige Jayantha & Lau 2008). It is usual for a family of four members to share 40 square metres, especially those living in a public estate. In the United States, the median size of the living space per person is around 67.5 square metres per person (Department of Housing and Urban Development 2007). On the other hand, Chinese values emphasize the development of interdependence and family closeness (Chen 2001), these beliefs also influence parents' childrearing practices like sharing beds. In Hong Kong and many Asian countries, child-parent bed sharing is commonly observed in families (Liu, Liu & Wang 2003; Yang & Hahn 2002). Under such circumstances, if a family member is infected with seasonal influenza, it is easily spread to other family members within overcrowded living areas (Steege et al. 2009).

Crucially, overcrowding in Hong Kong can have negative outcomes on individual health. Inadequate ventilation and dampness accumulation are factors that can compound the risk. These factors are associated with adverse respiratory effects in all age groups and can accelerate the spread of respiratory tract disease triggers in the homes, and the wider community (Hernberg et al. 2014; Tiesler et al. 2015). To minimize the risk and impact of a crisis occurring, the development of preventative interventions and habits as normal everyday practices are required; such as maintaining high levels of personal hygiene of individual and families is essential. Communities need to be decisive in their use of anticipatory interventions such as using strategies to maintain healthy immune responses and personal hygiene.

1.1.4 Public health and health promotion measures to address seasonal influenza

The Hong Kong Government has developed preparedness and response activities for the prevention of community influenza epidemics. These activities are focused on: planning

and coordination; surveillance; investigation and control measures; laboratory support; infection control measures; provision of medical services; antiviral stockpile; vaccination; port health measures; and communication between health organizations and government (Centre of Health Protection of Hong Kong 2014b). The Centre for Health Promotion has launched regular health education talks, public announcements through mass media and posters strategically placed in public areas such as public libraries and markets regarding personal hygiene to raise public awareness of influenza prevention (Centre for Health Promotion of Hong Kong 2010).

In December 2012, the Public Opinion Programme (POP) at the University of Hong Kong conducted a telephone survey. This survey was undertaken to investigate the personal hygiene awareness of people in Hong Kong ten years after the SARS survey. This survey targeted Cantonese speaking Hong Kong citizens aged 25 or above (Public Opinion Programme The University of Hong Kong 2013). Five hundred and thirteen respondents were successfully interviewed and the response rate was 68.1%. Among those respondents, 65% of them claimed they decreased awareness of personal hygiene practices. While 44% reported they practiced proper hand washing. The findings indicate that more than half the people interviewed did not practice proper hand washing. Regarding wearing mask, only 53% said they wore a mask when they developed flu symptoms. Compared with the practices identified above during the SARS epidemic, the percentage decreased 18% and more than 25% respectively. Among those participants, 26% have child/children aged below 15.

The researchers concluded that existing health education and promotion conducted through health education talks, poster presentations or announcements through multi-media had resulted in a minimal effect. A number of factors may have affected the results including a lack of understanding of messages due to low literacy and cultural issues, particularly the health literacy of parents who are largely responsible for the care of children. These results highlight the need to explore: how health literacy influences Hong Kong parents with preschool child in seasonal influenza prevention and related health promotion strategies; and how health professionals and families can support their children in establishing and sustaining personal hygiene practices?

1.1.5 Influence of parental health literacy on the health behaviour of children

Health promotion is the process of enabling people to increase control over, and to improve their health (World Health Organization 1986). It moves beyond a focus on individual behaviour towards a wide range of social and environmental interventions. It aims at enhancing the individual and the communities to engage in healthy behaviours in order to reduce the chance of developing chronic diseases (World Health Organization 1986). Health literacy is an important component of health promotion which informs the use of communication strategies to bring about behavioural changes to promote people health (Nutbeam, Harris & Wise 2010). There is no consensus on the definition of health literacy (Sørensen et al. 2012). Health literacy is an emerging concept that promotes broader thinking on the content and methods applied in health education. According to the World Health Organization (WHO), health literacy is the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health (World Health Organization 2015). The definition signals that health literacy comprises a set of skills which enables individuals to exert a higher degree of control over the personal and social determinants of health (Nutbeam, Harris & Wise 2010).

Health literacy is a key outcome of health education activities (Nutbeam 2000). It can be categorized into different levels of functional, interactive and critical health literacy (Nutbeam 2000; World Health Organization 2015). In terms of individual benefits, functional health literacy is supported through reading and writing skills (Nutbeam, Harris & Wise 2010) that lead to an improved knowledge of risks and health services, and compliance with prescribed actions in everyday situations. Interactive health literacy aims to improve the capacity of an individual to act independently, improve motivation and increase self-confidence to apply new information to solve problems in different circumstances. Critical health literacy improves individual resilience to social and economic adversity. It involves the application of advanced cognitive skills to critically analyze information to exert greater control over life events (Nutbeam, Harris & Wise 2010; World Health Organization 2015) . In terms of community and social merits, functional health literacy increases the participation in population health programmes; interactive health literacy enhances the capacity to influence social norms

and interact with social groups; and critical health literacy improves community empowerment and enhances the capacity to act on social and economic determinants of health.

Parental health literacy directly affects a child's health practices. Research demonstrated that there is an association between low health literacy and poor health outcomes (Berkman et al. 2011; Brigham et al. 2015; Parker 2000). Low levels of health literacy in individuals and communities have been found to have higher rates of health care service utilization, limited information seeking behaviour (von Wagner et al. 2009) and lower influenza vaccination receiving rates (Berkman et al. 2011) than those with high levels of health literacy. The health literacy of parents has an effect on family life style and behaviour (Beets, Cardinal & Alderman 2010; Gussy et al. 2008; Schor & Menaghan 1995) that directly impacts the health outcomes of children in their care (DeWalt & Hink 2009). However, a scarcity of study has been conducted in this important area, it would be of value to examine how health literacy influences parents in seasonal influenza prevention. Crucially the findings of this research will assist in understanding different levels of health literacy of Hong Kong parents' seasonal influenza health practices.

1.1.6 Cultural values and traditions: influence on Hong Kong Chinese parent's seasonal influenza prevention and related health promotion strategies

Cultural values and traditions significantly affect local Hong Kong Chinese people's responses and practices to upper respiratory tract disease such as using herbal preparations including Yu Ping Feng San, Folium Isatidis and Radix Scutellariae to prevent the common cold and influenza-like infections (Lau et al. 2005). Differences in the health practices of families in Western and Asian societies have been noted in the literature (Yamashiro & Matsuoka 1997). For instance, diet therapy is used in many Chinese families to achieve health by maintaining a balance between heat and cold inside the body (Chen 2001) while the use of food such as honey or lemon drinks are often applied to relief symptoms of colds in Western families (Paul et al. 2007).

Hong Kong is a former British colony that is highly westernized but the population is largely Chinese. In Hong Kong, Traditional Chinese Medicine and Western medicine continue to be integrated into long established health practices (Lam 2001). Hong Kong

parents accept the co-use of Western medicine and Traditional Chinese medicine remedies (Lam 2001; Lau et al. 2005). Traditional Chinese medicine includes herbal treatments, diet therapy, use of animal secretions and organs, and folk methods which involve massage to stimulate blood circulation; skin scrapings to reinforce body points and meridians to treat seizures (Ludman & Newman 1984). The principles underpinning Traditional Chinese medicine and Western medicine are very different (Lam 2001). Chinese medicine is informed by the philosophical, ethical and religious tradition of Taoism that emphasizes harmony between human beings and nature providing peace of mind (Chen 2001). To achieve health, an individual must adjust him or herself to fit the nature of rhythms of the universe. The harmony of the forces of Yin and Yang have long dominated concepts of health and illness among Chinese people (Chen 2001). Imbalance of the forces of Yin and Yang within and between the body and its environment is believed to cause illness. In contrast to Chinese medicine, Western medicine focuses on the use of biomedical sciences, genetics and medical technology to diagnose, treat, and prevent injury and disease.

Apart from government recommendations, culturally specific health interventions applied by the local community are also reportedly used to treat upper respiratory tract infections (Lau et al. 2005). A review of the literature on seasonal influenza prevention and related health promotion strategies, found that most research studies focus on the: factors affecting vaccination uptake (Hofstetter, Barrett & Stockwell 2015; Lau et al. 2013; Liao et al. 2011; Lohiniva et al. 2014); methods to increase influenza vaccination uptake rate (Stockwell et al. 2015); and the use of face masks and effective hand hygiene to prevent household influenza infection (Cowling et al. 2009). However, there is little research exploring the health practices and promotion strategies of Hong Kong Chinese parents with preschool children in seasonal influenza prevention at the home level. Research can provide valuable insights into the role of culture in Chinese mothers' health practices to prevent influenza. The results of such research will be of use to enable culturally specific family health education to be developed and delivered to the local community.

1.1.7 The preschool child and the importance of learning healthy practices

The preschool years are the most suitable time for parents to increase their educational input and provide appropriate support for their children to develop lifelong health promotion behaviours (Harvard Family Research Project 2006). This is recognized in Global Sustainable Development Goals (SDG) that 193 members state, that include Hong Kong, have agreed to SGD three emphasizes the importance of health promotion to ensure the health and well-beings of all, including children. Special attention to be drawn to early childhood development (ages 0-5 years), the period that is crucial for health development that is linked to the outcomes later in life (United Nations 2015). SDG three also emphasizes the need to reduce the incidence of major infectious diseases that are affected by inadequate hand-washing facilities and practices.

The preschool period is one of transition as a child starts to get ready to go to school. They are developing skills that enable thinking, attending and remembering (Bodrovea & Leong 2007). The preschool years comprise the period from three-to-six years of age (The Education Bureau of Hong Kong 2015). During this period of a child's life they are becoming independent and competent. They move from the 'what's that' stage to wanting to know 'why'. The preschooler is characterized by intuitive thinking and a move towards logical thought processes through advanced learning, language and understanding of causality (Piaget 2013). Apart from educational institutions, family is one of the immediate primary sources and providers of children's health education and information (Cook & Cook 2009; Morrison 2008). Children learn concepts of health and health skills as a result of parental modelling and repeated opportunities for practicing these health behaviours at home (Cook & Cook 2009; Morrison 2008). These regular opportunities to practice skills have demonstrated lasting effects on subsequent adult activity-related behavioural patterns (Thompson, Humbert & Mirwald 2003).

The effectiveness of parental teaching depends on the extent to which this teaching has advanced a child's understanding of the health practice (Haire-Joshu et al. 2008; Morrongiello, McArthur & Bell 2014). A child's level of understanding will impact upon their ability to comply with health practices. If parents can enhance children's understanding of health practices such as correct hand washing compliance, the risk of preschool children contracting infectious disease such as seasonal influenza will be

lowered. Using a consistent teaching process will assist the parent to support the child's knowledge and skills development. This teaching process involves: alerting the child to a teaching moment, providing visual cues and verbal instruction, giving encouragement and providing feedback (Oxford & Findlay 2013). Importantly, effective parental teaching strategies support children's learning and the enhancement of the parent-child interaction through bi-directional communication (Skouteris et al. 2011).

Parent-child interaction can be used as an approach in family health promotion. A recent research study demonstrated that child preventive health intervention using sensitive and supportive parent-child interaction as a delivery approach was effective in enhancing a child's socio-emotional development and health (Weisleder et al. 2016). Health promotion that adopts a parent-child interaction approach should not be underestimated as a crucial family education tactic for protecting and improving both family and young child's health.

A review of the literature related to parental teaching identified that the majority of research studies are focused on the association of parenting styles either related to healthy lifestyles such as healthy eating (Arredondo et al. 2006; Vereecken et al. 2009) or health practices such as internet use (Livingstone & Helsper 2008). There is minimal research investigating the teaching approaches of parents, particularly Hong Kong Chinese parents regarding how they teach their preschoolers to prevent seasonal influenza. It is therefore of value to investigate how parents and their preschoolers interact to develop health practices and build prevention knowledge, in particular those practices used to prevent seasonal influenza within the home.

1.1.8 Community nursing services gap in child and family health promotion

The Community Nursing Service (CNS) in Hong Kong commenced providing services in1967 from the Yang's Memorial Social Service Centre (Hospital Authority 2012a). It was not until 1977 that the CNS gained government approval to become an integral part of the health care system. The service was extended to most parts of Hong Kong. By 2013, there were approximately 446 community nurses in Hong Kong serving over 90% of the population (Hospital Authority 2014).

Community nurses are health care practitioners linking hospital services to patients' home. The nurses have numerous and varied roles including being health educators, caregivers, counsellors for patients, as well as coordinators of outreach programmes (Hospital Authority 2012a). The community nursing service provides: home medical interventions such as physical assessment, minor procedures such as insertion of nasal gastric tube, but also client and family education, health promotion and rehabilitation. Similar to other developed countries, aging is a serious and increasing problem in Hong Kong society. Health services for elderly people constitute a priority focus of local CNS (Hospital Authority 2014). Most of the elderly patients have a chronic illness and are vulnerable to contracting other illnesses. Under such circumstances, the majority of health interventions provided by the community nurse focus on disease prevention (Hospital Authority 2012a), rather than health promotion. Even though health promotion to people, families and the community is one of the key roles of local CNS (Hospital Authority 2012a), the scope of service in this area of health promotion is limited.

A multi-faceted approach involving the health sector, community partners and families in health promotion is a fundamental goal of health promotion (Cyril, Smith & Renzaho 2015). It is evidenced that parent engagement in health promotion activities ensures the sharing of the responsibility for enhancing and improving children's health (Epstein 2001). Partnerships between community nurses and community stakeholders such as school teachers provide opportunities to strengthen parents' abilities to create healthy households; by appropriately using health services, to assist parents set achievable goals (Landy et al. 2012) and provide emotional support and information. This partnership is of particular importance to child rearing so that parents and their children are enabled to live healthier and productive lives (Carr-Hill & Currie 2013). It is worth exploring with parents how the community nurse's role can be enhanced to support parents and their young children to develop health promotion and illness prevention knowledge and skills in the prevention of seasonal influenza.

1.2 Aim and scope of the research

1.2.1 Research aim and objectives

The aim of this research was to examine the health literacy of Hong Kong families with a healthy preschool child to provide insights for the prevention of seasonal influenza and related health promotion strategies at the household level. The objectives of this research were to:

- Identify the knowledge, skills, beliefs and attitudes of parents with preschool children in relation to seasonal influenza.
- Identify the living environment that impacts on parent's health behaviour in relation to seasonal influenza.
- Identify the role of culture that impacts on parent's health behaviour in relation to seasonal influenza.
- Investigate parental teaching strategies to prevent seasonal influenza and related health promotion practices.
- Explore the potential of a nurse-led health promotion intervention to prevent seasonal influenza at household level.

1.2.2 Research questions

Five research questions were posed to guide this study:

- How does health literacy influence Hong Kong parents of preschool children's seasonal influenza prevention practices?
- How does the living environment affect parent's health practice in seasonal influenza?
- What is the role of culture in seasonal influenza prevention practices of Hong Kong Chinese parents with preschool children?
- What are the parental teaching practices regarding seasonal influenza prevention?
- What is the role of nurses in seasonal influenza prevention and related health promotion of Hong Kong Chinese parents with preschool children?

1.2.3 Significance of the research

Yearly influenza epidemics can seriously affect all populations particularly those with immature immune systems such as young children. Parental health literacy has a direct link to a child's health behaviours. Although many research studies have examined health literacy in the context of different health issues, minimal research has been undertaken that explores the health literacy of parents with preschool child in relation to seasonal influenza prevention. As a result of the serious impact of seasonal influenza on

public health, the findings of this study are important in identifying significant gaps in the delivery of health promotion interventions to prevent seasonal influenza. It is important to investigate the level of parental health literacy for the purpose of health promotion intervention development and delivery and the factors affecting parental health literacy in family health promotion activities. Insights gained from the findings will direct policy makers to the importance of focusing on improving existing family health promotion strategies to avert child and family illness and plan effective influenza preparedness to address future influenza epidemics.

Apart from assessing the factors contributing to effective family health intervention implementation using a macro perspective, it is also important for the health planner to examine parental teaching approach to support their child to establish seasonal influenza prevention strategies within the home setting. I, as a community nurse educator, have commonly observed that parents adopt different kinds of teaching strategies to enhance the compliance of their child's health practices. Most of the parental teaching I have seen are delivered without explanations or reasons given to child. I have also noted some parents perform inappropriate health behaviours in front of their child such as touching their eyes and nose without hand washing before, biting nails and coughing without covering their mouth and nose. I believe that it is important for health educator to teach parents appropriate teaching approaches with the support of positive parent-child interactions in establishing child health behaviour habit.

1.2.4 Thesis structure

Most of the findings from this research have resulted in journal publications that are presented within the relevant chapters. The permission letters for use of the articles in the thesis are provided in Appendix 1. The overall structure of the thesis is as follows:

Chapter 1 Background: covers background knowledge to the study that is assumed in subsequent chapters. This chapter describes: the prevalence of seasonal influenza in Hong Kong; environmental conditions contributing to the spread of respiratory tract infection; public health and health promotion measures to address seasonal influenza; influences of parental health literacy on a child's health behaviours; family contribution to designing and implementing child health promotion interventions; and finally, the characteristics of preschool children's health practices and learning.

Chapter 2 Literature Review: reviews the current international literature in relation to the context of health promotion interventions to prevent early childhood seasonal influenza at the household level. The included evidences were drawn from both experimental and observational studies as appropriate. The results from this chapter have been published in *Journal of Clinical Nursing* (Lam, Dawson & Fowler 2014)

As an indication from the findings of the first review paper, another review of literature was completed that examined the approach to better engage a parent and child in a home based health promotion intervention. The summary of this review paper is attached in the chapter summary of chapter 2. This review paper has been published in the *Journal of Child Health Care* (Lam, Dawson & Fowler 2016).

Chapter 3 Methodology: describes Yin's multiple-case study methodology including study design, sample selection, data collection and data analysis used to guide this research study. The ethics process and the steps taken to protect the participants' identity are described.

Chapters 4, 5 and 6 provide the findings of this research study. Each of these Chapters consists of a published or a submitted paper.

Chapter 4: presents the first findings within the research and outlines the health literacy of Hong Kong Chinese parents with preschool children in seasonal influenza prevention. The results from this chapter have been published in *PLoS ONE* (Lam, Dawson & Fowler 2015). These findings provide answers to the following research questions:

- Research question 1: "how does health literacy influence Hong Kong parents of preschool children's seasonal influenza prevention practices?"; research question
- Research question 2: "how does the living environment affect parent's health practices in seasonal influenza?"
- Research question 5: "what is the role of nurses in the seasonal influenza prevention and related health promotion of Hong Kong Chinese parents with preschool children?".

In order to answer these questions, the research aimed to identify the knowledge, skills, beliefs and attitudes of parents with preschool children in relation to seasonal influenza; identity the living environment that impact on parent's health behaviour in relation to seasonal influenza; and explore the potential of a nurse-led health promotion intervention to prevent seasonal influenza at household level.

Chapter 5: reports findings related to the role of culture in seasonal influenza prevention practices of Hong Kong Chinese parents with preschool children. A manuscript reporting the results from this chapter is currently under review by the peer reviewed journal: *Journal of Community Health Nursing*. The study findings described in this chapter provide answers to research questions 3: "what is the role of culture in relation to the seasonal influenza prevention practices of Hong Kong Chinese parents with preschool children?" An outcome of answering question 3 is its contribution to our understanding of research objective 3: "identify the role of culture that impacts on parent's health behaviour in relation to seasonal influenza".

Chapter 6: outlines the findings concerned with the teaching approaches that Chinese Hong Kong mothers adopted to teach their preschool children to prevent seasonal influenza. The findings for this chapter were drawn from interviews and observations of parent-child teaching interactions. This chapter includes a manuscript that has been published in *BMC Nursing.* The findings described in this chapter provide answers to research questions 4: "what are the parental teaching practices regarding seasonal influenza prevention?"; and in doing so addresses research objective 4: "investigate parental teaching strategies to prevent seasonal influenza and related health promotion practices".

Chapter 7 Discussion: highlights the implications of these research findings in the context of previous research as well as the important issues relevant to the research aims and objectives.

Chapter 8 Recommendations, strengths, limitations and conclusions: identifies the strengths and limitations of this study and makes recommendations that are developed from the results of this project for future research. A conclusion of the significant

findings, recommendations for policy development and future research agendas was provided at the end of this chapter.

1.3 Chapter summary

Seasonal influenza virus is easily transmitted from person-to-person through droplet and direct contact. Yearly influenza epidemics can seriously affect all age groups particularly those with immature or compromised immune systems, in particular, young children and the elderly who have a chronic illness. Maintenance of personal hygiene is recommended as one of the most effective preventive measures in seasonal influenza prevention. Children learn the health practices through modeling their parents and repeated practice. They need their parents' teaching, supervision and being reminded when learning, developing and embedding these health behaviours as life-long practices. Parental health literacy in seasonal influenza prevention directly influences the preschool child's health practices.

Although, the Hong Kong Government has set up the preparedness plan and response activities for the prevention of community influenza epidemics, the compliance rate of Hong Kong adults in personal hygiene practices remains low. After a review of the literature, it was found that many research studies have examined health literacy in the context of different health issues, minimal research has been undertaken that explores the health literacy of parents with preschool child in relation to seasonal influenza prevention. It is worth examining the level of parental health literacy for the purpose of health promotion intervention development.

The lack of research in the field of the health literacy of parents with preschool children with respect to the prevention of seasonal influenza underlies the choice of a multiple-case study design that is particularly useful for studying phenomena where there is a dearth of knowledge. It is anticipated that this research approach will facilitate the understanding of previously unknown areas regarding parental health literacy in seasonal influenza prevention. Insight from such understanding will inform policy makers to support the improvement of existing child and family health promotion services.

Chapter 2 Literature review

2.1 Introduction

The delivery mode of a health promotion programme, engagement of participants, involvement of relevant individuals or groups in programme development and the context of health teaching materials are known as crucial elements to underlie the success of health promotion intervention delivery (Nutbeam & Bauman 2006). It is important to attend to these factors carefully to ensure they are addressed appropriately and effectively in the process of programme planning and implementation (Green & Kreuter 2005).

In order to gain a comprehensive understanding of health promotion programmes related mechanisms to preventing early childhood seasonal influenza at a household level, a review of literature was conducted to contribute to this understanding and to identify where further research is needed. This knowledge will assist in ensuring the effective implementation of family health promotion strategies for the prevention of influenza transmission. Identifying and using the most effective health promotion approach is crucial for health professionals to support parents in promoting family health and preventing the onset of illness within the family and wider community (Durlak & DuPre 2008). The following paper reviews published primary research concerned with health interventions to decrease influenza at the household level. A realist inquiry methodology was applied to identify the contextual factors affecting the effective delivery of health interventions and the appropriate approach for promoting child and family health with a focus on targeting seasonal influenza at the household level.

2.2 Publication of result - Health promotion interventions to prevent early childhood human influenza at the household level: a realist review to identify implications for programmes in Hong Kong.

The results contained within this chapter have been published as follows:

> Lam, W., Dawson, A. & Fowler, C. (2014). Health promotion interventions to prevent early childhood human influenza at the household level: a realist review to identify implications for programmes in Hong Kong. *Journal of Clinical Nursing, 24(7-8), 891-905*

The following text is copied from the published manuscript (see Appendix 2).

2.2.1 Introduction

An individual's health is affected by multiple inter-related physical and psychological factors, as well as their relationship to environmental attributions (Chan 2011; Lee 2011; Lohrmann 2010). Yearly influenza epidemics can seriously affect all age groups, including those with developing and weakened immune systems such as: young children, elderly people and those with chronic illness (World Health Organization 2009b). Human influenza is caused by the influenza viruses A, B or C. Influenza A viruses can further be sub-typed and Influenza A (H1N1) is one of the examples. In Hong Kong, these viruses are common from January to March and from July to August (Centre of Health Protection of Hong Kong 2012a). As a result of these seasonal fluctuations, Hong Kong residents are at risk of contracting influenza twice a year for three-month periods (Centre of Health Protection, 2012). The virus is transmitted easily from person to person through droplet and direct contact (Centre of Health Protection of Hong Kong 2012a; World Health Organization 2009b), particularly in overcrowded environments.

Hong Kong is a small geographical area densely populated with seven million people (Hong Kong Census and Statistics Department 2012). Living space in Hong Kong is limited, with restricted internal floor area per person, especially for those living in public estates (Mesthrige Jayantha & Lau 2008). It is usual for a family of four to share around 40 square metres, which translates to 12.5 square metres per person. This living

area is considerably smaller than the median living space in the United States, where it has been calculated at around 67.5 square metres per person (Department of Housing and Urban Development 2007). Under such circumstances, the risk of being infected by the influenza virus is comparably higher. High rates of infection in confined spaces are supported by studies by Baker *at el.* (2000) and Fullilove and Fullilove (2000) who found that communities with overcrowding and higher levels of population density experience greater rates of respiratory disease, chronic illness and other health issues. A realist review methodology has been selected to identify contextual factors that facilitate the successful delivery of interventions at the household level This will provide important insights to enable policy makers in Hong Kong and other high-risk countries to not only prevent routine influenza transmission and other common infectious diseases, but to reduce the likelihood and severity of possible epidemics.

2.2.2 Background

In the last century, three pandemics of human influenza have affected the world population in 1918, 1957 and 1968 respectively. The deadliest pandemic was the "Spanish Flu", which is thought to have killed at least 40 million people between 1918 and 1919 period (WHO 2003). Two other influenza A pandemics have occurred: the Asian influenza pandemic in 1957 and the Hong Kong influenza pandemic in 1968. Both not only had devastating consequences for the economy but also resulted in significant global morbidity and mortality (World Health Organization 2003).

More recently, an Influenza A (H1N1) virus emerged to cause illness in humans, resulting in a pandemic in mid 2009 (WHO 2010). After early outbreaks in North America in April 2009, the new influenza virus spread rapidly around the world. A total of 74 countries and territories were affected. Unlike typical seasonal flu patterns, this new influenza virus led to patterns of death and illness not normally identified as resulting from influenza infections. Most of the deaths caused by this influenza pandemic occurred among younger people, including those who were otherwise healthy. Pregnant women, younger children and people of any age with chronic medical conditions appeared to be at higher risk of illness-related complications (World Health Organization 2010). In recent years, antiviral drugs used to treat influenza have been an effective treatment. Vaccination is suggested as one of the most effective ways to

prevent the disease or severe outcomes from the illness (World Health Organization 2009b). However, drug therapeutic intervention may cause complications such as fever or drug allergy. In addition, new sub-type variants of influenza appear from time to time and at irregular intervals (Centre of Health Protection of Hong Kong 2012a). People are not always immune to new variants of the virus. Even people who are vaccinated may still become infected because of the constant changing of influenza viruses (World Health Organization 2003). These variants may then cause epidemics (World Health Organization 2009b).

Crucially, many diseases can be prevented or their impact on health minimized through health promotion and preventative measures (Centre of Health Protection of Hong Kong 2012a; National Scientific Council on the Developing Child 2010; World Health Organization 2003). Maintaining high levels of personal hygiene, avoiding close contact with infected persons and proper hand washing are recommended as the most effective means of preventing transmission and arresting the spread of influenza (Centre of Health Protection of Hong Kong 2012a; World Health Organization 2009a, 2009b). The family is one of the immediate primary sources and providers of children's health education and information (Hopper et al. 1992). Nurses are well placed to support parents, as the nurse's role is not only to take care of the sick but also to promote overall health and prevent the onset of illness within the community (Royal College of Nursing 2007). However, it is not clear what programme-related mechanisms are important at the household level to ensure the efficient and effective implementation of health promotion interventions promoting health behaviours that prevent influenza transmission. This paper reviews published primary research concerning health interventions to decrease influenza at the household level. To our knowledge, we are the first to apply a realist inquiry approach to the study of factors affecting the delivery of interventions targeting influenza within households. The present review aimed to identify interventions that have been found to prevent and manage influenza among young children in the home and to examine programmatic elements and contextual factors related to their successful delivery. We aimed to develop insights for community nursing and recommendations to guide the development of health promotion interventions.

2.2.3 Review methods

Community interventions are complex and involve multiple components that interact in a non-linear way. Recently, there has been an increasing emphasis on measuring the effectiveness of programmes. However, due to variability in programme implementation and policy contexts, the reasons that determine a programme's success and adoption in the community setting are not always clear (Saunders, Evans & Joshi 2005). A programme's success could be ascribed to any programme-related reasons comprising programme design, implementation, and/or ability to reach the target population (Saunders, Evans & Joshi 2005), the mode of intervention delivery and the way in which healthcare workers are involved. In addition to programme contextual factors, organizational support, socio-economic, cultural and the political environment including stakeholder involvement, their interests and convictions regarding change are also vital to the success of a programme.

Realist inquiry is useful for examining the relationship between the context into which interventions are delivered and their outcomes. Such inquiry aims to determine what is it about this programme that works for who in what circumstances (Pawson 2002; Wong, Greenhalgh, et al. 2013). Realist reviews can help to identify how interventions produce certain outcomes by exploring what processes are used, what outcomes are triggered by the various components of the intervention, how change is brought about, and which contextual factors are critical for success or failure (Pawson 2002; Wong, Greenhalgh, et al. 2013). The method emphasises an understanding of causation and how causal mechanisms are formed and constrained by social context. Realist reviews are particularly suitable for understanding complex social programmes involving human decisions and actions (Wong, Greenhalgh, et al. 2013). A realist approach was therefore chosen for this review as it provides a rationale and tools for synthesizing complex and, at times, difficult to interpret evidence from community-based programmes (Wong, Greenhalgh, et al. 2013).

Figure2.1. Identification of papers for inclusion in the review.

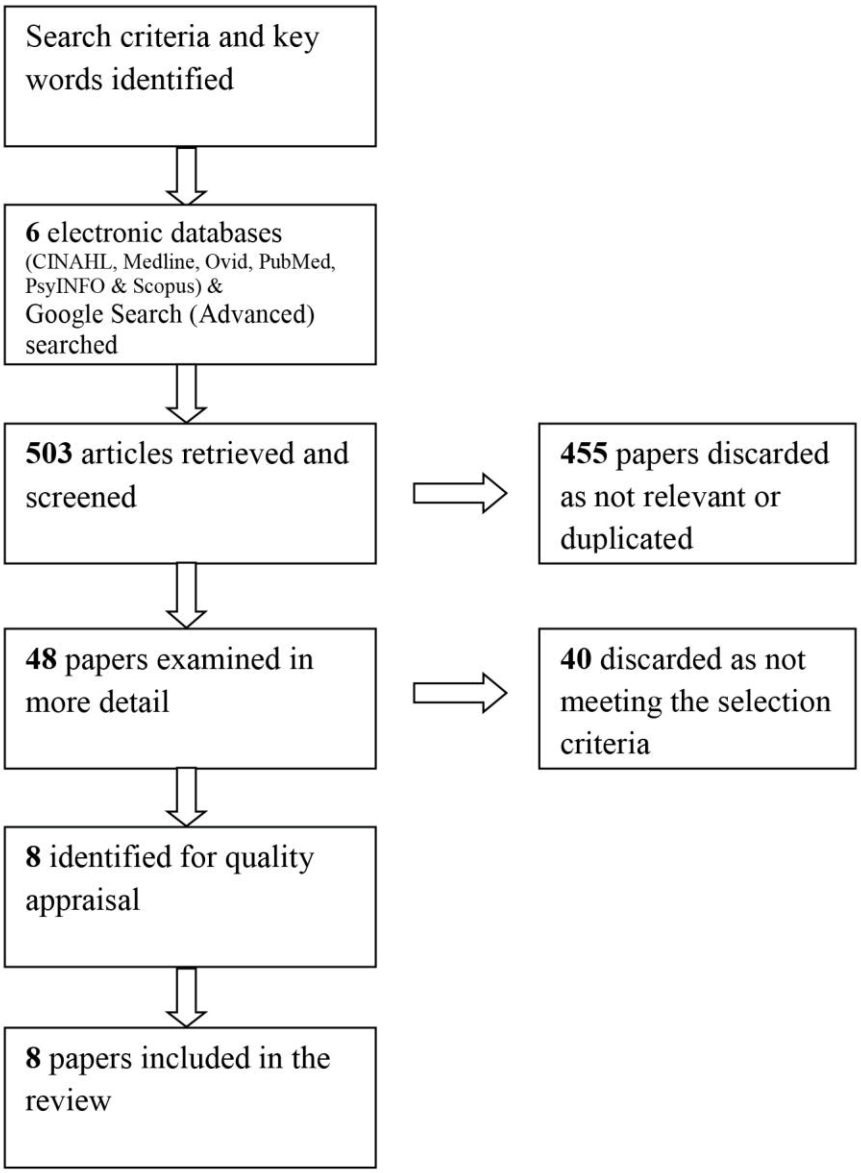


Figure 2.1 provides a flow chart of the process of identifying, including and excluding papers for the review. Six electronic databases and Google scholar, 503 were searched to identify quantitative and qualitative studies. Duplicate articles were identified and excluded. Searches were undertaken using the key words: health promotion, health education, children, influenza, and infectious disease. Inclusion criteria for retrieved articles were developed, based upon a checklist derived from this review's aims, a study population involving parents or families with children at the household level, health interventions to prevent human seasonal influenza, full text available, research articles published in English from 2003 to 2013 and details of the research design and the

outcome of the interventions provided. The articles were assessed and selected by screening records and examining the full-text versions according to predefined inclusion criteria. Fifty articles were selected for further examination, with the final total of eight retrieved quantitative research studies used for analysis. Studies with diverse methodologies were included to extract rich data from a variety of countries and settings in order to provide a comprehensive picture of intervention implementation.

The papers were read, re-read, and discussed. A matrix was constructed using an Excel spreadsheet to collate information for each research study:

- Study country and setting
- Any theories or mechanisms assumed by the research authors to explain the success or failure of the programme
- Nature of the experimental and control interventions, including intensity and timing
- Study design, sample size and outcome data
- Process detail such as delivery mode, use of a training package, healthcare worker training and involvement, equipment and products provided

We systematically assessed the outcome, context and mechanisms through which the interventions produced their outcomes. Relevant data were considered trial by trial in terms of the interaction between context, mechanism and outcome, and then across the different trials to detect patterns and heterogeneity. We discussed preliminary conclusions and synthesized key findings using a narrative and interpretive approach (Greenhalgh, Kristjansson & Robinson 2007).

2.2.4 Results

A total of eight quantitative studies formed the basis of the review. See **Table 2.1** for a summary of the articles.

Table 2.1 Summary of eight studies included in the review

Reference	Aim/objectives/purpose	Context	Sample criteria and size	Method/data gathering	Findings
Luby *et al.* (2005)	To examine the effect of hand washing promotion with soap on the incidence of acute respiratory infection, impetigo, and diarrhea.	Karachi, Pakistan.	At least 2 children younger than 15 years old; at least one of whom was less than 5 years old; Children (n=4691) in 906 households from 36 settlements Control: 306 households from 11neighbourhoods. Intervention: 600 households from 25neighbourhoods.	Cluster randomized controlled trial: 1 year project Control: stationary for children's learning Intervention: education, meeting and use of plain soap Intervention: education, meeting and use of antibacterial soap Data collected by weekly record symptoms of all household members for 1 year and weight children aged under 5 years at baseline and every 4 month.	1) Incident rate of disease differed significantly between control and intervention group. 2) Incident rate of disease did not differ significantly between use of plain and antibacterial soap
Cowling, *et al.* (2009)	To investigate the effect of hand hygiene and use of face masks on prevention of households transmission of influenza.	Hong Kong	People (n=407) from 259 families diagnosed with influenza A or B virus from 45 outpatient clinics; among 259 families, 794 families members aged from less than 5 to more than 50 year old.	Cluster randomized controlled trial: 7 days intervention and 1st home visit scheduled within 2 days; 2nd home visit at 3rd or 6th day after 1st home visit. Control: education on healthy lifestyle and symptom alleviation Intervention: Hand hygiene group: education on proper hand washing with liquid hand soap, hand rub provided. Intervention: Face mask group (pus hand washing): education on surgical face mask use with surgical mask provided. Data collected by self-reported diaries, interview on adherence to intervention, no. of masks and amount of soap/hand rub used and secondary attack rate confirmed by laboratory.	1) No significant difference between control and intervention group. 2) Hand hygiene plus face masks seemed to prevent household transmission of influenza virus when implemented within36 hours of index patient symptom onset 3) Adherence to intervention varied. Intervention group reported higher adherence than control group.
Holloway *et al.* (2009)	To evaluate the community education intervention on treatment of acute respiratory infection (ARI).	Nepal	Children (n=3654) under 5 in 2719 households from 4 hill districts randomly assigned to receive the intervention.	1 year quantitative pre and post intervention study using questionnaire for data collection. The surveys included symptoms of acute respiratory illness, drug use, percentages of cases attending health facilities and receiving antibiotics.	1) Health clinic attendance rose by 13% in child under-fives with severe ARI and fell by 9% in child under-5 with mild ARI. 2) Use of prescribed antibiotics increased 21% in child under-5 with severe ARI but only 1% in under-fives with mild ARI. 3) Irrespective of ARI severity, the use of non-prescribed antibiotics dropped by 5%. 4) consultation with community health volunteers and use of safe home remedies increased by 6.7% and 5.7% respectively
Macintyre *et al.* (2009)	To examine the effect of face mask use on control of respiratory virus transmission in households	Sydney, Australia	Children (n= 401) age 0-15 children with fever and either cough or sore throat; living in the families containing more than 2 adults and both were age above 16 years old.	Cluster randomized controlled trial: 14 days intervention with daily follow up. Control: no masks Intervention: surgical masks for 2 adults, to be worn at all times when in the same room as the infected child. Intervention: P2 masks for 2 adults, to be worn at all times when in the same room as the infected child Data collected by self-reported, observation during follow up and exit interview.	1) No significant differences were noted between control and interventions. 2) Less than 50% of participants wore masks most of the time. 3) Household use of face masks was associated with low adherence and was ineffective for controlling seasonal respiratory disease.

Table 2.1 Summary of eight studies included in the review (cont'd)

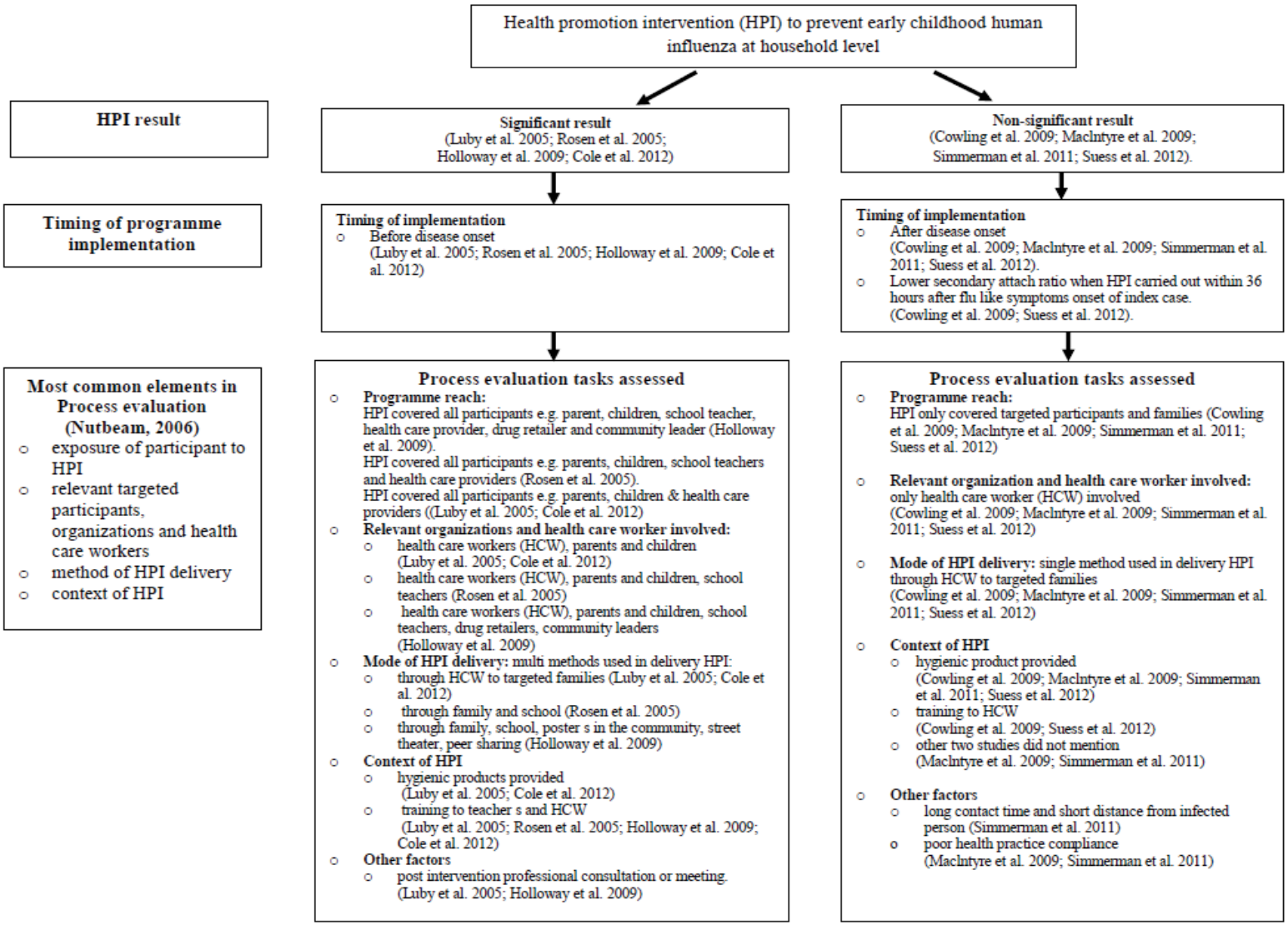
Reference	Aim/objectives/purpose	Context	Sample criteria and size	Method/data gathering	Findings
Rosen *et al.* (2009)	To examine the effects of health education intervention regarding hand washing and communicable pediatric disease such as diarrhea or respiratory infection.	Jerusalem, Israel	Preschool children (n=1029) and 80 teachers from 40 preschool	Cluster randomized controlled trial: 5 months intervention. Control: no health education Intervention: education programme to the teacher Data collected by observation on change of hand washing behaviour from teachers' and their assistance and illness absenteeism.	Intervention group scored higher in every individual item of the survey.
Simmerman, *et al.* (2011)	To examine the effect of hand washing and wearing mask in household on reduction of influenza transmission from sick child to parents	Bangkok, Thailand	Children (n=442) with influenza and fever in 1147 households. Among those children, 221 (50%) were aged under 6.	Cluster randomized controlled trial: 4 weeks intervention and 1st home visit within 24 hours, then subsequent home visit on 3rd, 7th and 21th day. Control: receiving education on hand washing Intervention: receiving education on hand washing as well as wearing paper face mask Data collected by self daily record of symptoms and secondary attack rate confirmed by nasal and throat swabs as well as serum test.	1) Influenza transmission was not reduced by interventions 2) Influenza secondary attack rate was 21.5%.56 out of 345 secondary cases were asymptomatic. 3) 397 (89.8%) households reported that the index patient slept in the parents' bedroom. 4) Health practice adherence was poor, especially among index case and their younger sibling.
Cole *et al.* (2012)	To examine the effect of family hygiene education programme with hygiene products provided on reduction of 3 diseases (gastrointestinal and respiratory illness and skin infection) of children aged under 5	Cape Town, South Africa	Families (n=685) from 2 regions with at least one child aged under 5 years old. Divided into 2 groups: each group consisted of people living in government housing and informal housing: 307 households: (control 177; intervention 182) 378 households: (control 130; intervention 196)	Controlled trial: two years intervention with weekly home visit Control: education solely Intervention: education plus hand hygiene product Baseline illness data collected in both groups one year before intervention. Post intervention data collected during follow up and home visit by Sunday Family Health Chart, Burden of Illness of three diseases, record on behaviour change and amount of soap/ antiseptic usage.	1) Both control and intervention groups got significant reductions in 3 diseases. 2) Intervention group had greater reductions.
Suess, *et al.* (2012)	To investigate efficacy, acceptability and tolerability of non-pharmaceutics intervention in households with influenza index patients	Berlin, Germany	Patients (n=218) aged under 14 years old from 84 households, having flu symptom within 2 days and confirmed flu by laboratory.	Cluster randomized controlled trial: 8 days intervention Control: education Intervention: Mask group– surgical mask provided with information given. Intervention: Mask/Hand washing group–surgical mask and alcohol based hand-rub provided with information on the correct use of it given. Data collected by self-report daily record, questionnaire on adherence of masks use and secondary attack rate confirmed by nasal swab.	1) Intervention implemented within 36hours after symptom onset of index case, influenza secondary attack rate of M and MH groups was significantly lower than control group. 2) There was no statistically significant effect of the M and MH interventions on secondary infections 3) Household members who spent at least 18hours each day at home were significantly more likely to develop laboratory confirmed influenza infection.

The findings of four studies were found to be statistically significant. Two papers focused on acute respiratory infection, namely human influenza (Holloway et al. 2009; Rosen et al. 2009). These studies were conducted in Israel and Nepal respectively and examined school health education on personal hygiene or hand washing as the preventive interventions. Two studies solved three health issues together, such as gastrointestinal, respiratory and skin infections, using the one intervention (Cole et al. 2012; Luby et al. 2005). This research was carried out in Pakistan and South Africa and adopted hand hygiene with the use of a hygiene product (e.g. plain soap or antibacterial soap) as an intervention.

Four studies reported that there were no significant differences in the prevalence of influenza resulting from the delivery of household-level interventions. These studies focused on interventions to address influenza specifically (Cowling et al. 2009; MacIntyre et al. 2009; Simmerman et al. 2011; Suess et al. 2012). These four studies were conducted in Hong Kong, Australia, Thailand and Germany respectively. Hand washing with a hygiene product and use of face masks were the basis of the interventions.

The analysis identified various features across all studies included in the review that were found to impact upon the implementation of influenza prevention programmes at a household level (**Figure 2.2**). These factors are described below, with examples from the pertinent studies.

Figure 2.2 Concept map on identified features



Timing of programme implementation

Before disease onset

Among the eight studies included in the review, four papers involved the delivery of a health promotion intervention before disease onset (Cole et al. 2012; Holloway et al. 2009; Luby et al. 2005; Rosen et al. 2009). In these studies, all families with children within the relevant communities were invited to join the programmes. Once they were recruited to the programmes, preventive primary interventions were taught and participants applied these interventions in their homes. Primary intervention was defined as an intervention applied before the disease developed or pre-pathogenesis (Gordis 2009). Even though the interventions used (hand washing with a provided hygiene product and health education on personal hygiene or on hand washing) were delivered differently in these four studies, they achieved the same statistically significant result in preventing infectious disease transmission.

Post-influenza onset

Four studies in the review focused on the delivery of an intervention within one to two days after the onset of influenza to prevent secondary infection (Cowling et al. 2009; MacIntyre et al. 2009; Simmerman et al. 2011; Suess et al. 2012). Preventive measures used to control acute respiratory transmission included hand washing and mask wearing. The outcome measures in these studies included the secondary attack rate of the influenza virus, adherence to hand washing and mask wearing (Cowling et al. 2009; MacIntyre et al. 2009; Simmerman et al. 2011; Suess et al. 2012). However, all of the results showed that there were no significant differences between the control and intervention groups in these four studies.

Prompt implementation of personal hygiene practice within 36 hours

The study by Cowling *et al.* (2009) reported that there were no significant differences in secondary attack rate between the control using hand hygiene only and the intervention group, who used face masks and hand hygiene. The secondary attack rate is defined as the probability that infection will occur among susceptible people within a reasonable incubation period following known contact with an infectious person or an infectious source (Halloran 2005). However, the report found that there was a decrease in the secondary attack rate among intervention group participants if health promotion

interventions were delivered within 36 hours of flu symptom onset in the index patients, who were described as the first people to become infected in the households. The study of Suess *et al.* (2012) also demonstrated that household transmission of influenza could be reduced significantly by using face masks and hand hygiene, when implemented within 36 hours after symptom onset of the first infected case.

Mechanisms that lead to programme success in the prevention of household influenza were triggered by an increase in participants' knowledge, skills and awareness of disease prevention, and their being empowered to implement preventive measures before or at the time of disease onset.

Programme reach

Enhancement of programme success was triggered by health service accessibility to the community. Two studies (Holloway et al. 2009; Rosen et al. 2009) attributed the success of their studies to the exposure of all people within the community through their full participation to the health intervention. They employed a primary care approach to avoid infectious disease transmission at home. This approach is the first level of contact individuals, families and the community have with the national health system bringing health care as close as possible to where people live and work (UNICEF & World Health Organization 1978). This broader and more comprehensive approach involved strategies such as public regulations (e.g. proper use of antibiotics and seeking medical advice when sick); instruction to drug retailers; and training for community leaders, school teachers, healthcare workers and parents with children.

Unlike these two studies, the four studies with non-significant results (Cowling et al. 2009; MacIntyre et al. 2009; Simmerman et al. 2011; Suess et al. 2012) only recruited infected participants and affected families. These studies concentrated on the provision of hygiene products such as face masks, soap or hand rubs, and the involvement of healthcare workers in delivering health education to families.

Organizational and healthcare worker involvement in programme delivery

Mechanisms for programme success were explored in two studies. The analysis found that the two programmes where significant differences were identified between

intervention and control arms not only invited families with their children, but also included different important community partners (Holloway et al. 2009; Rosen et al. 2009) to participate. School teachers, healthcare workers, drug retailers and community leaders were encouraged to support implementation of the preventive measures (Holloway et al. 2009; Rosen et al. 2009). The above findings supported wider involvement of community partners as a crucial contextual factor leading to health professional consultation availability for participants. The studies that did not find any difference between the intervention and control groups involved healthcare workers, parents and their children in the intervention implementation (Cowling et al. 2009; MacIntyre et al. 2009; Simmerman et al. 2011; Suess et al. 2012).

Mode and place of programme delivery

Two studies that outlined programmes where significant findings were noted involved the dissemination of health interventions by healthcare workers, parents with their children, child-to-child and school teachers (Holloway et al. 2009; Rosen et al. 2009). They adopted multiple modes to implement the interventions (Holloway et al. 2009; Rosen et al. 2009). Key messages regarding prevention of infection transmission in households were conveyed to programme participants through different channels such as school, posters, street theatre and peers. This delivery approach triggered more opportunities for community participation, while research papers describing the delivery of programmes that did not find significant differences between the intervention and control only delivered the health programme through family members and healthcare workers at the household level (Cowling et al. 2009; MacIntyre et al. 2009; Simmerman et al. 2011; Suess et al. 2012).

Contact with infected persons

In a Thai study, Simmerman *et al.* (2011) demonstrated that influenza transmission was not reduced by hand washing and face mask use. The authors concluded that this may have been due to the poor face mask compliance of infected patients and shared sleeping arrangements. Based on the analysis, close contact between individuals and longer time spent with infected patients were strong predictors for secondary influenza viral infection. It was recommended that a careful analysis be completed regarding the socio-cultural perspective for future health promotion studies in human influenza.

Compliance and sustainability of health practice at home

The studies by Simmerman *et al.* (2011) and MacIntyre *et al.* (2009) identified that poor face mask compliance was one of the contextual factors affecting the success of preventive health interventions. Simmerman's *et al*. (2011) Thai study also concluded that the non-significant results may be triggered by the poor face mask compliance of infected children and their young siblings. Similar comments are also noted in MacIntyre *et al.* (2009)'s study that identified that less than 50% of participants wore masks most of the time, while other participants wore face masks rarely or never. Participants reported three reasons for not wearing face masks: discomfort, children refusing to wear the mask, and children forgetting to wear the mask. Further research is needed to examine how to sustain the wearing of face masks.

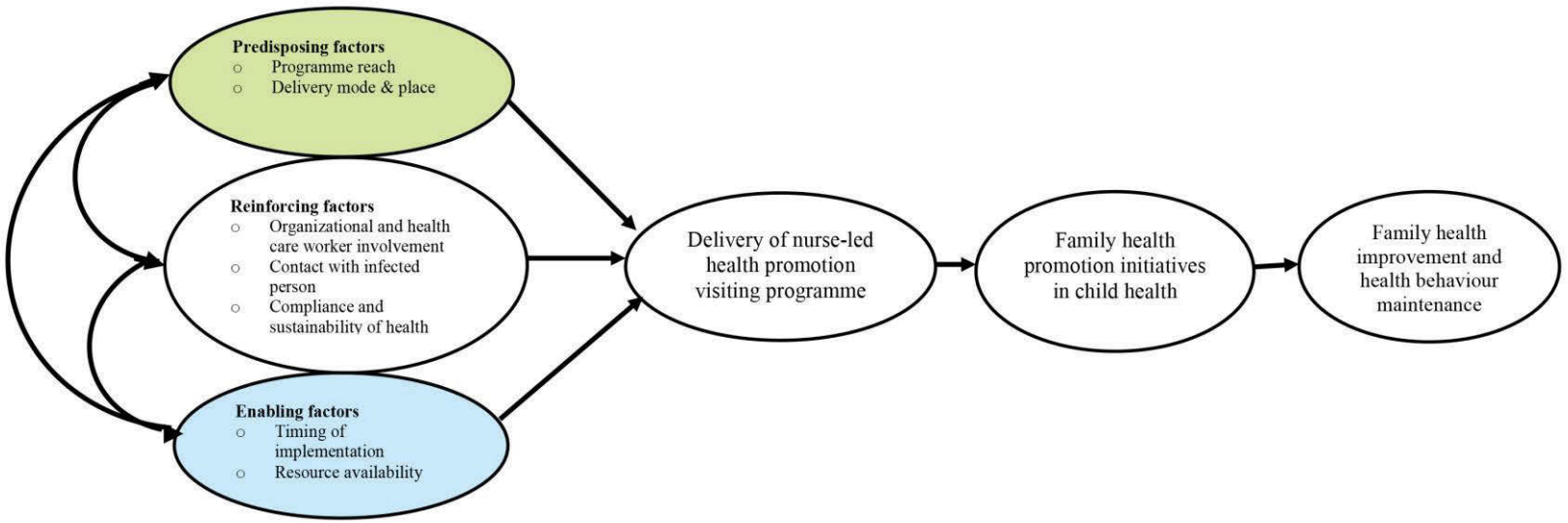
2.2.5 Discussion

Process evaluation provides a useful conceptual framework for understanding the crucial factors and mechanisms affecting the success of the interventions detailed in the papers identified in this review. Process evaluation is a set of activities directed towards assessing progress in programme implementation (Green & Kreuter 2005; Nutbeam, Harris & Wise 2010). Process evaluation includes a broad range of methods and measures, but the most common elements are: participants' exposure and participation in the programmes, relevant stakeholders' and partners' engagement, programme delivery method, and intervention context such as changes to physical environment and assessment of intervention impact (Nutbeam, Harris & Wise 2010).

Using the concept of process evaluation, the findings of this realist review demonstrate that studies where influenza had been prevented were found to have a wider community reach and engage not only families but health workers, teachers, drug retailers and community leaders. Multiple strategies were also employed, including education, street theatre, posters in the community and peer sharing before the onset of influenza symptoms. In addition, interventions that demonstrated success in preventing influenza involved family compliance with healthcare behaviours in the home. Contact time and physical distance from the infected person were found to be vital to the effectiveness of health prevention interventions for seasonal influenza.

These process evaluation factors have been incorporated in the design of a framework for the development of a nurse-led health promotion visiting programme that can be employed to better facilitate the delivery of health promotion programmes in Hong Kong that can be seen at **Figure 2.3.** This framework summarizes the relationship between programme factors (left ovals) in enhancing (arrows) family health promotion initiatives (middle oval) so as to improve healthy behaviours and family health (right oval) in a household.

Figure 2.3 Conceptual framework for the development of nurse-led health promotion visiting programme and family health



The framework for delivering nurse-led health promotion interventions is underpinned by the PRECEDE-PROCEED (PP) model of health promotion programme planning, using structure, process, and outcome measures (Gielen et al. 2008; Green & Kreuter 2005). The PP model is most aligned with ecological models in health promotion, where human behaviour is viewed as being determined by both individual, social and environmental factors (Hancock 1993). The PP model has been successfully applied to identify needs for health service interventions (Hosseini et al. 2016) and widely used to apply behavioural change theories in different health settings (Gielen et al. 2008; Phillips, Rolley & Davidson 2012).

The PRECEDE model is based on the premise that an education diagnosis should precede an intervention (Green & Kreuter 2005; Mirtz et al. 2005). The PP model guides the development of an intervention using a process involving nine phases, with the first five involving the identification of health problems and their determinants through a series of diagnostic steps (Gielen et al. 2008; Mirtz et al. 2005). The last four steps involve programme application and various forms of evaluation. Phase I focuses on the identification and evaluation of possible social problems, followed by an epidemiological diagnosis. The primary task in this phase is to determine which health problems pose the greatest threat to a given target population. Planners use epidemiological data to identify and rank the health problems. Phase III focuses on the systematic identification of behavioural health practices and environmental factors that appear to be linked to the identified health problem. Phase IV covers educational/ecological assessment including predisposing, reinforcing and enabling perspectives. Phase V takes into consideration the administration and policy aspects. This phase focuses on the administrative and organizational concerns that must be addressed prior to programme implementation. Phase VI is the implementation of the intervention, and process evaluation takes place in Phase VII. The Phase VIII impact evaluation measures the programme's effectiveness in terms of objectives and changes in predisposing, enabling, and reinforcing factors. Phase IX is the outcome evaluation (Green & Kreuter 2005).

Among these nine phases, the educational/ecological assessment phase is the most pertinent to this discussion because it focuses on the identification of factors that are

necessary to initiate and sustain behavioural change (Green & Kreuter 2005). This phase is a composite of three important areas: predisposing factors, enabling factors, and reinforcing factors. Based on these three perspectives, these findings of the review can be better understood and used to inform the planning and design of health promotion for influenza. Community health nurses need to consider predisposing factors, including family knowledge, attitudes, beliefs, personal preferences, existing skills, and self-efficacy toward the desired behaviour change (Green & Kreuter 2005).

Reinforcing factors include causes that reward or reinforce the desired behaviour changes. This can involve conducting indirect health education through social support networks and involving health professionals in consultation or healthcare worker training, e.g. train the trainer programmes to enable children to share their health practice with their peers in school (Reamy & Slakey 2001). Family participation, role modelling and reinforcement of children's behaviour practice in daily interactions has been found to impact upon maintaining children's healthy behaviour (Beets, Cardinal & Alderman 2010; Gussy et al. 2008; Schor 2003). However, this can only be achieved by building children's and parents' awareness of healthy practices and enhancing mutual support within families, such as reminding each other to wash hands on arriving home in order to initiate changes in health practices and thereby prevent seasonal influenza (McConnell et al. 2013).

Enabling factors are direct or indirect environmental factors facilitating health behaviour changes (Green & Kreuter 2005). These include the context of programmes/services and resources necessary for achieving an intervention outcome. For instance, the availability of hand hygiene products (contextual factor) might influence the effectiveness of hand hygiene practices (outcome) because of encouragement in adequate health promotion practices (mechanisms). The timing of intervention implementation is important. Prompt preventive measures and health promotion interventions taken (contextual factor) lead to increased community awareness and competence (mechanism) to prevent and manage influenza in the community (outcome).

2.2.6 Implications for programme development

Applying a health promotion approach

These findings confirmed that health promotion interventions are important for mitigation of a pandemic influenza (Cowling et al. 2009). Based on analysis of the papers in this review, interventions to prevent influenza infection at a household level should be implemented using a health promotion approach, rather than a disease prevention approach. The studies show that health interventions delivered before disease onset demonstrated significant results in the prevention of infection transmission (Cole et al. 2012; Holloway et al. 2009; Luby et al. 2005; Rosen et al. 2009). The provision of adequate protection before disease onset highlights the importance of primary prevention measures (Gordis 2009). When designing and implementing health promotion activities, the message of early implementation of personal hygiene practices should be emphasized, but these require integration with other messages including those regarding healthy lifestyle, to assist immune systems and vaccination programmes.

Community nurses should incorporate health promotion services and health education activities into their professional roles (Hospital Authority 2012a). It was acknowledged that community nurses play a major role in shifting the health system away from a predominant focus on illness and cure, and toward increased attention to health promotion and disease prevention (International council of nurses 1996). It may be necessary to review existing nursing practice and strategies in order to redirect nursing practice from being disease-orientated towards a health promotion ideology (McIlfatrick 2004).

Family health promotion initiatives in child health

Apart from educational institutes, the family is one of the immediate primary sources and providers of children's health education and information (Hopper et al. 1992). Children will be less vulnerable to influenza if sufficient supports are provided by their families or community health networks (Stevenson et al. 2009). In order to minimise the risk, family involvement in and support for health education and health promotion are necessary to enhance the success of interventions (Baranowski & Stables 2000; Ferguson et al. 2006; Treviño et al. 2005).

Health practice initiation and sustainability requires a family to provide an appropriate environment for children to learn and practice health-related behaviours, with parents providing regular reminders. This daily contact can also be transformed into a cost-effective way of fostering and sustaining their children's health-related practices (Perry, Crockett & Pirie 1987; Schor 2003).

Under such circumstances, it is worthwhile for nursing professionals to increase their efforts in collaborating with families and communities to sustain health promotion interventions that include targeting health behaviours and preventative measures to address infectious diseases such as influenza.

Integrated and comprehensive nurse-led family-based health promotion

This review has identified the directions for future family nursing practice in the prevention of human influenza, particularly during seasonal human influenza or pandemic influenza episodes. The findings of two studies in this review provide evidence that basic, simple and cost-effective interventions such as hand washing with a hygiene product effectively prevent not only human influenza infection transmission but also other infectious diseases with similar transmission routes, like gastrointestinal and skin infections (Cole et al. 2012; Luby et al. 2005). This highlights the importance of not using multiple strategies, as in the case of education and social marketing interventions, but also an integrated approach to health promotion to address multiple health issues that can be understood within the framework of an ecological model of health promotion (Lee et al. 2007). The study by Schellenberg *et al.* (2004) identified that integrated child health management contributed to reducing infant mortality and morbidity (Schellenberg et al. 2004). Nurse-led health clinics are a feature of healthcare delivery in countries such as Australia, the USA, Canada and the UK (Pulcini et al. 2010; Shiu, Lee & Chau 2012) and have been adopted in Hong Kong since the 1990s (Shiu, Lee & Chau 2012). Evaluations consistently show that various nurse-led interventions have resulted in improved clinical outcomes and added value to the quality of care (Larsson et al. 2012; Shiu, Lee & Chau 2012). The home setting is an optimal place for health promotion and education, especially for children and their families as learning takes place within an everyday context. In a study by Li *et al.* (2009), home nursing services were identified as feasible in addressing childhood health

risk factors through early intervention (Li Ming et al. 2009). Based on the findings of this review, there is a service gap in the provision of integrated and comprehensive nurse-led family-based health promotion service to children and their families. The refocusing or enhancement of child and family health service is a potential gap that needs to be addressed by local health policy makers.

Socio-cultural factors affect the health practices of families and their children (Evans et al. 2011; MacIntyre et al. 2009). These family practices can directly influence their children's health status (Lopez-Dicastillo, Grande & Callery 2010; Yung et al. 2010). An American study found that ethnicity, household income, parent education level and acculturation affected different child feeding practices and concerns. Spanish-speaking Hispanics and African-American parents were more likely than English-speaking Hispanics to use food as an incentive to calm the child (Evans et al. 2011). Sharing a bed with children who could be infected is a daily practice in some countries like Thailand (Simmerman et al. 2011). These factors signal the need for attention to the socio-cultural context during the programme design and implementation to ensure that all opportunities for health promotion and education can be harnessed (Lopez-Dicastillo, Grande & Callery 2010).

Complex, community-based interventions inevitably operate at multiple levels, and must be interpreted in their appropriate cultural and policy context. This review has highlighted the importance of delivering socio-culturally appropriate multi-faceted interventions that engage families and community members in building healthy practices within the home. The individual exists within a family that plays a vital role in establishing health value, attitudes and habits, and continuously influences the health of its members (Hancock 1993). The family is not merely an incorporated component of the ecological system. Instead, it should be viewed as the entry point of initiation and the focus of primary health promotion intervention. The family is the principal unit of a socio-cultural system in which behaviour patterns are learned, adapted, or altered (Novilla et al. 2006). Therefore, the family and its influence on health should not be neglected (Schor & Menaghan 1995) as a primary valuable resource and setting for enhancing and protecting health at both individual and community levels.

The community health nurse has a significant role to play in family health, in Hong Kong as in other countries. The time has come to re-examine the service scope of community nurses, particularly when working with families with children. There is a need to review existing family nursing practice and strategies about how to include integrated and comprehensive home-based health promotion in routine practice (McIlfatrick 2004).

An effective hand washing approach with a hygiene product was found to be the most effective disease prevention and control method in the household (Suess et al. 2012). However, there was no mention of cough etiquette, which has been emphasized as a pivotal component in the management of influenza (Centre of Health Protection of Hong Kong 2012a; World Health Organization 2009b). This personal health hygiene practice poses a challenge to researchers as they might have underestimated its significance as a preventive intervention.

2.2.7 Conclusion

These findings suggest that interventions conducted using a primary care approach were important for the mitigation of acute respiratory infections at the household level. Hand washing with a hygiene product was also vital to prevent household transmission of the influenza virus when it was implemented within 36 hours of patient symptom onset. However, questions relating to the sustainability of health practices are of concern requiring further exploration. If health practices cannot be sustained, there may be frequent recurrences of infectious diseases such as influenza. Hence, there is a need for the establishment of family health promotion interventions at the household level to maintain health practice and improve family health.

Relevance for clinical practice

The current body of evidence suggests that nurse-led family health promotion interventions should consider using an integrated and comprehensive approach, as these have been shown to ensure quality healthcare service outcomes. Future research will provide health professionals with increased insight into how structured nurse-led health

promotion interventions may be effectively implemented and thereby benefit family health services.

Strength and limitations of the review

This review includes only published peer-reviewed studies and is thus susceptible to publication bias. The studies were completed in Australia, Germany, Hong Kong, Israel, Nepal, Pakistan, South Africa and Thailand. Although these diverse contexts make it difficult to generalize, it strengthens the analysis of different health promotion intervention contexts, providing policy-makers with a more complete picture of the issue during the strategy planning and decision-making processes.

2.3 Chapter summary

Mechanisms impacting on intervention delivery and requiring consideration were identified within this literature review. These included: timing of implementation, programme reach, organizational and healthcare worker involvement, mode and place of delivery, contact with infected person, health practice compliance, and sustainability at home. When developing family health promotion intervention contextual factors related to successful programme delivery should be considered. Crucially a need exists to support, family health promotion initiatives for child health within the community. This review highlighted the importance of using a health promotion rather than a disease prevention approach to implement interventions to prevent influenza infection at a family level.

The findings of this review also indicated that the health practices of the child and family members could not be sustained resulting in the potential for frequent recurrences of influenza infection among family members. Children learn health knowledge and practices as a result of parental modeling and repeated opportunities for practicing these health behaviours (Cook & Cook 2009; Morrison 2008). Evidence demonstrates that there are positive effects of health promotion interventions where families are actively involved in promoting physical and mental health to facilitate child development (Ciliska et al. 2001). As a result of the severe and significant impact of seasonal influenza on public health, the health intervention approach to increasing the active engagement of families and their children in the development and sustainability

of healthy practices in the home has raised a serious concern requiring further exploration.

Another review of literature was therefore done to gain a comprehensive understanding of how parent and child could be better engaged in in planning, implementing and evaluating home based health promotion programmes to sustain their health practices at the household level (see Appendix 3). The findings of this second review found that parents and children did not appear to be actively involved in undertaking the assessments and evaluation of the home-visiting health promotion programmes (Lam, Dawson & Fowler 2016). There is a need to develop a consistent home visiting approach that includes comprehensive assessments as part of the planning phases and parent and child involvement at each step of programme development, implementation and evaluation. This approach enables the development of tailored and sustainable health promotion interventions in order to achieve optimal child health outcomes. The results also identified that no studies assessed parent-child interactions as part of the programme assessment. Only three of 16 reviewed studies included strategies to enhance parent-child interactions in their home based health promotion interventions. The lack of focus on parent-child engagement is problematic despite it being identified as the key factor for child positive health practice establishment and sustainability. Greater focus is therefore essential to ensure that parent-child interaction is consistently included as a crucial element of all aspects of child and family health promotion.

Chapter 3 Methodology

3.1 Introduction

A multiple-case study research design was employed to investigate and understand seasonal influenza prevention and health promotion behaviour of Chinese Hong Kong parents and their preschool children at a household level. The research questions are:

- How does health literacy influence Hong Kong parents of preschool children's seasonal influenza prevention practices?
- How does the living environment affect parent's health practice in seasonal influenza?
- What is the role of culture in seasonal influenza prevention practices of Hong Kong Chinese parents with preschool children?
- What are the parental teaching practices regarding seasonal influenza prevention?
- What is the role of nurses in seasonal influenza prevention and related health promotion of Hong Kong Chinese parents with preschool children?

This chapter has three key objectives. The first is to describe the characteristic of Yin's case study research design, methodologies considerations when using a multiple-case study approach and the application of this multiple-case study in this research study. The second is to provide a detail description of the recruitment process and demographic data of the study participants. Finally, the details of the research components used will be explained: the instruments used to guide the interview; the procedure of data collection; analysis of quantitative and qualitative data for case-based and cross-case analysis; ethical consideration including the mitigation of risk and harm to participants; and data management.

3.2 Yin's case study research design characteristics

Case study design provides tools for the researcher to understand complex social phenomena within its context (Baxter & Jack 2008). It is grounded on a constructivist paradigm. It claims that truth is relative and that it is dependent on one's perspective. This paradigm "recognizes the importance of the subjective human creation of meaning,

but doesn't reject outright some notion of objectivity. It enables an investigation to retain the holistic and meaningful characteristics of real-life events such as individual life experiences, organizational processes and the maturation of industries (Carr-Hill & Currie 2013; Yin 2014). Case study research which involves empirical inquiry contributes uniquely to the knowledge of individual, familial, community, organizational, social, and political phenomena in its contemporary situation within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident (Yin 2012, 2014). It can inform professional practice or evidence-informed decision making in both clinical and policy realms (Baxter & Jack 2008).

Case study design can be used for three purposes: exploratory, descriptive and explanatory. An exploratory case study tests the feasibility of desired research procedures. A descriptive case study presents a detailed description of a phenomenon within its context. An explanatory case study presents data associated with cause and effect in order to explain which *causes* generate which *effects*. The research aim is used to determine, which type of multiple case studies design will be used.

3.2.1 Descriptive multiple-case study approach

A descriptive multiple case study can involve multiple cases with a single unit or multiple units of analysis. These two types of multiple-case studies designs focus on two or more cases. The intention of a single unit design is to investigate the global nature of a phenomenon, such as two or more programmes or families. While the multiple unit case study examines the sub-unit(s), such as two or more issues in two or more programmes or families under investigation. This study adopted a multiple-case study approach (holistic/single unit of analysis) to guide the analysis of the influences of health literacy (single health issue) of 20 Chinese Hong Kong parents with preschool children (multiple cases) in seasonal influenza prevention and related health promotion strategies with detail explanation in a local family context (a phenomenon).

3.2.2 Methodological considerations

As this study used a multiple-case study design, the following discussion will focus on the methodological considerations in conducting a multiple-case study. A multiple-case study approach is especially useful where a comparison of cases is potentially fruitful.

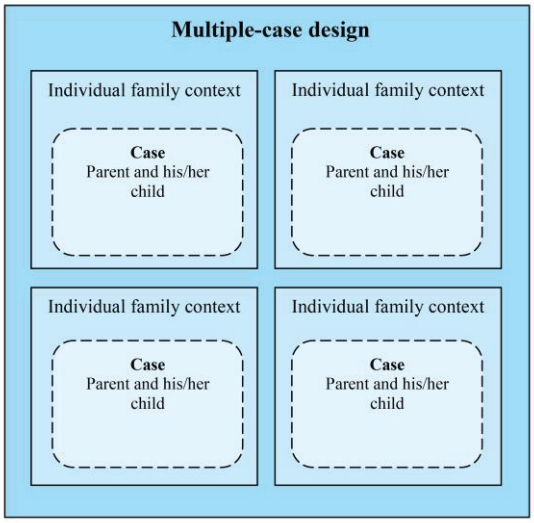
In multiple-case studies every case should serve a specific purpose within the overall scope of inquiry. Each case must be carefully selected so that it either (a) predicts similar results (a literal replication) or (b) produces contrasting results, but for predictable reasons (a theoretical replication) (Creswell 2007; Yin 2014). The cases should serve in a manner similar to multiple experiments, with similar results (a literal replication) or contrasting results (a theoretical replication) predicted clearly at the beginning of the investigation.

A multiple-case study design is most useful for investigating complex issues (Yin 2014). It involves the triangulation of data sources (Yin 2014). The multiple sources of evidence may be collected through the use of quantitative or qualitative or both for data triangulation and combining data from standard measures, semi-structured interview, survey, written documents, observations, and field notes. Data analysis may involve descriptive statistics, thematic analysis and pattern-matching techniques.

3.3 Application of a multiple-case study

The following section describes how a multiple-case (holistic/single unit of analysis) study design was applied in this study. Each family was identified as a case. Each family was seen as a single case analogous to a single experiment, and multiple cases were analogous to replicating the study in different cases. Multiple cases were selected according to the predicted patterns based on the study proposition that they could be contrasted by the different parents' health knowledge, practices, confidence and experience. **Figure 3.1** illustrated the context of a multiple-case design in this study.

Figure 3.1 The context of a multiple-case design



As stated by Morse and Field (2002), qualitative research is particularly useful for studying phenomena where there is a dearth of knowledge. It is often extremely important in laying the foundation for later research. The choice of a multiple-case study design for this research study was influenced by the area of investigation and the overall aim of the study as there has been minimal research undertaken. This research approach enabled the discovery of previously unknown features regarding family health promoting behaviours providing in-depth knowledge of human realities and ascribed meanings (Cresswell 2009; Polit & Hungler 2004).

A multiple-case study approach was used to present a comprehensive description and explanation of individual family contexts and parent-child relationships in relation to seasonal influenza prevention (Cresswell 2009). A case study approach can provide rich and detailed description of previously unexplored issues in a real-life family context through observing, describing and documenting (Creswell 2007; Yin 2012) parents' experience using health promotion related behaviour to prevent childhood seasonal influenza. A multiple-case study approach has allowed the analysis of cases within each household setting and across a number of households. The parents were asked to explain or expand upon their understanding of disease prevention and health promotion related issues. They were also asked to reflect on their experience of teaching and health promotion strategies used to assist in protecting their children from becoming infected by seasonal influenza.

This approach enabled the gathering of data to provide a detailed description of parental teaching strategies and factors affecting their teaching. The data sources used in this research study included documentation, interviews, direct observations and survey (Creswell 2007; Yin 2012).

3.4 Recruitment process

A networking approach (Harris et al. 2015) was used to identify potential preschools which helps to recruit parents and their young children for this study. Letters and study information sheets were sent via the person-in-charge of five Hong Kong kindergartens for distribution to Chinese Hong Kong parents, inviting them to participate in the study. Finally, three kindergartens agreed to join the study.

The selection criteria were Chinese Hong Kong parents with a healthy three to five year old child who were willing to communicate and share their experiences. Any parents with a child who was unwell were excluded.

Initially, school teachers helped to deliver the research information to the parents and gained their verbal consents to provide the personal contacts to the researcher. The researcher rang the parents and personally invited them to participate. The information sheets provided the basis for a detailed explanation before the parent was asked if they would consent to participating in the study with their child.

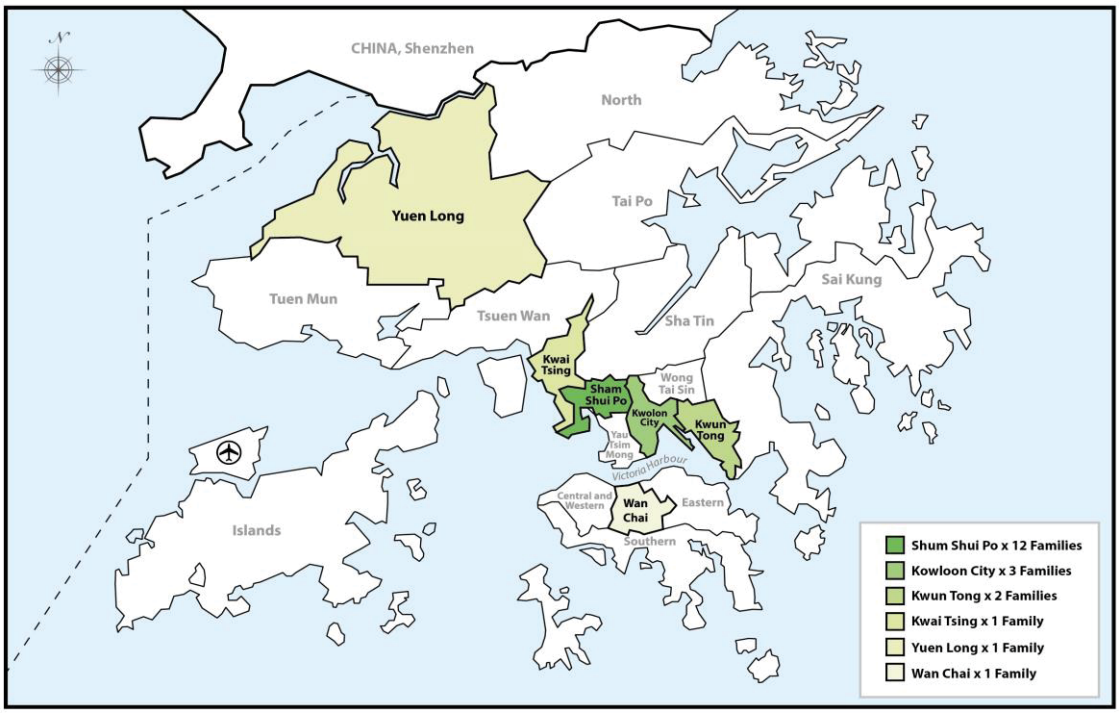
The interviews were arranged in the parent's home at a convenient time for the parents. Detailed explanation of the research was provided to parents and informed consent was obtained before interviews.

3.5 Research participants

The three kindergartens were from three out of 18 Hong Kong districts. They were located in Kowloon City, Shum Shui Po and Wan Chai respectively. Two kindergartens were nonprofit and co-educational preschools. One was a private independent and co-educational kindergarten. In total, 23 parents were contacted via a telephone call. Three parents did not agree to join the study. Twenty parents and their healthy preschool child from three kindergartens were recruited. All participants were mothers and the main

caregivers of their children. The gender of the participants was homogeneous as all were female. Hong Kong Chinese mothers are highly involved in child care which is often their first concern (Chan, Bowes & Wyver 2009) hence mothers selected to participate in this study. The 20 families came from six districts. Twelve families were from Shum Shui Po, three families from Kowloon city, two from Kwun Tong and one from Kwai Tsing, Yuen Long and Wan Chai correspondingly. **Figure 3.2** outlined the location of 18 districts in Hong Kong.

Figure 3.2. The location of 18 districts in Hong Kong



Eleven families (55%) were living in private apartments and nine families (45%) were living in public estates. Nine families (45%) had three generations living in the same household: grandparent, parent and child. Eleven families (55%) had two generations living in the same household: parent and child. The mothers were aged from 28-to-42 years old. Three families (15%) had one child, 14 (70%) had two children and three families (15%) had three children. Ten mothers (50%) had received secondary school education and ten completed tertiary education. Fifteen mothers (75%) were housewives and five mothers (25%) were full-time workers with their children being cared for by other family members. The demographic data are illustrated in **Table 3.1**.

Table3.1. Demographic data of 20 families

Personal particulars of 20 participants:	
1. Gender of participants	– 20 mothers
2. Age of participants	– 2 were 28 years old – 7 were between 30-35 years old – 8 were between 36-40 years old – 3 were between 41-45 years old
3. How many children in the families?	– 3 families had 1 children – 14 families had 2 children – 3 families had 3 children
4. Employment of main caregivers	– 15 housewife – 5 full time worker
5. Who is/are the main caregiver(s) of the child(ren)?	– 15 children were cared by mothers – 1 child was cared by both father and working mother – 4 children were cared by grandmothers and working mothers.
6. Education of main caregivers	– 10 mothers received secondary school education – 10 mothers received tertiary education
7. Monthly household income (HKD)	– 1 was under 10,000 – 10 were 10,000-20,000 – 5 were 20,000-40,000 – 4 were over 40,000
8. How many people living there? – Three generations: grandparents, parent and child living in the same household – Two generations: parent and child living in the same household	 – 9 families – 11 families

3.6 Sampling method

Purposive sampling was used to select the cases. As stated by Creswell (2007), a purposeful sample provides a means to acquire understanding of the research problem and the central phenomenon that has undergone minimal exploration. This research utilized a form of purposive sampling known as intensity sampling in order to select Chinese Hong Kong parents who are deemed as being able to provide information-rich data for the purpose of the study (Miles & Huberman 2014; Morse & Field 2002). The knowledge and opinion of these families provided important insights making the research questions to be addressed (Creswell 2007).

3.7 Sample size

Rigid rules are not usually applied to determine an adequate sample size in qualitative research, however, as a general principle a sample should be small enough to permit deep analysis and large enough to result in new understanding (Sandelowski 1995). In this study, 20 Chinese Hong Kong mothers and their preschool child were interviewed until recurring patterns and no new information were detected in the interviews provided by the 20 mothers. Then, a decision was made that saturation of the data was achieved, meaning that no new findings emerged during the last interviews (Miles & Huberman 2014; Morse & Field 2002).

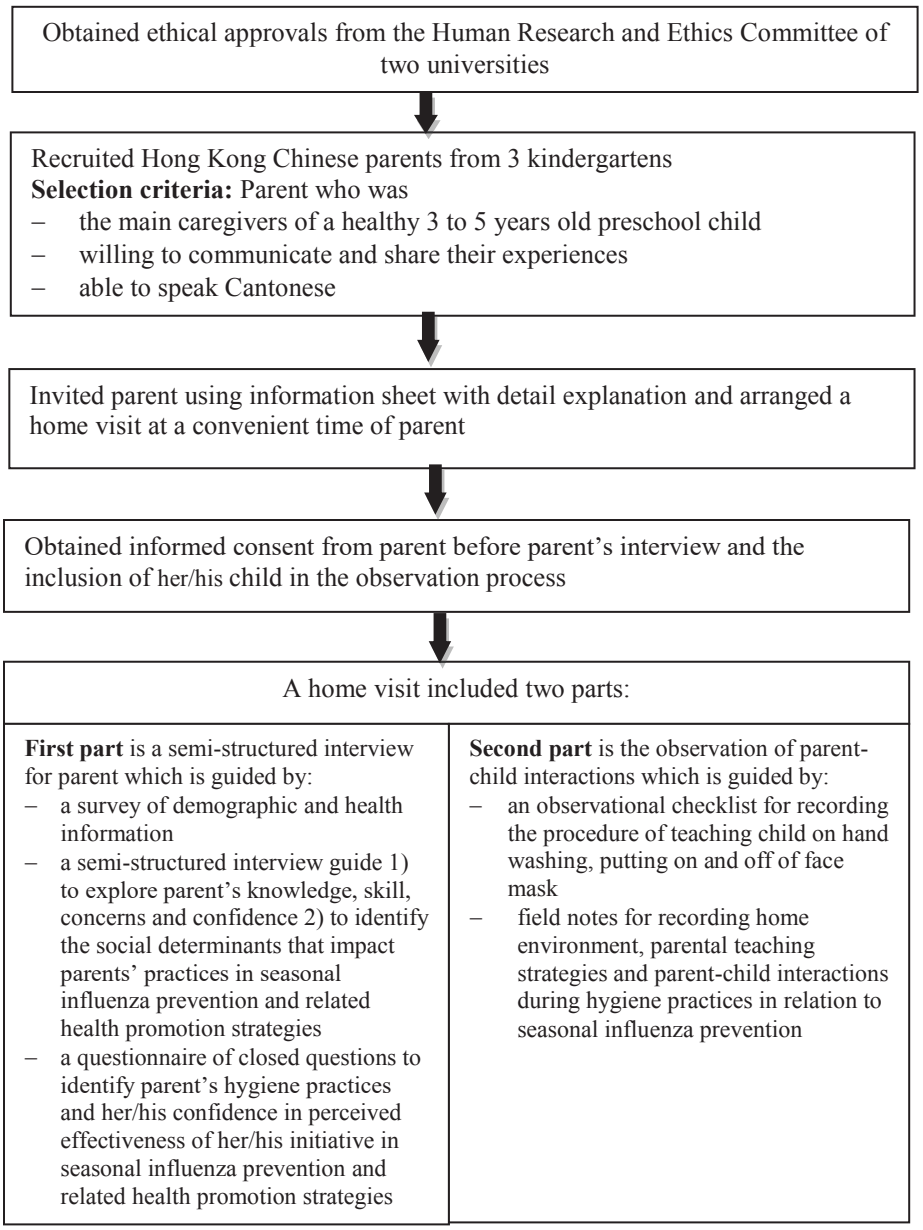
3.8 Data collection

In this study, data were obtained by the researcher from multiple data sources to ensure all relevant information recorded to address the study objectives. A home visit was arranged to collect the seasonal influenza prevention and related health promotion strategies data in the parent's home to identify the parent's knowledge, skill and confidence, as well as, the observation of the living environment and interactions with children in their usual setting.

The home visit included two parts. The first part had three activities: the collection of relevant demographic information about the family and their health status; a semi-structure interview to explore parent's knowledge, skills and confidence in regard to seasonal influenza prevention and related health promotion strategies; and a questionnaire using closed questions to identify parent's knowledge, skills and confidence in seasonal influenza prevention and related health promotion practices.

The second part of the home visit comprised parent-child interaction observations during hygiene practice episodes. Mothers were invited to demonstrate the procedure of teaching their child to wash his/her hands, wear and take off a face mask by using the observational checklist. The parental teaching strategies and parent-child interactions observed during the demonstration and home visit were also recorded in the field notes. The flow of the research study is shown in **Figure 3.3.**

Figure 3.3 The flow of the research study



Each home visit took approximately 60-90 minutes. A digital recorder was used for data collection. The parents were informed that the whole interview was digitally recorded and would be de-identified to maintain confidentiality.

3.8.1 Instruments

With the aim of investigating and understanding the seasonal influenza prevention and health promotion behaviour of Hong Kong parents and their preschool children, the approaches and instruments used in this study included a survey of demographic and

health information (Appendix 4), a semi-structured interviewing guide (Appendix 5), a questionnaire containing closed questions (Appendix 6), an observational checklist (Appendix 7) and researcher field notes (Appendix 8). The instruments were developed after a review of relevant literature and discussion with supervisors, colleagues and school teachers experienced in family health promotion. These instruments were, then validated by a panel of academic experts, community nurses and school teachers who are knowledgeable in infection control and child and family health through the use of a content validity index. This index ensured the questions were clear, unambiguous, were able to be answered and they collected adequate information to address the proposed research objectives. This validity index used a four-point scale ranging from 1-4 (not relevant=1, some relevance=2, very relevant=3, extremely relevant=4) to assist three panel members in rating the instruments. The three panel members rated all the items as "very relevant" or "extremely relevant". It implied that the instruments were very relevant and representing for use in examining the domain of this research topic.

3.8.1.1 Face-to-face interview

The survey of demographic and health information, a qualitative semi-structure interviewing guide and a questionnaire of closed questions were developed to guide the face-to-face interview during the first part of home visit.

3.8.1.1.1 Demographic and health information survey

The survey of demographic and health information was collected to provide a context for the case studies. This information included sex, age, marital status, education level, monthly household income, household surface area and family health status.

3.8.1.1.2 Semi-structured interview guide

An in-depth qualitative interview was conducted with the parent using a semi-structured interview guide (Appendix 4-8). The interview allowed an exploration of the parent's knowledge, skills and confidences in relation to personal hygiene and health practices regarding seasonal influenza prevention at a household level. In-depth interviews are particularly useful for gaining access to unexplored areas of human experience (Morse & Field 2002; Polit & Hungler 2004). This approach allows the interviewer to decide in advance what areas to cover. A semi-structured interview is open and receptive to

exploring unexpected information provided by the parents. During the interview, non-directive and open-ended inquiry were used by the researcher to stimulate potential areas of free thinking, while at the same time giving parents freedom to express their feelings and experiences (Creswell 2007; Morse & Field 2002). At the same time, the interviewer also had the flexibility to ask additional follow-up questions that encouraged the parents to elaborate on their original response or to follow a line of inquiry introduced by the parents.

The open-ended questions enabled detailed relevant data to be obtained. For instance, participants were asked: do you think your knowledge and skills are adequate enough to guide your family's behaviour in preventing seasonal influenza and promoting healthy behaviour for your family; what concerns do you have about promoting health behaviours to prevent or minimize seasonal influenza for your child and other family members; could you describe/explain any factors in your life that may affect your health promotion behaviour in relation to seasonal influenza within your household; and to what extent do you think a nurse should be involved in providing support and education to implement health promotion interventions for seasonal influenza for your family? All questions were sequenced to correspond with the parent's experiences and to flow from the provision of general to specific information.

3.8.1.1.3 A questionnaire of closed questions

The closed questions may help to make the meaning of the question clearer. It is defined as pre-coded or restricted. The respondents do not reply in their own words, but select from a series of pre-assigned answers that best fits their own views (Vinten 1995). The closed questions adopted in this questionnaire enabled an understanding of parents' knowledge, health behaviour practices and confidence about the related practices that included hand washing and cough etiquette. The inclusion of certain questions related to hand washing and cough etiquette were adapted from other instruments in the field such as Centre of Health Protection of Hong Kong (Centre of Health Protection of Hong Kong 2014a, 2014c) and World Health Organization hand hygiene survey (World Health Organization 2009a). A five point Likert scale was used to measure parents' health knowledge and practices: every time, often, sometimes, seldom and never.

The inclusion of certain questions developed by the researcher related to parent's confidence with their perceived seasonal influenza prevention initiation effectiveness. A Likert scale was used to capture the parent's level of confidence: completely confident, very confident, moderately confident, slightly confident and not at all confident.

3.8.1.2 Observations

An observational checklist and field notes were used during the second part of the home visit. Observation served as a means for verifying and/or nullifying information about the knowledge and practices related to personal hygiene provided by the parent during the first part of the home visit (Cresswell 2009; Yin 2014). As the visit took place within the participant's home, the home setting provided valuable background information about the interaction between people and environment. This observation allowed the researcher to gain first-hand information about the behaviour of the participant in their homes providing authentic and reliable information. The attained data were recorded in the observational checklist and field notes ensuring no important information was missed.

3.8.1.2.1 Observational checklist

The observational checklist illustrated the procedure used for parental teaching about hand washing, putting on, wearing and taking off a face mask. The mothers were not provided with any instructions or prompting on how to undertake this task by the researcher during the observation. The aim of this data collection technique was to identify the mother's existing knowledge and skills in teaching and supporting the development of her child's hand washing technique. The inclusion of steps of these procedures was based on the guidelines suggested by Centre of Health Protection of Hong Kong (Centre of Health Protection of Hong Kong 2014a, 2014c). The three procedures were assessed using a dichotomous scale (yes/no).

The steps of hand washing were:

- wet hands with water; apply enough liquid soap to cover all hand surfaces
- rub hands palm to palm; right palm over left dorsum with interlaced fingers and vice versa
- palm to palm with fingers interlaced; backs of fingers to opposing palms with fingers interlocked
- rotational rubbing of left thumb clasped in right palm and vice versa
- rotational rubbing; backwards, and forwards with clasped fingers of right hand in left palm and vice versa
- wrists are rubbed
- rinse hands with water; dry hand thoroughly with a single use towel/tissue paper
- use towel/tissue paper to turn off faucet
- rub all parts of the hands including the wrists using a proper hand hygiene technique for at least 20 seconds.

The steps of wearing a face mask were:

- pick up the mask with clean hands
- coloured side of the mask faces outwards, with the metal strip uppermost
- put on the mask using both clean hands
- tie the string or place the loops around the ears
- spread out the folds to cover the chin
- mould the metal strip to fit the shape of the nose.

The steps of taking off a face mask were:

- avoid touching the outside of the mask when taking off
- if you must touch the outside of the mask, wash hand before touching the mask
- discard mask into the garbage bin with a lid and wash hands with soap.

3.8.1.2.2 Field notes

The field notes recorded the environmental settings, the parental teaching strategies and parent-child interactions observed during the interview and demonstration. The observations of environmental settings included noting the tidiness of the home

environment, the availability of face masks, a thermometer, liquid soap for hand washing, tissues for drying, the place for toy and medications storage. A framework was used to guide the observations of parental teaching strategies that involved identifying the steps parents took during teaching hand washing and face mask wearing (Oxford & Findlay 2013). These steps were: alerting the child to the activity to be learned or practiced; instructing the child to perform what is expected or the steps to be taken; allowing the child to demonstrate; evaluating the standard of the child's health practice and providing feedback to the child on their health practice performance (Oxford & Findlay 2013). The observations of parent-child interaction involved: one or two-way communication; clear and age appropriate task instructions; showing appreciation of the task attempts; encouragement when encountering something difficult and language style used (Oxford & Findlay 2013). Both teaching strategies and the characteristics of the parent-child interaction were assessed using a dichotomous scale with a space for reflective notes to be written on each item. **Table 3.2** showed the multiple data sources of evidence to address the study objectives.

Table 3.2. Multiple data sources of evidence to address the study questions

Two parts of a home visit	**First part** parent interview			**Second part** parent-child interaction observations	
Data source / **Study objectives**	Demographic and health information Survey	Semi-structured interview guide	Closed questions questionnaire	Observational checklist	Field notes
Objective 1 Identify the knowledge, skills, beliefs and attitudes of parents with preschool children in relation to seasonal influenza.		√	√	√	√
Objective 2 Identify the living environment that impact on parent's health promotion behaviour in relation to seasonal influenza.	√	√			√
Objective 3 Identify the role of culture that impact on parent's health promotion behaviour in relation to seasonal influenza.		√			√
Objective 4 Investigate parental teaching strategies to prevent seasonal influenza and related health promotion practices.		√		√	√
Objective 5 Explore the potential of a nurse-led health promotion intervention to prevent seasonal influenza at household level.		√			

3.9 Data analysis

The analysis of the quantitative and qualitative data was carried out concurrently as data and beginning analysis from the previous interview would guide the collection of data in the next interview. Case-based analysis was the initial step of examining the individual cases before the work of cross-case analysis commenced (Yin 2014).

3.9.1 Case-based analysis

In this study, analysis of quantitative data from the demographic survey, the questionnaire of closed questions, the observational checklist, qualitative data from the semi structure interviews and the field notes were included in the case-based analysis in each of the 20 cases. The template presenting the multiple data source used in case-based analysis is shown in **Table 3.3**.

Table 3.3 Table of multiple data sources analysed in the multiple case study

Two parts of a home visit	**First part** – parent interview			**Second part** – parent-child interaction observation	
Data source & nature / **Data for case-based analysis**	Quantitative	Qualitative	Quantitative	Quantitative	Qualitative
Home environment affecting parent's health practices in seasonal influenza prevention	Demographic information				Field notes
Characteristics of family	Demographic and health information				Field notes
Parent's knowledge, skill and confidence in seasonal influenza prevention and related health promotion strategies		Semi-structured interview			
Nurse's role in the family's seasonal influenza prevention and related health promotion strategies		Semi-structured interview			Field notes
Parent's hygiene practices and confidence in perceived effectiveness of her initiative in seasonal influenza prevention and related health promotion strategies			Closed questions questionnaire		
Procedure of parental teaching to child on hand washing, putting on and off a face mask				Observational checklist	
Parental teaching strategies and parent-child interaction during hygiene practices in relation to seasonal influenza prevention					Field notes

Analysis of quantitative data from the demographic survey, questionnaire and observational checklist

The demographic and numerical data obtained from the closed-response questions on the questionnaire and the observational checklist were calculated by using The Office Excel 2016 software. These quantitative data enriched the qualitative analysis of each

case as it provided a context for parent responses, parent and child behaviours and interactions.

Analysis of qualitative data from the semi structure interviews and the field notes

The analysis of the semi-structured interviews occurred iteratively and information constructed from previous interviews guided the collection and analysis of data in the next interview (Creswell 2007). As a result, gaps in information were filled and constructions were extended until no new ideas were generated (Morse & Field 2002).

Firstly, after the completion of each interview, the digital recording was replayed within one-to-two days with the researcher listening carefully to the questions and parent responses and to the tone of the parent's responses. Each recorded interview was transcribed verbatim in Cantonese. After the transcription, the whole script was checked against the tape for accuracy. The researcher is a registered nurse with a master degree in nursing and experience in translation. She translated the transcriptions from Cantonese to English as she typed these translations into her computer. A registered nurse with a bachelor degree in nursing and experience in translation and who was not involved in this research study back translated the quotes to ensure the validity of the interview data. Discussions occurred and consensus agreed on as to the correct translation if differences between the two versions were observed. A backup file was also established.

These data were de-identified during the transcription stage. All exclamations including laughter, pauses in the conversation and expletives were included in the script. During and after the interview, non-verbal expressions of the parents, such as gestures, facial expressions, child's behaviour and interaction with their children were recorded as observations in the field notes. This information was included in the script where appropriate to provide a context for the interviewing process.

Then, all data were read and reread to identify themes and patterns within the communication behaviours and verbal speech patterns. A thematic analysis of the interview transcripts was employed to categorize, tabulate and examine the data to address the study objectives (Yin 2014). It involves the searching across a data set to

find repeated patterns of meaning (Braun & Clarke 2006). This has been identified as a procedure for the categorization of verbal and non-verbal data for the purpose of classification, summarization and tabulation (Morse & Field 2002; Yin 2014).

The raw data from the 20 semi-structured interviews were reviewed to mark and link primary codes according to the research objectives. These codes were grouped into broad categories through repetitive scanning of the data (Yin 2014). The categories were then collated into theme clusters. Analysis continued until no new themes emerged, as data saturation occurred (Creswell 2007; Morse & Field 2002; Yin 2012). Data saturation was observed at the eighteenth interview. Two additional interviews were completed to confirm that the mothers were not providing new data.

In a second step, a deductive approach was applied for pattern-matching (Yin 2012). Pattern-matching logically compares an a priori predicted pattern derived from theory with an observed empirically based pattern (Trochim 1989). If the patterns coincide, a theoretical replication across cases is made. If the patterns are consistent with each other, the findings can assist a case study in enhancing its internal validity (Yin 2014). In other words, the initial theoretical proposition was compared to the findings of the first case. On this basis, the proposition was revised, then compared to the findings of the second case again. The result of the iterative process led to further revision and comparison with the initial proposition, and led to an expansion of the theory. The researcher went back to the original data, read through it repeatedly and compared the derived patterns with previously outlined predefined patterns in order to ensure no missing data and consistency with the study objectives (Yin 2012). The themes and data extraction were independently examined by two other researchers in order to achieve an agreement on pattern matching for the purpose of internal reliability of the study (Yin 2014). Exclusions to the thematic codes were also discussed with these researchers.

3.9.2 Cross-case analysis

A comprehensive comparison was made across cases including families' demographic information, living environment, parental education level, seasonal influenza preventions, health promotion strategies, parental teaching strategies and the characteristics of parent-child interaction in relation to hygiene practices. This cross-

case analysis of the multiple cases provided an understanding of the commonalities and differences between cases regarding hygiene practices for seasonal influenza prevention (Creswell 2007; Yin 2014).

3.9.3 Credibility

The assurance of reliability is very important to the credibility of the findings (Yin 2012). In this study, specific strategies were employed to minimize those factors that detract from the validity of the data collected from the parents and the study rigour. Back translation of the quotes was completed to ensure the validity of the qualitative data. The researchers examined independently a subsample of the transcripts to determine the agreement on the developed codes. When agreement was reached, the thematic codes were then applied to the remaining data. The use of multiple data sources was a strategy to ensure data credibility (Creswell 2007; Yin 2014). In this study, the data from different multiple sources were converged in the analysis process. This convergence of various sets of data provided an understanding of the overall case. The concordance between the interview, observation and survey data enhanced the construct of the rigour of the findings (Yin 2012). Telephone follow-up occurred if clarification of the parents' interview data from parents was necessary. The methodology of this research study underwent peer-reviewed during the process of candidature assessment.

3.10 Ethical considerations

This study was reviewed and approved by the Hong Kong Polytechnic University Human Research and Ethics Committee (Appendix 9) and University of Technology Sydney Human Research Ethics Committee (Appendix 10). Before conducting the interviews, the information sheet and consent form were distributed to the parents with detailed explanation provided by the researcher. Informed written consent was obtained from each parent before the start of the interview. The parents were provided with contacts for further information about the research or any concerns that might arise. Participation in the study was voluntary and parents were able to withdraw from the study at any time without impacting on any service or care they were receiving.

All data were de-identified during the transcription process. The obtained data was to be used for academic purposes only. All parents consented to their data obtained for this research study to be used within publications and conference presentations.

The confidentiality practices were strictly adhered to by the researcher. The parents, prior to data collection commencing, were informed that the whole data collection process would be digitally recorded.

3.10.1 Risk/Harm

Potential risks or harm for this research project were viewed from the perspective of the researcher, parents and their preschool children. As the interview locale was in the parent's home, safety of the researcher was considered when planning the interviews. The researcher is an experienced community nurse who has extensive experience providing home visits and is very familiar with determining if any hazards exist. Address details, allocated time for the interview and the researcher's mobile phone number were left with a contact person who monitored the movement of the researcher during the proposed interview time with each parent.

It was anticipated that a familiar and natural environment would enable informants to speak freely (Yin 2014) during the interview. The home environment allowed the researcher to capture and gain an insight into the family's living environment and the parents interaction with their children. The independence of the researcher was emphasized to parents. This independence ensured that the provided service or care they received from the kindergarten where recruitment occurred would not be affected during and after participation in this research study. The ability to withdraw from the study at any time without consequences to their child's attendance at kindergarten was reinforced.

It was anticipated that some parents, might share their difficulties in nurturing the children or about other family related issues. A distress protocol was developed to manage this situation if it arose; the researcher would offer a list of local resources including health services and telephone counseling numbers to the parent if needed. This situation did not occur during any of the interviews.

3.10.2 Information sheets and consent

The information sheets (Appendix 11) outlined the project including the study aim and objectives, who the researcher would like to invite to participate in the study, name and contact details of the researcher and any potential harm/risk caused by the study. The consent form (Appendix 12) requested permission for interviews to be digitally recorded, as well as telephone follow-up, if necessary, for clarification of the interview data. As part of the informed consent process, the researcher met with participants to answer any questions and to discuss privacy and confidentiality before obtaining signed consent.

As the children involved in this study were preschoolers they were unable to provide informed consent. The researcher was reliant on parents providing this consent for the inclusion of their child in the observation process.

3.10.3 Data management and storage

Following each interview, the digital recording was downloaded onto the researcher's personal computer that is password protected. The name of the participant was substituted with a code during interview transcription. All digital recordings and transcriptions were stored in a password-protected external drive as a backup.

All collected data including transcriptions, external hard drive, consent forms, information sheets and field notes were securely stored in a locked cabinet within a single office. Only the researcher accessed these raw data. As per request by the ethical committee, all data were secured and will be kept for 5 years before being deleted. To ensure confidentiality and anonymity, the data were de-identified with the name of the parents, children or kindergarten and any other information that may result in identification of the parents removed or changed during transcription.

3.10.4 Researcher position

The researcher is identified as an instrument for data collection and therefore has great potential to influence the interpretation of obtained data (Pezalla, Pettigrew & Miller-Day 2012). Bott (2010) emphasized the importance of reflexivity in managing researcher's position in the research study. Qualitative researchers are required to

remain in a flexible conversation with his/her research participants and research contexts so as to preserve a sense of researcher's own subjectivity within the research process (Bott 2010). They are required to avoid the tendency to become absent from or above the research contexts in order to cultivate a relationship for mutual exchanges of information or disclosures between researcher and participants.

My substantive role is as a nurse educator employed in a university. Apart from the assigned teaching role by the university, I have also participated in different community health promotion activities and health consultancies required by various community stakeholders such as preschools, schools and community centres.

As this study was dependent on a relationship and collaboration with the preschool teachers, it was understood that this could potentially influence the parents' decision to participate in this research study. To ensure this influence was limited, several steps were taken. Firstly, during first contact with the parents, I introduced myself as a PhD student, outlined the study and discussed my role as a full time nurse educator in university to ensure honesty and transparency. All the interviews took place in the parents' homes where we were away from the preschools teachers to ensure privacy and avoid dependent relationship of parents to teachers. Some parents, at times during the interviews were reluctant to share sensitive issues such as school polices and facilities in promoting children's health practices to prevent seasonal influenza. This issue was resolved when I emphasized several times the independence and confidentiality of the research process. Trust began to develop between the parents and me as the researcher.

3.11 Chapter summary

This research employed a multiple case study design consisting of qualitative and quantitative data to answer the identified research aim and objectives. These data provided valuable insights into this important public health topic area. The focus of this chapter presented the detailed procedures of this study including research design, recruitment process, and characteristics of 20 families participating in this research, sampling method, data collection, ethical considerations and data analysis. The results are presented in the next chapter.

Chapter 4 Findings Part I - The Health Literacy of Hong Kong Chinese Parents with Preschool Children in Seasonal Influenza Prevention: A Multiple Case Study at Household Level

4.1 Chapter introduction

Health literacy has been clearly identified as a crucial determinant influencing individual and family health behaviour, health services use, and ultimately health outcomes and health care costs (Nutbeam 2008; Sørensen et al. 2012). At a local level developing an understanding of the health literacy of Hong Kong Chinese parents with preschool child in seasonal influenza prevention at a household level is essential foundation knowledge to support the development of sustainable health behaviours and has been identified as an important component of this research study. This study aimed to determine parents' health knowledge and skills, their access to health information concerning seasonal influenza and their capacity to apply new knowledge to effectively manage influenza episodes within their home. Understanding such knowledge and behaviour will assist in designing and establishing mechanisms that better support parents in teaching their children health promoting practices. These mechanisms include how parents can be more engaged by nurses in designing, implementing and evaluating health promotion programmes. These programmes require a strong focus on how nurses can support parents to optimize interactions with their children when teaching and maintaining health practices.

This chapter reports research findings from a multiple-case study that explores parental knowledge and hygiene practices in the prevention of seasonal influenza, their reported cognitive skills in the application of new knowledge in different circumstances, the factors enabling their health practices and the potential role of nurses in family health promotion. These findings therefore answer the following research questions of this study:

- How does health literacy influence Hong Kong parents of preschool children's seasonal influenza prevention practices?
- How does the living environment affect parent's health practices in seasonal influenza?
- What is the role of nurses in the seasonal influenza prevention and related health promotion of Hong Kong Chinese parents with preschool children?

In order to answer these questions, the research aimed to:

- Identify the knowledge, skills, beliefs and attitudes of parents with preschool children in relation to seasonal influenza;
- Identity the living environment that impact on parent's health behaviour in relation to seasonal influenza and;
- Explore the potential of a nurse-led health promotion intervention to prevent seasonal influenza at household level.

The analysis reported in this chapter was drawn from the collection of qualitative and quantitative data gathered through the use of a survey (Appendix 4 part I), a semi-structured interviewing guide (Appendix 5 question 2, 6 and 7), a questionnaire with closed questions (Appendix 6 part I) and field notes (Appendix 8 part I and part III) with the purpose of understanding parents' functional, interactive and critical literacy on seasonal influenza prevention and related health practices.

Basic demographic data from the survey provided a context for the cases in this study and included sex, age and education level of participants, number of children in the family, employment of main caregivers and monthly household income.

A semi-structured interviewing guide was used to explore the health literacy of the participants' regarding seasonal influenza prevention. These questions included:

- do you think your knowledge and skills are adequate enough to guide your family's behaviour in preventing seasonal influenza and promoting healthy behaviour for your family?;
- could you describe/explain any factors in your life that may affect your behaviour in relation to reducing your ability to protect your child and other family member against seasonal influenza? and;
- to what extent do you think a nurse should be involved in providing support and education to prevent and manage influenza for your child and other family member?

These questions were used to enable in-depth data collection about different determinants affecting participants' health literacy.

A questionnaire of closed questions was adopted to elicit participants' seasonal influenza health practices including hand washing, cough etiquette knowledge, mask wearing and related health promotion activities comprising flu vaccination uptake and regular toy cleaning.

The field notes recorded observations made during and immediately post interview that consisted of the tidiness of the home environment, face mask use and the availability of a thermometer, liquid soap and tissues for hand washing and drying, toy storage and parent-child interaction in relation to health practices.

4.2 Publication of results

The results contained within this chapter have been published as follows:

> Lam, W., Dawson, A. & Fowler, C. (2014). The health literacy of Hong Kong Chinese Parents with preschool children in seasonal influenza prevention: a multiple case study at household level. *PLOS One, 10* (12), e0143844, doi:10.1371/journal.pone.0143844.

A copy of the manuscript is attached to this thesis as Appendix 13.

The health literacy of Hong Kong Chinese parents with preschool children in seasonal influenza prevention: a multiple case study at household level

4.2.1 Introduction

Health literacy comprises "the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health" (World Health Organization 2015). It enables individuals to exert a degree of control over their decision making which in turn determines health outcomes (Nutbeam, Harris & Wise 2010). Health literacy influences individual and family health behaviour, health services use, and ultimately health outcomes and health care costs (Nutbeam 2008; Nutbeam, Harris & Wise 2010; Sørensen et al. 2012). Health literacy can be categorized into functional, interactive and critical health literacy (Nutbeam, Harris & Wise 2010) that deliver benefits to individuals, families and society. Functional health literacy is supported through reading and writing skills that enable people to function effectively in everyday situations. It involves knowledge of risks, health services and readiness to comply with prescribed actions and participate in population health programmes. Interactive health literacy concerns an individual's capacity to act independently with the motivation and self-confidence to apply new information to solve problems in different circumstances, influence social norms and interact well with social groups. Finally, critical health literacy involves the application of advanced cognitive skills to critically analyze information to exert greater control over life events and can lead to building community empowerment to address the social determinants of health.

Research shows that there is an association between low health literacy and poor health outcomes (Berkman et al. 2011; Brigham et al. 2015; Parker 2000). Individuals and communities with low levels of health literacy have been found to have higher rates of health care service use, lower information seeking behaviour (von Wagner et al. 2009) and lower influenza vaccination up take rates (Berkman et al. 2011) than those with high levels of health literacy. The health literacy of parents has an effect on family life style and behaviour (Beets, Cardinal & Alderman 2010; Gussy et al. 2008; Schor & Menaghan 1995) that directly affects the health outcomes of children in their care (DeWalt & Hink 2009).

Younger children along with pregnant women, and people with chronic medical conditions are at a higher risk of seasonal influenza infection than other groups in the population (World Health Organization 2010). In Hong Kong influenza is significantly associated with increased hospitalization rate of child under five years of age (Chan et al. 2013). The numbers of children hospitalized as a result of influenza highlights the need for policy makers to focus on improving existing family health promotion strategies to avert child illness and plan effective preparedness and response systems to address future influenza epidemics (Lam, Dawson & Fowler 2014)

The level of Hong Kong Chinese parents' health literacy, in terms of parental knowledge and practices in relation to preventing and managing seasonal influenza prevention is unknown. There is no research that provides an understanding of parents' health knowledge and access to health information concerning influenza, nor their capacity to effectively manage flu episodes in the home. Such knowledge could provide valuable insight into ways of enhancing parents' health literacy so they can not only effectively communicate health messages to their children but support the development of healthy behaviour through role modelling (Morrison 2008). Parents are well positioned to reinforce their children's healthy practices through their daily interactions and make informed decisions concerning health care use as they spend significant time with their children. This includes the practice of hand washing and cough etiquette as recommended by the WHO and Hong Kong Department of Health as effective measures to prevent the spread of influenza (Centre of Health Protection of Hong Kong 2012b; World Health Organization 2009a, 2009b). Apart from these preventive measures, evidence exists supporting the use of face masks by an influenza infected person to reduce influenza viral transmission (Cowling et al. 2010). Two studies found that close contact and the longer the time spent with an infected person were strong predictors for contracting an influenza viral infection (Simmerman et al. 2011). While early implementation of correct face mask wearing after the onset of symptoms decreased the chance of viral transmission (Cowling et al. 2009). This implies that wearing a face mask on its own is not enough to prevent influenza viral transmission. Maintaining an optimal distance of one metre between individuals and prompt face

mask wearing are both important to enhance the effectiveness of seasonal influenza prevention (Lam, Dawson & Fowler 2014) . A key strategy in many countries has been the annual provision of an influenza vaccination for high-risk groups such as young children and older people with chronic illness to prevent and reduce influenza transmission and related complications (Lau et al. 2013; Uwemedimo et al. 2012; Wong et al. 2006; World Health Organization 2009b). In Hong Kong's public clinics, free influenza vaccination is only provided to elder people aged over 65 with chronic illness (Department of Health of Hong Kong 2015). Children between the age of six months and less than six years may receive subsidized vaccination from private doctors. This might be the reason for only 9% of 401 parents allowing their children to receive influenza vaccination in a local study (Lau et al. 2013). Low vaccination rates associated with low parental knowledge of influenza vaccination and perceptions of side effects were also reported in this study.

The Centre of Health Protection of Hong Kong (CHP) (Centre for Health Promotion of Hong Kong 2010) has focused on raising public awareness of influenza infections using a variety of methods including printed materials, websites, telephone hotlines, briefing sessions, public television announcements and media interviews, along with large-scale publicity campaigns to promote personal and environmental hygiene, and various vaccination programmes (Centre for Health Promotion of Hong Kong 2010). This top-down preventive approach has its limitations and has been challenged for its inability to create lasting behavioural change that reaches all populations (Huber & Shapiro 2012). Using this approach, parents are positioned as recipients of information and are not actively involved in family health promotion activities. They are not engaged as stakeholders in identifying health problems, developing health promotion strategies, implementing those strategies and evaluating the implementation process (Huber & Shapiro 2012). As a result, they are less likely to feel engaged in health promotion campaigns and unlikely to act upon the messages communicated in these efforts. In a survey finding of 513 Hong Kong citizens by the Public Opinion Programme (2013) on hand washing and mask wearing behaviour, despite considerable health communication campaigns this survey found, around half of the parents did not practice recommended hand washing and mask wearing techniques when they had flu symptoms. Among those

parents, one quarter were parents of children aged below 15 years (Public Opinion Programme The University of Hong Kong 2013).

This paper reports on a study to explore the health literacy of Hong Kong Chinese parents with preschool child/ren regarding seasonal influenza prevention. The aim of this paper is to provide useful insights into the design and delivery of health promotion initiatives to address influenza at both community and population level.

4.2.2 Methods

Research Approach

A multiple-case study design was employed to investigate functional, interactive and critical health literacy of parents' seasonal influenza prevention in different family context. A case comprised a parent with preschool child/ren between three-to-five years from a range of preschools and family backgrounds. The approach allowed the researchers to analyze phenomena from multiple perspectives within each real-life setting and across settings to understand the similarities and differences between the cases (Stake 1995; Yin 2014). A multiple-case study approach is advantageous because it is thought to produce substantial and robust results beyond the limitations of a single case study (Yin 2014). This research approach can enable the discovery of previously unknown features regarding seasonal influenza prevention and family health promoting behaviours, providing in-depth knowledge of human realities and ascribed meanings (Creswell 2007; Crotty 1998; Polit & Hungler 2004).

Participants

Purposive intensity sampling was used to provide rich information that manifested the phenomenon of health literacy among parents with preschool children. A networking approach was used to identify potential preschools. Letters and study information sheets were sent via the person-in-charge of five Hong Kong kindergartens for distribution to Chinese parents, inviting them to participate in the study by contacting the researcher. Finally, three kindergartens agreed to join the study. The researcher then personally invited the parents and provided a detailed explanation of the research. The selection criteria were parents with a healthy three-to-five year old preschool child/ren who were

willing to communicate and share their experiences. Twenty mothers and their healthy preschool children from three kindergartens were recruited. All participants were mothers. The gender of the participants was homogeneous because Chinese mother are usually the main caregiver of child in Hong Kong (Chan, Bowes & Wyver 2009).

The three kindergartens were from three out of 18 Hong Kong districts. They were located in Kowloon City, Shum Shui Po and Wan Chai respectively. Two kindergartens were non-profit and co-educational preschools. One was a private independent and co-educational kindergarten. The 20 families came from six districts. Twelve families were from Shum Shui Po, three families from Kowloon city, two from Kwun Tong and one from Kwai Tsing, Yuen Long and Wan Chai correspondingly.

Twenty mothers were the main caregivers of their children; aged from 28-to-42 years old. Three families had one child; fourteen had two children and three families had three children. Ten mothers had received secondary school education and ten completed tertiary education. Fifteen mothers were housewives and five mothers were full-time workers with their children being cared for by other family members.

Data Collection

Individual semi-structured interviews using open and closed questions were undertaken and field notes were taken to record the observations of mother-child health education activities. The interviews were digitally recorded and then transcribed verbatim for data analysis, with the purpose of understanding mothers' functional, interactive and critical literacy on seasonal influenza prevention and health practices. Open-ended questions to elicit participants' seasonal influenza health practices and related health promotion activities included: "what strategies/activities do you use at home to increase your confidence regarding promoting healthy behaviours or minimize the risk of developing influenza?"; and "what are the concerns you have (if any) about promoting health behaviours to prevent or minimise seasonal influenza for your child and other family member?" Closed questions sought to collect: demographic data, knowledge of influenza prevention including hand washing, cough etiquette knowledge, mask wearing and related practices. The closed questions were based upon a review of relevant literature that included infection control measures of patients with acute

respiratory diseases in community settings (World Health Organization 2009a) and procedures guiding hand washing and face mask wearing (Centre of Health Protection of Hong Kong 2014a, 2014c). The closed questions were then, validated, using a content validity index, by a panel of academic experts, community nurses and school teachers who were knowledgeable about infection control and child and family health. This index ensured that the questions were technically correct, unambiguous, culturally appropriate and able to provide adequate information to address the proposed research questions (Polit & Beck 2006). Mothers' knowledge and skills to guide their family's behaviour in seasonal influenza prevention and promoting healthy behaviour were investigated using a Likert scale with one representing the least adequate to ten indicating the most adequate. The frequency of mothers' hygiene practices was assessed using a five level scale: every time, often, sometimes, seldom and never. Field notes were taken to record the observations during interviews that included noting the tidiness of the home environment, face mask use and the availability of a thermometer, liquid soap and tissues for hand washing and drying, toy storage and mother-child interaction in relation to health practices.

Data Analysis

A thematic analysis of the interview transcripts was employed that consisted of examining, categorizing, tabulating and combing the data to address the propositions of the study (Yin 2014). First, the researcher reviewed the raw data from the 20 semi-structured interviews and then identified the primary codes by marking and linking them according to the research objectives. The codes were grouped into broad categories through repetitive scanning of the data (Yin 2014). Categories within the text that yielded certain themes were collated into theme clusters. Analysis continued until no new themes emerged, as data saturation occurred (Creswell 2007; Morse & Field 2002; Yin 2012). An example of the theme development is provided in Appendix 15. A deductive approach was then, applied for pattern-matching (Yin 2012). The researcher went back to the original data, read through it repeatedly, and compared the derived patterns with previously outlined predefined patterns in order to ensure no missing data and consistency with research objectives. The themes and data extract were independently examined by two other researchers in order to achieve an agreement on patterns matching for the purpose of internal reliability of the study (Yin 2014).

Exclusions to the thematic codes were also identified and discussed with these researchers.

The demographic, numerical data and observations revealed an overall understanding of parental health practices in seasonal influenza prevention. These data provided a context for mother response enriching the analysis of each case.

In the final stage, a synthesis of findings was undertaken (Creswell 2007; Yin 2014). The researcher made a comprehensive comparison across cases including families' demographic information, living environment, parental health knowledge, and reported health practices and actual practices from observations. This cross-case analysis of the multiple cases provided an understanding of the commonalities and differences between cases in regard to seasonal influenza prevention (Creswell 2007; Yin 2014).

Ethical Considerations

This study was reviewed and approved by the Hong Kong Polytechnic University Human Research and Ethics Committee (reference no.: HSEARS20140121001) and University of Technology Sydney Human Research Ethics Committee (approval number: 2014000072). All participants provided informed written consents were obtained from all mothers before the interviews commenced. For the children, written informed consents were also obtained from their mothers for the inclusion of children in the observation process. Observations included mother and child face mask wearing, hand washing and cough etiquette practices. Participation in the study was voluntary with an understanding they could withdraw from the interviews at any time.

4.2.3 Findings

The analysis identified four major themes across the data. These themes were: mothers' knowledge and reported skills and practices in relation to seasonal influenza prevention; parental knowledge seeking and exchange practices; mothers' approaches to health information and enabling environments for health promotion.

Mothers' Knowledge and Reported Skills and Practices

In response to the closed questions about the adequacy of mothers' knowledge and skills to guide their family's behaviour in seasonal influenza prevention and promoting healthy behaviour, thirteen (65%) out of the 20 who responded identified they had adequate knowledge and skills (rated seven-to-eight out of ten points on the scale). Three (15%) scored 6-to-6.5 points as having moderate knowledge and skills. Three participants indicated 5 points and one gave themselves 4 points.

However, mother responses to how they perceived their knowledge and skills levels did not concur with their actual health practices descriptions. Considerable gaps were noted in mothers' responses to their perceived hygiene practices with their actual health practices observed during interviews. All mothers reported that they washed hands after blowing their nose, coughing and sneezing; before eating and before handling food. Fourteen (70%) reported they did not or only sometimes washed their hands after caring for the sick. 14 (70%) reported they did not or only sometimes washed their hands after going to the toilet. Eighteen (90%) stated they did not know the distance that should be maintained from an infected person and 14 (70%) reported that they did not put on a face mask every time when experiencing flu symptoms (one mother said they never wore a mask). No mothers were able to demonstrate all the steps required for proper hand washing and 15 mothers (75%) washed their hands for less than 20 seconds. Thirteen (65%) said that they did not or only sometimes washed their children's toys. Eight (40%) reported that they discarded used tissues in rubbish bins without a lid (four mothers did not know to use a garbage bin with a lid) (**Table 4.1**).

Table 4.1 Knowledge and skills of hygiene practices

Knowledge of hygiene practices (N=20)	**Frequency of hygiene practices**				
	Never	**Every time**	**Often**	**Sometimes**	**Seldom**
When do you (parent) wash your hands with soap?					
Before touching the eyes, nose and mouth	9	2	0	8	1
After blowing nose, coughing and sneezing	0	20	0	0	0
Before eating	0	20	0	0	0
Before handling food	0	20	0	0	0
Before touching your child	12	3	0	5	0
After caring for the sick	5	6	0	9	0
After touching public installation such as escalator handrail, elevator control panel or door knobs	11	6	0	3	0
Do you maintain adequate distance (1 metre) between you and the infected person?	13	3	1	3	0
If you do not maintain adequate distance (1 metre) between you and the infected person, do you wear mask?	17	0	0	3	0
Do you clean toys and equipment regularly?	5	4	3	4	4
Do you put on a face mask on while having respiratory symptoms?	3	6	6	4	1
Which of the following is correct thing to do with tissues after sneezing and blowing your nose? (N ≠ 20) Wrap up respiratory secretion with tissue paper and discard it into garbage bins without lids.	0	7	1	0	0
Do you touch your mask once it is secured on your face?	7	1	3	5	4
Do you wash your hands before and after touching the mask?	17	1	0	1	1
Do you change mask at least daily? Replace the mask immediately if it is damaged or soiled?	3	17	0	0	0
Do you know how adequate should the distance be kept between you and the infected person?	Don't know	18	Know	2	
Skills on hand washing: (N = 19)	**Perform**		**Did not perform**		
Backs of fingers to opposing palms with fingers interlocked.	12		7		
Rotational rubbing of left thumb clasped in right palm and vice versa.	4		15		
Rotational rubbing, backwards, and forwards with clasped fingers of right hand in left palm and vice versa	4		15		
Wrists are rubbed	9		10		
Rub all parts of the hands including the wrists with proper hand hygiene technique for at least 20 seconds.	4		15		

However, their actual health practices did not concur with their descriptions (**Table 4.2**).

Table 4.2 Observations on mother-child interaction in relation to health practices

Participants	Identified hygiene practices issues	Observations: mother-child interaction in relation to hygiene practices
P4	Child did not cover mouth and nose when coughing	Son coughed without covering his mouth. Mother gave no response or action to his coughing.
P9	Child did not cover mouth and nose when coughing	Son was playing the digital games. He coughed several times without covering his mouth. Mother gave no response or action to his coughing
P12	Mother did not wash hands before touching her face and nose.	Mother did not wash her hand before and after touching her face and nose for several times during interview.
P14	Mother did not wash hands before taking a pack of lemon tea to her son and did not remind her son to wash his hands before drinking.	Son requested to his mother that he wanted to drink a pack of lemon tea. Mother gave him one pack of lemon tea but did not remind her son to wash his hands before drinking.
P15	Mother did not wash hands before taking a cup of jelly out of the refrigerator for her child and did not remind her daughter to wash hands before eating.	When playing the toys, daughter suddenly requested to eat a cup of jelly. Mother took it out of the refrigerator without washing her hands first. She gave the jelly directly to her daughter without reminding her to wash her hands before eating.
P18	Mother did not wash hands before preparing the bread for her child to eat.	Son told his mother he wanted to eat bread. Mother passed the boy to the domestic helper to help him to wash hand. Mother went to kitchen and took out the bread for her son to eat but she did not wash her hands before touching the bread.
P20	Mother did not remind her child to wash hands before eating.	When playing with the toys, daughter told her mother that she wanted to eat seaweed. Mother asked her to take the seaweed out from the drawer by herself without reminding her to wash her hands. Daughter ate seaweed without washing her hands.

In response to the open-ended questions, mothers were uncertain when the seasonal influenza peak seasons were and the distance they should maintain from an influenza infected person.

> *"I only know it's around January to March. For July and August (summer time), I think that the heat from the sunlight will kill the germs. I don't know it's also the peak period (of seasonal influenza)." (P20-M83)*

> *"I did not pay attention to the distance to be kept from the sick one; I only know that it is advised not to stay too close with them." (P10-M117)*

Mothers said they did not wear a face mask throughout the whole disease course.

> *"When I start to feel sick, I will wear a face mask for the first few days. But after taking the medications and my health condition is under control with less sneezing and cough, I will stop wearing it. I will not wear a face mask throughout the whole disease course." (P17-M74)*

> *"I will not wear it if I only have symptoms like runny nose or cough. (I will not wear it) throughout the disease course. I wear it only in those days my condition is most serious." (P19-M187)*

Mothers stated that they would reuse face masks if they did not look soiled.

> "[What do you do when you have a face mask on and want to blow your nose?] *I will put the mask on one ear first, then blow my nose and wear it back on again." (P17-M94)*

> *"I will change the mask once a day. Sometimes, if my cough is not that serious, I will fold the mask up and put it in an envelope for later use." (P19-M212)*

> *"If my mask is not too dirty and I do not cough too often, I will reuse it (the mask). I will fold it up and use a tissue to wrap around it for later use." (P20-M184)*

The mothers identified that they did not always wash their hands properly. Some claimed that washing their hands only with water was adequate for cleaning their hands.

> *"The proper procedure of washing hands is very long. I only use a very short period of time when washing my hands. I will not wash it seriously; the procedure and the time are not enough." (P4-M126)*

"We usually wash our hands just simply like this. We do it in a simple way. We do not wash it step-by-step, following the instructions." (P14-M306)
"If their (children) hands are not too dirty, I will not force them to use soap to wash their hands. Ha...ha…" (P19-M350)

"Emm… I basically use it [liquid soap when wash hands] as well. But I think that it's not necessary to use soap all the time because I think it's already good enough to use water for cleaning hands." (P20-M322)

Mothers reported that they did not know the ratio of water to bleach when performing domestic cleaning. For example:

"I think it [bleach to water ratio] is really troublesome to follow the ratio of 1:99. I will just roughly add bleach to a large bucket of water as long as it's diluted." (P19-M117)

"1:49 is for cleaning… I don't remember. I cannot differentiate when to use 1:99 and when to use 1:49." (P20-M88)

Mothers described that they did not have a regular schedule to clean children's toys. They only cleaned the toys when they were dirty.

"Sometimes the toys are contaminated by the droplets from sneezing; it's better to use alcohol to spray them. However, I did not do so. I did not intentionally clean his toys. Really!" (P10-M150)

"I use towel to wipe [their toys]. Emm… when they were little, I used diluted Dettol to disinfect them. But now I seldom clean their toys. If their toys have a bit of dust, I will use water only to wipe them. My husband always says that the best method to clean household is to use water." (P19-M90)

Mothers did not throw their used tissue papers into a lidded rubbish bin. They discarded the tissue in the first available garbage bin. Some mothers stated that they had uncovered rubbish bins at homes.

> *"When throwing rubbish, it depends the location, which one is more convenient, then I will throw into that bin. When throwing, I seldom notice whether it [rubbish bin] has a lid or not." (P8-M83)*

> *"Because it's really really dirty. If I am at home, I will use a tissue to cover my nose when I am sneezing. Then I will throw the used tissue into the bin, however the bin does not has a lid." (P10-M160)*

Parental Health Knowledge Seeking and Exchange

Mothers reported three common sources for their information seeking and exchange. They were social connection, public service announcement and a community contact point.

Social Connection as a Means for Seeking and Exchanging Health Information

The research data illustrated mothers' social connections to different family and community members, social media, the internet and television as sources of health knowledge and practices. Mothers identified they accessed knowledge through formal and informal means including direct face-to-face meetings, phone talking, group gathering, attending health clinic and sending messages. The most common method used by mothers to share and gain health information communication with other people and mothers was through a mobile messaging application. This allowed them to get instant messages and exchange messages without having to pay.

> *"I know that there is a website for Department of Health, but I have not visited it ever before. We used to just read information popped up from mobile phone or website. We are not used to visiting the website from the government." (P10-M315)*

"Other parents and I have a WhatsApp group. Whoever children are sick, the parents will take initiatives to tell one another. For example, parents will share the health status of their children, which disease their children get? Then, other parents will be posted on the situation and know what to be taken in order to prevent spreading of the disease among the group." (P16-M172)

For mothers a common source of health information was from the internet

"I will actively look at which type of disinfectant is good. I will take a look at books or go to some websites as well, those websites for mothers. Some topics, for example saying that his son is always sick, there will be conversations about that for a while, and then I will take a look at other people's experience." (P4-251)

"We also share on which type of soup we should boil [to prevent flu or health promotion against flu]. I usually go into websites, for example Baby Kingdom. Inside, other users will teach you boiling specific soup to expectorate sputum." (P17-M107)

In the following quotes, discussion with neighbors and news heard from public media fueled decisions not to vaccinate. These discussions were about complications and side-effects affecting those children who had been vaccinated.

I am afraid of the reaction after vaccination. There are a lot of news which reported the side effects of vaccination." (P6_M101)

"The parent living upstairs said that after flu vaccination, her children still got a fever and unwell. Therefore, I did not let my children receive the vaccination since I am afraid that they will get sick after injection." (P13- M151)

Mothers reported the significance influence of knowledge exchange through intergenerational learning between parent and their elders. The following quotes provide examples of these health promotion messages.

> *"When I am looking back to my health practice, to certain extend, I think my practices are influenced by my parents or family members." (P4-M316)*

> *"I heard it* [boiling dried vegetables and pig's lung soup] *from elder people*… [it] *clear the residue of western medications away from our bodies since they* [medications] *will stay in our bodies after we take them. So it's better to clear them away* [from body]*". (P11-F178)*

> *"The other parents share this method, eating Bo Ying Dan to prevent influenza with me. I also learn it from previous generations." (P20-M194)*

Receiving Public Service Announcement

M0others recognized the wider community as a source of health information. School teachers, health professionals and government posters were all identified as health promotion sources:

> *"If the school distributes notices back home, I will take a look at it… Some kind of notices or anything pamphlets, my children take back, I will have a look at them."(P3-M203)*

> *"There are leaflets in the child and maternal clinic as well as television. When we are waiting for doctor consultation, the television will broadcast health information on flu, sometimes they will teach you about personal hygiene." (P8-M255)*

> *"There are posters placed* [regarding prevention of influenza] *at the entrance of library, near the places for monthly magazines. I did see posters placed there." (P15-P323)*

Mothers claimed that their health promotion practices were enhanced through government television advertisements.

> *"Every time when I see an advertisement about government providing free vaccinations, then I know it is the time to bring them to have vaccinations." (P16-M88)*

> *"If it's the peak season of influenza, and when the television broadcasts news about the prevention of influenza, I will ask him to wash his hands more frequently." (P11-F40)*

A Community Contact Point for Seeking Health Information

Mothers described that nursing services could provide a dissemination point for health information to enhance parents' knowledge and skills in prevention of seasonal influenza.

> *"There should be a contact point for nurses to hold health education talks. Just like community centre, at least when the mothers are free, they can bring the children to attend the talks. If there is no such arrangement in the community, we don't know where to learn and how to prevent seasonal influenza." (P7-M468)*

> *"The best method to promote flu prevention is to find a contact point. Which means... more elder people ask questions in the contact point, then they will spread out the learned knowledge/information to others. This is the better way." (P11-F254)*

Mothers suggested community nursing services might include health consultation. Through the consultation, parents' misunderstanding and concerns about health issues might be addressed and often reduced.

> *"... There are many children living in this estate. It is a good if community nurse is here. We can get the information from community nurses. I remember one of my experiences before; I don't know what happen to my baby daughter. I dialled to the nurse…the maternal and child health centre nearby. Phone call is a convenient way to seek advice in emergency occasion. It is good to get prompt information. At least there is a person who can calm you down first." (P6-M432)*

> "[Having a community nurse within the estate] *is convenient for everyone. It is convenient for the neighbours; we don't have to go to clinic which is far away from us, for enquiry. We can ask her what to eat when having influenza. What medication to eat when having a cough. Questions like which type of medication is the best will be asked as well. Asking the best medications for the fastest recovery of influenza. Since we do not know a lot, we will definitely ask questions about the type of medications to buy or the best medication first." (P2-M155)*

Mothers**' Approaches to Health Information**

The interview analysis found that mothers were interested in learning about health from a variety of sources including: YouTube, government websites, and commercial marketing and were mostly accepting of the information presented. However, the mothers had no intention of verifying the obtained health information and potential issues about the reliability and quality of the information were raised:

> *"I surf the websites to see anything related. Sometimes, I will also browse YouTube… I rely on these to obtain information. I follow and act on what people say without the need for clarification." (P1-M217)*

"Those are what the promotion says [they promote health]. Ha…Ha… (Laughing). They [commercials] *will mention about the effect or what will be enhanced physically afterwards. Adults like us will take in comparatively less instead but we think that children need more protection; therefore I will buy these* [healthy product] *for them. I get no intention to verify the information, but sometimes they* [commercial companies] *will quote their sources or from some statistics etc." (P3-M256)*

While some mothers trusted the advertisement provided about a product other mothers were more critical of the information provided by the commercial company. In the first quote the mother appeared ambivalent about the trustworthiness of a product.

"I watched the television and they broadcasted their commercial, showing that Evergreen H_2O multi purposes disinfectant cleaner is used for mopping the floor. I really do not know whether it's effective or not. I really do not think about whether it's effective or not." (P11-F74)

In this second quote the mother was much more critical of the impact on her child's body.

"Credibility is very important to me. My choice definitely is based on its credibility. It is very important because it [Bo Ying Dan] *is taken into their* [children's] *bodies." (P20- M202)*

Enabling Environments for Health Promotion

A Shortage of Health Resources

The mothers felt that inadequate health resources provided in the community hindered their health practices. Some mothers highlighted the difficulty of finding lidded rubbish bin in the streets.

"Well…There's no reason for me to find one with a lid. If there is a bin without a lid beside you, it doesn't make sense for you to walk to a further one. I know, but all the bins near this area do not have a lid." (P2-M78)

"If I am on the street, I will throw the rubbish to the bin without cover as most of the rubbish bins have no lids. I get no choice. I only can throw them to these bins [without lids]." (P5_M83)

Mothers complained about the inadequate public hand washing facilities nearby and the lack of liquid soaps in the public toilets.

"I think the soap provided in the public toilets is not enough. There isn't any all of time." (P15-P304)

"We do not have a habit of cleaning his hands after holding the hand rails of escalators. I won't be able to find a washroom to wash hands immediately." (P18-M45)

Mothers emphasised the need to deliver health information resources before disease onset. She recommended broadcasting government health promotion advertisements before the onset of seasonal influenza. It allowed time for parents to improve their preparation to prevent seasonal influenza.

"Emm… Sometimes I know it [peak influenza season] *only after watching promotion commercials produced by the government in television. Which means I know it only after the flu has come? It's too late to prevent." (P14-M270)*

"Government advertisements start promoting when it has already been the peak period of influenza. It has already been too late. Government should remind people a bit earlier." (P14-M272)

Resource Allocation for Health

Health resources such as physical examination and health promotion activities were identified as disproportionally focused on the health needs of the elderly rather than on children.

> *"Yes… The resources of this district are mainly for elderly people such as physical examination. It put a large proportion [health resources] on them. But I can't see that they have put any resources on children. Apart from vaccination for children, I can't see any resources allocating to them [children]." (P10-F42)*

> *"Maybe the resources of Child and Maternal Health Clinic are not enough. When my child was up to two years old, people there* [in clinic] *told me there is no need to come to clinic again since all follow-up consultations were finished. If there is nothing special, no need to attend the clinic. But, I just think...I want to know…more on child development or the eating issue of child...what I need to pay attention on it." (P16-M261)*

4.2.4 Discussion

Enhancing Functional, Interactive and Critical Literacy

Functional, interactive and critical health literacy can be fostered by increasing parents' capacities to access and effectively use health information (Nutbeam, Harris & Wise 2010) as well as providing health consultation in the community (Lam, Wu & Fowler 2014). The internet is a common access point for people searching for health information (Fiksdal et al. 2014). Online seeking behaviour has become increasingly integrated into the lives of health consumers encouraging them to be active health information consumers (McMullan 2006). Similar health seeking behaviour was also found in this study. Parents used the internet as a complimentary health resource to search for information (Fiksdal et al. 2014; Ybarra & Suman 2006) and exchanged new health information with other parents. This may have compensated for gaps in the provision of information by health professionals (Gilmour 2007), including when parents have difficulty making timely appointments with health professions or when scheduling conflicts arise during clinic hours (Bhandari, Shi & Jung 2014).

Apart from internet-based health education, the use of mobile health technologies such as short message service (SMS) for health message reminder provides new and innovative opportunities for health promotion and disease prevention efforts (Déglise, Suggs & Odermatt 2012). This telecommunication for health promotion is feasible in local text as cell phone use in Hong Kong is very common. The SMS application is a cost-effective health promotion method (Stockwell et al. 2012) as it will not cost parent's money when receiving health message. The text messages reminder for seasonal influenza prevention such as childhood vaccination and personal hygiene practices can reach parents in advance. Therefore, parents are able to take preventive measures before seasonal influence comes. In this study, similar health seeking behaviours were also reported. Parents claimed that they prefer reading the information popping up from mobile phone.

In order to address parents' needs associated with the change in their seeking behaviours, an electronic integrated health promotion service such as SMS health message reminder and internet-based health education has been recommended as effective ways to facilitate and increase parents' uses of health services (Healy 2006), and improve parents' functional literacy (Leung, Ma & Russell 2013; Ybarra & Suman 2006). Community nurses could contribute to enhancing parents' functional, interactive and critical literacy to use health information and service effectively through internet-based health education together with outreach services such as health workshops and consultation session (Nutbeam 2000). By participating and learning through workshops, parents' functional literacy such as health knowledge and skills, and interactive literacy such as developing confidence performing practices independently such as hand washing or coughing/sneezing manner can be further consolidated. Interactive opportunities will challenge parents' misunderstandings and inaccurate concepts can be corrected. Nurses can play a key role in the provision of educational information, guide parents to websites where reliable health information can be found (Rice 2006) and provide support as they learn to interpret and integrate online information with traditional health care approaches (Ybarra & Suman 2006). These interactive activities enable parents to develop critical literacy skills for the application of health practices in different situations and have greater control of their health through informed decision making (Nutbeam, Harris & Wise 2010). Encouraging parents to participate in the

design, development and evaluation of on-line educational programmes will ensure educational content is appropriate to the needs of the community (Lam, Wu & Fowler 2014; Nutbeam, Harris & Wise 2010).

Process Evaluation and Community Engagement in Programme Development

In this study mothers raised issues about the absence of adequate enabling conditions that inhibited their ability to take preventative action and to participate in health interventions (Green & Kreuter 2005). These conditions included: the limited availability of hand washing facilities and rubbish bins with lids, access to appropriate child-focused community health services, and community resources for health consultation.

A potential need is for greater community health planning and action that includes: process evaluation before and during planning stages and when implementing seasonal influenza prevention programmes in order to address the actual needs of the families. To ensure successful delivery of seasonal influenza prevention within communities, collaboration and partnerships is crucial among community members and public health agencies such as outreach clinics, district councils and schools. This approach ensures adequate health communication and integrates community engagement at every stage of programme development (Lam, Wu & Fowler 2014).

4.2.5 Conclusion

A multiple-case study was adopted to examine functional, interactive and critical health literacy of mothers' seasonal influenza prevention and related health promotion practices. The findings from this study demonstrated that many mothers have insufficient functional and critical health literacy in relation to seasonal influenza prevention and related health promotion. Mothers demonstrated a lack of, or incomplete hand washing and mask wearing and a limited critical analysis of available health information obtained from different community organizations. Community nurses could contribute to enhance parental capacity to use health information effectively through internet-based health education together with outreach services. The findings also suggest that community health professions take a critical role in increasing parents'

functional and critical literacy; vital elements when planning and implementing seasonal influenza health promotion intervention.

4.3 Chapter summary

The results from this chapter indicated that mothers used various social connections and technologies including different family community members, social media, the internet and television for health knowledge seeking and exchange. The mother's health knowledge and reporting skills and health practices in relation to seasonal influenza prevention were inadequate. These findings highlight the need for community health professionals to play a critical role in increasing parents' functional, interactive and critical health literacy.

Besides, limited enabling environments including shortage of health resources such as inadequate lidded rubbish bins and hand washing facilities in the community and uneven resource allocation for health promotion to children were identified as barriers to promoting parental health practices. This major barrier of uneven resource allocation for children's health promotion programmes and activities was highlighted by the mothers and it caused them concern. As identified in Chapter 1 much of the community health funding is directed towards the care of the elderly (Hospital Authority 2014). An increase in funding is required that is directed towards childhood health promotion and illness prevention.

To ensure successful delivery of seasonal influenza prevention within communities, greater community involvement in planning is necessary (Cyril, Smith & Renzaho 2015). Involvement in process evaluation when planning and implementing seasonal influenza health promotion programme would enable families to take greater ownership of programmes and ensure there is an increased likelihood of addressing the actual needs of the families (Lam, Dawson & Fowler 2016). This approach facilitates adequate health communication and community participation at every stage of programme development.

The findings of this study raise further questions about other influences that impact on the ability to effectively disseminate health promotion information. The role of culture

on parental daily health practices in seasonal influenza prevention and related health promotion strategies remains a crucial factor in the design and implementation of any health promotion activities or programmes. Before programmes or activities can be developed that support the development of parental health literacy, a detailed examination of cultural factors is required. The development of a comprehensive understanding of the reasons for inadequate parental functional, interactive and critical health literacy remains lacking and is crucial to enable a positive learning outcome for parents and their preschoolers.

Chapter 5 Findings part II - The role of culture in relation to the seasonal influenza prevention practices of Hong Kong Chinese parents with preschool children

5.1 Chapter introduction

A person's level of heath literacy can be affected by their approach to seeking health information and knowledge exchange. In this study and as reported in the previous chapter, parental functional, interactive and critical health literacy regarding seasonal influenza was found to be affected by the ways in which parents sought and shared health information. The reported findings also indicated that limited enabling environments hindered the promotion of parental health practices such as a shortage of hand washing facilities in the community and a lack of liquid soap in the public toilets.

Based on the findings of the literature, individual and family health knowledge and practices including health literacy are affected and shaped by culturally related principles and norms (Adair et al. 2004; Christensen 2004). Cultural values and traditions significantly influence local Hong Kong Chinese people's responses and practices to upper respiratory tract disease such as using herbal preparations to prevent common cold and influenza-like infections (Lau et al. 2005). Given the unknown nature of the role of culture in relation to the seasonal influenza prevention practices of Hong Kong Chinese mothers with healthy preschool children, this study provides insights and raises further questions about the influence of cultural beliefs and practices on mothers' daily health practices regarding seasonal influenza prevention strategies. Future enquiry is necessary into the cultural influences on mothers' daily health practices to prevent seasonal influenza.

In response, this chapter reports a detailed analysis of the role of culture in the seasonal influenza prevention practices of Hong Kong Chinese mothers with preschool children. The study findings described in this chapter provide answers to the research questions 3 "what is the role of culture in relation to the seasonal influenza prevention practices of Hong Kong Chinese mothers with preschool children?" An outcome of answering question 3 is its contribution to our understanding of research objective 3 "identify the

role of culture that impacts on mother's health behaviour in relation to seasonal influenza".

All analysis from this chapter was drawn from the data gathered through a survey of demographic data (Appendix 4 part I question 10-12), a semi-structured interviewing guide (Appendix 5 question 6) and the field notes (Appendix 8 part I). These data have contributed to understanding the role of culture in parental seasonal influenza prevention practices.

Basic demographic data including the estimated household surface area, the number of people living in the household and child sleeping arrangement has been used to provide a context for the cases in this study. This contextual understanding is significant as it varies from the conditions experienced by many developed countries.

The open-ended question of the semi-structured interviewing guide assisted in exploring participants' culture related seasonal influenza health promotion strategies and related health activities. This question was "could you describe/explain any factors in your life that may affect your behaviour to protect your child and other family members against seasonal influenza. The question was further extended into two questions "do any of your family/cultural practices affect your decision making about the management of seasonal influenza"; and "do any of your family members use alternative medicine to protect your child from seasonal influenza?" These questions were developed for the specific purpose of in-depth and focused data collection with regard to culturally related seasonal influenza prevention practices.

The field notes were taken to record the observations during interviews that included noting the home environment, child sleeping arrangements and Western health products and Chinese medication storage in relation to seasonal influenza prevention.

5.2 Publication of results

The results contained within this chapter have been submitted for publication and are currently under review as follows:

> Lam, W., Dawson, A. & Fowler, C. (2014). The role of culture in relation to the seasonal influenza prevention practices of Hong Kong Chinese parents with preschool children. *Journal of Community Health Nursing* (under review)

The publication is part of a series of papers from a single study. The manuscript version submitted for consideration with this journal is attached to this thesis as Appendix 15.

The role of culture in relation to the seasonal influenza prevention practices of Hong Kong Chinese parents with preschool children

5.2.1 Introduction

Individual and family health knowledge and practices, including health literacy are affected and shaped by culturally related principles and norms (Adair et al. 2004; Christensen 2004). In Hong Kong, seasonal influenza is common in the periods from January-to-March and July-to-August. Influenza is easily transmitted and particularly affects those with immature or compromised immune systems such as young children and the elderly with chronic illness (Centre of Health Protection of Hong Kong 2016; World Health Organization 2009a). (Centre of Health Protection of Hong Kong 2012b). Hong Kong Chinese parents have been found to use both Western medicine and Traditional Chinese medicine remedies (Lau et al. 2005) to manage their children's cold symptoms and prevent their children from seasonal influenza infections. These include the use of herbal preparations such as Sang Ju Yin, Yu Ping Feng San, Folium Isatidis and Radix Scutellariae (Lau et al. 2005). Differences in the health practices of families in Western and Asian societies have been noted in the literature (Yamashiro & Matsuoka 1997). For example diet therapy, which is based upon a cultural belief in the energy giving effects of food is used in many Chinese families to achieve health to maintain balance by "heating" or "cooling" the body (Chen 2001). While foods such as honey or lemon drinks that seem to have soothing properties are often applied to prevent colds in Western families (Paul et al. 2007).

Hong Kong is highly westernized but the population is largely Chinese. Traditional Chinese Medicine and Western medicine continue to be integrated into long established health practices (Lam 2001). Traditional Chinese medicine includes different types of treatments such as herbal preparations, diet therapy, the use of animal organs, massage to stimulate blood circulation and acupuncture to treat a range of conditions (Ludman & Newman 1984). The principles underpinning Traditional Chinese Medicine and Western medicine are very different (Lam 2001). Chinese medicine is informed by the philosophical, ethical and religious tradition of Taoism that emphasizes harmony between human beings and nature providing peace of mind (Chen 2001). To attain health, an individual must regulate him or herself to fit the rhythms of the universe. The concepts of health and illness among Chinese people have long been influenced by the harmony of the forces of Yin and Yang (Chen 2001). The imbalance of these forces within and between human body and its atmosphere is believed to cause illness. In contrast to Chinese medicine, Western medicine is based on the use of empirical or measurable evidence derived from the biomedical sciences including genetics and involves medical technology to diagnose, treat, and prevent injury and disease.

The Hong Kong local health authorities have employed social marketing campaigns to promote personal and environmental hygiene strategies to prevent seasonal influenza. In addition, resources have been targeted at increasing immunization rates through vaccination programmes (Centre for Health Promotion of Hong Kong 2010). Maintaining personal hygiene including proper hand washing and cough etiquette, and having a seasonal influenza vaccination are recommended as the most effective methods to prevent the spread of seasonal influenza (Centre of Health Protection of Hong Kong 2014a; Jennings et al. 2008; World Health Organization 2009a).

Hong Kong is a small densely populated territory of over seven million people (Hong Kong Census and Statistics Department 2012). It is common for a family of four to live in an apartment with a total area of 40 square metres. Chinese values emphasize the development of interdependence and family closeness (Chen 2001), these beliefs also influence parents' childrearing practices such as sharing beds. In Hong Kong and many Asian countries, child-parent bed sharing is commonly observed in families (Liu, Liu & Wang 2003; Yang & Hahn 2002). Under such circumstances, if a family member is

infected with seasonal influenza, it is easily spread to other family members within overcrowded living areas. Therefore, the use of anticipatory interventions becomes crucial to reduce the risk of cross infection including on-going strategies to maintain healthy immune responses and personal hygiene. Hong Kong Chinese mothers are highly involved in child care which is often their priority concern (Chan, Bowes & Wyver 2009). As children often stay at home with their mothers for large amounts of time, mothers are in a strong position to reinforce children's health practices through daily interaction and reminders. Mothers are role models for children to learn and behave (Bodrovea & Leong 2007).

A review of the literature on seasonal influenza prevention, found that most research studies focus on the: factors affecting vaccination uptake such as influenza infection knowledge (Hofstetter, Barrett & Stockwell 2015; Liao et al. 2011; Lohiniva et al. 2014) or perceived benefit from flu vaccination and perceived severity from seasonal influenza (Kwong, Lam & Chan 2009; Lau, Au, et al. 2012; Zijtregtop et al. 2009); methods to increase influenza vaccination uptake rate (Stockwell et al. 2015); and the use of face masks and effective hand hygiene to prevent household influenza infection (Cowling et al. 2009). There is limited research in the peer reviewed literature exploring the role of culture in seasonal influenza prevention practices of Hong Kong Chinese parents with young children at a household level. The aim of this study is to provide an understanding into the role of culture in Chinese parents' health practices to prevent influenza. The findings will be of use for community nurses when working with Chinese communities in planning health promotion programmes, health services as well as influenza preparedness plans.

5.2.2 Methods

Research Design

We undertook a mixed methods research study using a multiple-case approach (Cresswell 2009; Yin 2012). A case comprised a mother with a child between three-to-five years from a range of Hong Kong preschools and family backgrounds. This study approach permits the researchers to: examine phenomena from multiple views within and across each real-life setting, analyse the commonalities and variances between the cases and, discover previously unknown features regarding the culturally specific health

promotion practices of parents related to seasonal influenza prevention (Stake 1995; Yin 2014).

Recruitment and Participants

A networking approach was used to identify potential preschools. Letters and study information sheets were delivered to parents via the principals of five kindergartens that invited the parents to join the study by contacting the researcher. Three kindergartens agreed to facilitate the contact with potential parents. Parents indicating a willingness to communicate and share their experiences were contacted by the researcher, a detailed explanation of the research was then provided. Purposive intensity sampling was used to recruit parents. In total, 23 parents were contacted. Three parents refused and 20 parents with healthy young children under five years agreed to participate in this study. All participants were mothers. The gender of the participants was homogeneous because Chinese mother are usually the main caregiver of child in Hong Kong (Chan, Bowes & Wyver 2009).

Data Collection

Semi-structured interviews using open and closed questions were conducted in mothers' homes. Field notes were also used to record the observations taken during the interviews. Digitally recorded interviews were transcribed verbatim for data analysis, with the aim of understanding parental health promotion strategies for seasonal influenza prevention and their health promotion practices to minimize the impact of flu symptoms or their onset. Open questions included: "can you describe how your family/cultural practices affect your decision making about the management of seasonal influenza"; and "do any of your family members use alternative medicine to protect your child from seasonal influenza"? Demographic data were collected including household surface area, number of people living there and the child's sleeping arrangements. Observations were documented using an observation guide and field notes. Observations were made concerning the home environment, mother-child interaction and medication storage with regard to prevention of seasonal influenza. The interview and observation guide were developed after a review of relevant literature and discussion with two researchers, colleagues and school teachers experienced in child and family health promotion. A validation process occurred using academic experts,

community nurses and school teachers who were knowledgeable about infection control, child and family health and preschool education. This validation process ensured that the instrument was culturally appropriate, explicit, technically correct and able to provide sufficient information to address the proposed research questions (Polit & Beck 2006).

Data Analysis

A thematic analysis was used to examine, categorize, tabulate the interview data to address the study objectives (Yin 2014). First, the transcripts from the 20 semi-structured interviews were reviewed to mark and link primary codes according to the research propositions. These codes were clustered into broad categories through repetitive reading of the data (Yin 2014). The categories were then grouped into thematic clusters. Analysis continued until no new themes emerged (Creswell 2007; Morse & Field 2002; Yin 2012). Data saturation was observed when similar meanings and categories were noted from the data after the eighteenth interview. Two additional interviews were further finished to confirm that no new data were provided by the mothers. A structured approach was taken to establish patterns across these data (Yin 2012). The first author (WL) returned to the data, re-reading numerous times to make comparisons with previously outlined predefined patterns to ensure consistency with the study objectives and identify data that may have been missed. The other authors (AD and CF) independently assessed the identified themes and data extraction process and consensus was reached on the findings thereby ensuring rigour (Yin 2014).

The demographic data, observations and field notes identified culturally related health promotion practices used by Hong Kong Chinese mothers in seasonal influenza prevention. These data enriched the qualitative analysis of individual cases and provided a family context for the mother responses.

In a last stage, the families' demographic data, home settings, level of parental education, living environment, and culture related health promotion practices were compared comprehensively across cases. This cross-case analysis provided a thorough understanding of the similarities and variances between families regarding health practices for seasonal influenza prevention (Creswell 2007; Yin 2014). The

concordance between the interview and observation data enhanced the rigor of the findings (Yin 2012) .

Ethical Considerations

Ethical approval was obtained from the Hong Kong Polytechnic University Human Research and Ethics Committee and University of Technology Sydney Human Research Ethics Committee Human Research and Ethics Committees. The consents allow publishing and reporting of individual data. Mothers voluntarily joined the study and were informed that they could withdraw from the research at any time. All data were de-identified during the transcription process.

5.2.3 Findings

Twenty Hong Kong Chinese parents were recruited from three kindergartens and agreed to be interviewed. They were all mothers, aged between 28-and-45 years and the main caregivers of their preschool children. Ten mothers completed secondary school education. Ten mothers had finished tertiary education. Fifteen mothers were housewives. Five were full-time employees and their children were cared for by other family members. Nine families had three generations: grandparent, parent and child living in the same household. Eleven families had two generations: parent and child living in the same household.

The qualitative analysis of the interviews identified five major cultural practices within the data. The practices were: sharing beds; boiling white vinegar to kill air-born germs in the air; diet therapy to enhance health; self-prescribed Chinese medication to manage child's cold symptoms and the co-use of Western health products; and traditional Chinese medication to prevent seasonal influenza. The data gleaned from the observations enriched the interview findings.

Sharing Beds

Sharing a bed with small children is a common practice by Hong Kong Chinese families (Liu, Liu & Wang 2003). Many children sleep with their parents, domestic helpers or siblings even when they are ill. The following two examples illustrated this theme.

> *No matter whether my child is sick or not, she still sleeps with me. If I am sick, it's impossible for me to wear a mask to sleep. She likes to stick and sleep with me. (P8-M22)*

> *Elder daughter sleeps with her dad and younger son sleeps with me. I won't specifically sleep separately with them when I get flu. It's the same. (P11-M23)*

The findings of the above quotes were consistent with the situations observed during the home interviews. The household surface area of the 20 participative families ranged from 30 metres to 100 metres. The total number of people living in the household was from four-to-eight people. In relation to sleeping habit, three mothers reported that they will let their children sleep alone in their bed as usual when children get flu symptoms. Seventeen mothers claimed that sharing a bed was their usual practices no matter whether their children were sick or not sick. Bed sharing allows the mother to take care of their child in a convenient way, particularly when the child is sick. Among these 17 mothers, 13 mothers claimed that they sleep with their children. One mother said her son shares a bed with his elder brother. Three mothers stated their children slept with the domestic helper. (**Table 5.1**)

Table 5.1 Observations on home environment and setting

Participant	Reported household surface area by mothers	Number of people living there	Child sleeping arrangements
P1	66 metres	4 adults and 3 children	Child sleeps with her elder brother in same bed. When sick, child will sleep with her mother.
P2	45 metres	2 adults and 2 children	Child sleeps with mother in same bed. When sick, he also sleeps with mother.
P3	70 metres	2 adults and 2 children	Child sleeps alone in lower deck of bunk bed. When sick, she also sleeps alone in her bed.
P4	80 metres	3 adults and 2 children	Child sleeps with domestic helper in same bed. When sick, she also sleeps with domestic helper.
P5	45 metres	5 adults and 2 children	Child sleeps with mother in same bed. When sick, she also sleeps with mother.
P6	55 metres	2 adults and 3 children	Child sleeps alone in her own bed of bunk bed. When sick, she also sleeps alone in her bed.
P7	45 metres	5 adults and 3 children	Child sleeps with mother in same bed. When sick, she also sleeps with mother.
P8	45 metres	4 adults and 1 children	Child sleeps with mother in same bed. When sick, she also sleeps with mother.
P9	30 metres	2 adults and 2 children	Child sleeps with his elder brother in same bed. When sick, child will sleep with his mother.
P10	35 metres	2 adults and 2 children	Child sleeps with his elder brother in same bed. When sick, he also sleeps with his elder brother.
P11	38 metres	2 adults and 2 children	Child sleeps with mother in the same bed. When sick, child also sleeps with his mother.
P12	35 metres	2 adults and 1child	Child sleeps with mother in the same bed. When sick, child also sleeps with his mother.
P13	35 metres	4 adults and 3 children	Child sleeps with mother in the same bed. When sick, child also sleeps with his mother.
P14	40 metres	3 adults and 2 children	Child sleeps with mother in the same bed. When sick, child also sleeps with his mother.
P15	50 metres	4 adults and 2 children	Child sleeps with mother in the same bed. When sick, child also sleeps with her mother.
P16	100 metres	3 adults and 2 children	Child sleeps alone in her bed. When sick, child will sleep with her mother in the same bed.
P17	70 metres	4 adults and 2 children	Child sleeps with mother in the same bed. When sick, child also sleeps with his mother.
P18	100 metres	3 adults and 2 children	Child sleeps with domestic helper in same bed. When sick, she also sleeps with domestic helper.
P19	50 metres	2 adults and 2 children	Child sleeps alone in lower deck of bunk bed. When sick, she also sleeps alone in her own bed.
P20	75 metres	3 adults and 2 children	Child sleeps with domestic helper in same bed. When sick, she also sleeps with domestic helper.

Boiling White Vinegar to Kill Air-Born Germs

Mothers reported that they boiled white vinegar to ensure the environment was healthy for their children's health. Mothers claimed they followed other people in doing this practice even though they stated they did not know whether it worked or not.

> *I boiled white vinegar for the effect of disinfection. It will kill the bacteria in the air. When it is peak season of avian flu, flu etc., we follow other friends to boil the vinegar. People say that we can put the boiled vinegar near the window and then let it evaporate in the air. Let wind blow it around the flat. It gets no harm and why not to try. I just boil few times in a year. (P6-M81)*

> *Emm…Yes, boiling white vinegar can kill germs. This kind of way is very common back in the days. In the serious time of flu infection, all white vinegars were sold out. Ha...ha… Even no one proves that boiling white vinegar is an effective way in killing germs. I still will do it. It's better than having nothing done. (P15-M213)*

Diet Therapy to Enhance Health

Mothers reported that they made different types of Chinese soups that include boiling products such as Crocodile meat soup, the lungs of a pig, the Glabrous Greenbrier Rhizome and Ching Bo Leung to enhance health. The glabrous greenbrier rhizome and Ching Bo Leung are two different kinds of Chinese herbs which are common ingredients used in making Chinese soups.

> *I usually boil Chinese soup. I like Glabrous Greenbrier Rhizome most because it clears away the heat and detoxifies the waste products from our bodies. (P1-M59)*
> *I always ask my mum to boil like Ching Bo Leung to remove heat from our bodies... Those soups help you expel the dampness out from our body. Before, children got a cough for a certain period; grandmother then boiled crocodile meat soup for them since this soup helps to relieve cough. (P3-M355)*

We usually boil soup with dried vegetables and pig's lung for them to drink. Pig's lung is used to clear the heat from our bodies as well as moisturize our lungs. (P11-M192)

The above quotes demonstrate that mothers integrated the principle of Traditional Chinese medicine in their daily diet regime. Mothers also reported that different Chinese soups have functions such as to clear heat and dampness from the body to maintain balance of heat and cold inside the body.

Self-Prescribed Chinese Medication to Managing a Child's Colds Symptoms

The most common health practices mothers spoke of in order to manage their children's colds symptoms were the use of self-prescribed Chinese medication such as Monkey Bezoar Powder and Bo Yi Dan. This helps to avoid seasonal influenza development. Monkey Bezoar Powder is Calculus Macacae Mulattae powder and used to clear away excessive phlegm, relieve coughing and ease breathing.

I will let my younger son take Monkey Bezoar Powder which is kidney stone of monkey mixing it with some Chinese herbs. After taking one time of Rhesus Macaque Bezoar, his cough diminished a lot. He becomes energetic. Sometimes, after taking some western medications, he feels very sleepy and may sleep for a whole day. (P18-M173)

I will give them Bo Ying Dan to eat when their colds symptoms are minor. I will let them take for consecutive two days if they sneeze and have runny nose. They seldom need to consult the doctor after eating Bo Ying Dan. (P20-M116)

Co-Use of Western Health Products and Traditional Chinese Medication to Prevent Seasonal Influenza

Mothers reported that they applied different methods from different perspectives to prevent seasonal influenza. The most often cited approach was the use of both Western health products such as vitamin C and cod liver oil and Chinese medications such as herbal tea and Bo Ying Dan (a pill to treat fever, sneezing, cough, restlessness and crying at night). These Chinese medicines act to dispel wind, clear away heat and eliminate phlegm.

> *I usually give them vitamins C, cod liver oil etc. to eat to increase their body resistant. I buy and try various healthy products. (P1-M45)*

> *Children take vitamin C, fish oil and blueberry [for better eye sight] as supplements every day. All are for better body resistance. (P3-M249)*

Mothers also claimed that they drank herbal tea to promote health and prevent influenza.

> *Not only for treating flu, you can drink herbal tea in normal days for flu prevention. When children have flu, they will usually drink herbal tea. It is already enough to help them recover from flu. (P13-M239)*

Mothers gave their children Bo Ying Dan to enhance their body's resistance to prevent seasonal influenza.

> *After he starts going to school, I let him eat Bo Ying Dan even he's not sick. The purpose of taking it is to increase his body resistance. (P18-M188)*

During the home interviews Western health products such as vitamin C and bilberry capsules and Chinese medications such as Bo Ying Compound and Pure Pearl Powder were observed in three households. Table 3 outlines the medications that were observed in participants' homes. (**Table 5.2**)

Table 5.2 Western health products and Chinese medication storage observations

Participants	Medications observed in households
P1-P2	Nil
P3	Several bottles of vitamin C, bilberry and Bo Ying Compound were stored on a shelf.
P4-P5	Nil
P6	Several bottles of vitamin C, fish oil, Bo Ying Compound and Pure Pearl Powder were stored on a shelf.
P7-P16	Nil
P17	Several boxes of Bo Ying Compound were stored on a shelf.
P18-P20	Nil

5.2.4 Discussion

The findings from this study demonstrates that traditional cultural health practices and beliefs still have a strong influence on Chinese Hong Kong mothers' practices in managing colds symptoms and prevention of seasonal influenza. Mothers draw from both traditions in their prevention and health promotion practices in their attempt to maintain the health of their families. The results provide insights about family use of Western and Chinese medicine and can assist community nurses in planning and developing community disease prevention and health promotion programmes with Chinese communities.

Pluralistic Health Promotion Approach to Better Prevent Seasonal Influenza

This study adds to the body of knowledge concerning medical pluralism in Hong Kong society. The findings support that the concurrent use of both Western and Chinese medicines remains the preferred practice of Hong Kong families as found in other research studies such as the study of Chung et al. in 2007 (Chung et al. 2007). Two studies provide additional support to the findings of this research that the strategies designed to improve health outcomes among Hong Kong Chinese families may be more effective if they are culturally appropriate and a family focused approach to health promotion is taken (Huber & Shapiro 2012; Jamieson, Parker & Richards 2008). There are limited studies that consider the use of alternative medicine and how it may influence decision making concerning seasonal influenza prevention practices including vaccination uptake (Bleser et al. 2016). The study by Bleser et. al. (2016) reported that the influenza vaccination uptake rate is lower among children whose families practiced alternative medicine hence a focus on education among such families may be useful. Using culturally appropriate seasonal influenza practices and family focused approaches

will help to engender family acceptance of and compliance with evidence based health practices that will reduce influence transmission and management.

A review of preparedness plans for seasonal influenza pandemics in Hong Kong found that culturally based problem-solving perspectives and values of the local public are not routinely incorporated into health strategy plans to prevent seasonal influenza (Centre of Health Protection of Hong Kong 2014b). The Hong Kong Department of Health takes a strategic approach similar to that of many European countries, aiming mostly at health surveillance and harnessing and deploying available resources such as building up a good stock of antiviral agents and vaccines for influenza preparedness and risk reduction (Coker & Mounier-Jack 2006; Department of Health of Hong Kong 2015). Failing to act and incorporate family practices may result in culturally incongruent seasonal influenza preventive measures (Leininger 2002; Paton et al. 2008). Health departments must acknowledge socio-cultural practices and include family members in the development and management of seasonal influenza health promotion initiatives in order to make them appropriate and responsive (Gray et al. 2012).

Our study raises implications concerning professionals who should be involved in the public health response to influenza epidemics. Mothers in our study reported using Traditional Chinese medicine or seeking the advice of Traditional Chinese Medicine practitioners or herbalist as their first point of contact. Seasonal influenza could be better prevented and treated with improved planning, training and coordination between Western medicine, nursing and Traditional Chinese Medicine practitioners. This will require additional training for Traditional Chinese Medicine practitioners with an emphasis on referral and reporting cases of influenza to enable government surveillance systems to detect the cases at the on-set of an epidemic. This acknowledgement of medical pluralism may help to improve health promotion initiatives to prevent seasonal influenza**.**

Nurse-Parent Partnerships to Enable Cultural Congruent Health Promotion

Involving the health sector and families in health is a fundamental goal of family health promotion (Cyril, Smith & Renzaho 2015). People are more likely to take appropriate action and accept suggested actions if they have been engaged in decision-making

processes and programme development (Gray et al. 2012). Partnerships between community health nurses and families through outreach services can provide opportunities to strengthen the ability of parents to create healthy households. Nurses are able to counsel families and provide health advice in ways that are meaningful and culturally appropriate. This could include explanations of the efficacy of boiling white vinegar to kill air-born germs; to assist parents set achievable goals and provide individualized health information to address individual family concerns. It is vital for health professionals to foster relationships with parents by engaging parents in conversations about health promotion (Riesch, Anderson & Krueger 2006). Health professionals must be proactively involved in discussing culturally specific health practices such as the use of traditional Chinese medication and bed sharing practices. Such discussions provide opportunities for prompt and appropriate health recommendations that could ensure effective prevention, management and treatment of influenza. For example if the bedroom space is adequate, separate sleeping practices must be encouraged to minimize prolonged and close exposure of parent to infected child (Cowling et al. 2009). These approaches support the most favorable environment for health promotion and illness/disease prevention at both community and household levels.

In our findings, for several families recruiting domestic helpers to take care of the child is a common practice. In such cases, health professionals should involve such workers and consider using non-written materials or language appropriate teaching materials during outreach health consultation visits.

5.2.5 Conclusion

This study provided valuable insight into the cultural practices of Chinese Hong Kong mothers in the prevention of seasonal influenza and its treatment. The results of this study demonstrate that the traditional cultural health practices and beliefs still have a strong influence on the Hong Kong Chinese mothers' practices in managing colds symptoms and prevention of seasonal influenza. Mothers draw from both Western and Chinese traditions in their prevention and health promotion practices in their attempt to maintain the health of their families. The findings recommended that pluralistic health promotion approach should be carefully considered in local seasonal influenza

prevention programme to ensure a family's acceptance and compliance to the health advice from the health authority. Nurse-parent partnership is an important consideration when planning and implementing culturally appropriate health promotion services in a local context.

5.3 Chapter summary

This chapter presents five major cultural practices of Hong Kong Chinese mothers in seasonal influenza prevention practices. They were: sharing beds with family members or domestic helper even when the child is ill; boiling white vinegar to kill air-born germs to ensure a healthy environment for child's health; diet therapy to enhance body health; self-prescribed Chinese medication to manage child's cold symptoms and the co-use of Western and Traditional Chinese medication to prevent seasonal influenza. The findings of this study provided valuable insight into the cultural practices of Chinese Hong Kong mothers in seasonal influenza prevention and treatment. The results reported here validate the need for the pluralistic health systems in seasonal influenza preparedness plans to ensure the likelihood that families accept, support and comply with health advice from health authorities. The delivery of appropriate health promotion also requires a close health professional and parent partnership.

Preschool children learn health knowledge and practices as a result of parental modeling and repeated opportunities for practicing these health behaviours. Research demonstrates a positive relationship between the health practices applied by parents and the behaviour of their children highlighting the importance of parental heath education. The effectiveness of parental teaching depends on the extent to which this teaching has advanced a child's understanding of the health practice. Given the limited understanding of the teaching approaches used by parents to assist their preschool children learn about seasonal influenza prevention, future enquiry is required to investigate how parents and their preschoolers interact to develop health practices and build prevention knowledge.

Chapter 6 Findings part III - The approaches Hong Kong Chinese mothers adopt to teach their preschool children to prevent influenza: a multiple case study at household level

6.1 Chapter introduction

The effectiveness of parental teaching when assisting their children to learn new skills is considered to be an important contribution to family health. In Chapter 4 and 5 the determinants affecting parental functional, interactive and critical health literacy regarding seasonal influenza prevention and related health promotion were identified as significant. These determinants were identified as: mothers' health knowledge and practice competence, their social connections, mothers' attitude towards health information, family living environment and cultural influences.

For this reason, it is significant to assess the approach mothers adopt to assist their children learn strategies to prevent seasonal influenza. Preschool children spend extended periods of time with their parents. They learn health knowledge and practices as a result of parental modeling and repeated opportunities for practicing these health behaviours (Cook & Cook 2009; Morrison 2008). Research has demonstrated a positive relationship between the health practices applied by parents and the behaviour of their children (Song, Kim & Park 2013). This research has highlighted the importance of parental heath education to assist their child learn and develop skills in seasonal influenza prevention. Crucially the child's level of understanding of the health behaviours will impact upon their health practices compliance. To explicitly understand the teaching approach Hong Kong Chinese parents use when teaching their preschool children health practices, an in-depth enquiry was needed. This chapter reports a comprehensive analysis of the parental teaching approach and their interactions with preschool child in relation to seasonal influenza prevention practices.

The findings described in this chapter provide answers to research questions 4 "what are the parental teaching practices regarding seasonal influenza prevention?"; and in doing so addresses research objective 4 "investigate parental teaching strategies to prevent seasonal influenza and related health promotion practices". The analysis from this chapter was drawn from the qualitative and quantitative data gathered through a survey

of demographic data (Appendix 4 part I question 1-7), a semi-structured interviewing guide (Appendix 5 question 5), an observational checklist (Appendix 7) and the field notes (Appendix 8 part II) with the purpose of developing a comprehensive understanding of the parental teaching approach to prevent seasonal influenza at the household level.

Basic demographic data including sex, age, educational level of participants, number of children in the families and employment of main caregivers were described to provide a context for the cases in this study. This contextual understanding of Hong Kong Chinese families is vital for analysis as it is different from the situations experienced by other developed countries.

An open-ended question of the semi-structured interviewing guide was used to explore the teaching strategies adopted by mothers in assisting their children to learn how to prevent seasonal influenza. The question was "what concerns, issues or challenges do you face when trying to encourage your child and other family member to prevent influenza and carry out healthy practices?" This question was further extended into four questions: "how did you teach your child to wash their hands and cover their mouth when they cough?"; "how difficult was it for them to develop these new skills?"; "do you need to remind them to wash their hands and cover their mouth when they cough?"; and "what is your reaction and what would you do if your child refused to wash their hands?" These questions were developed for the specific purpose of in-depth and focused data collection.

An observational checklist was used to record parental teaching procedures when assisting their preschool child learn about hand washing, wearing and taking off a face mask. Field notes were also taken to record the observations, during interviews and demonstrations that included the parental teaching framework applied in teaching the child about health practices and the characteristic of mother-child interaction with regard to seasonal influenza prevention practices.

6.2 Publication of results

The results contained within this chapter have been published as follows:

> Lam, W., Dawson, A. & Fowler, C. (2014). The approaches Hong Kong Chinese mothers adopt to teach their preschool children to prevent influenza: a multiple case study at household level. *BMC Nursing* doi:10.1186/s12912-016-0172-4

A copy of the manuscript is attached to this thesis as Appendix 16.

The approaches Hong Kong Chinese mothers adopt to teach their preschool children to prevent influenza: a multiple case study at the household level

6.2.1 Introduction

In Hong Kong, influenza is usually common in the periods from January to March and July to August (Centre of Health Protection of Hong Kong 2012b). The virus is transmitted from person-to-person through droplet and direct contact (Centre of Health Protection of Hong Kong 2012b; World Health Organization 2009b). Yearly influenza epidemics can seriously affect all age groups but particularly those with immature or compromised immune systems such as young children and the elderly with chronic illness (Centre of Health Protection of Hong Kong 2012b; World Health Organization 2009a). The viruses causing influenza are constantly changing. Exposure to these new virus variants can potentially lead to influenza epidemics (World Health Organization 2009a, 2009b). Maintaining personal hygiene including proper hand washing, cough etiquette and regular seasonal influenza vaccination uptake (Centre of Health Protection of Hong Kong 2012b, 2014b) are recommended as the most effective measures to prevent the spread of influenza (Centre of Health Protection of Hong Kong 2014a; World Health Organization 2009a).

Research demonstrates a positive relationship between the health practices used by parents and children's behaviour (Song, Kim & Park 2013). A study by Song et al. (2013) demonstrates that parents' hand washing practices are significantly correlated with children's hand hygiene practice and research suggests that the hand hygiene behaviour of adults is likely to be the result of lessons learned in childhood (Whitby, McLaws & Ross 2006). Young children spend extended periods of time with their

parents ideally positioning parents, through their daily interactions, to teach and reinforce their children's health knowledge and practices. Without family involvement, health practices are unlikely to be sustained once the health promotion intervention ceases (Harvard Family Research Project 2006).

The preschool period is recommended as the most suitable time for parents to initiate and support their children to develop lifelong health behaviours (Schor 2003). Preschool children learn health knowledge and practices as a result of parental modelling and repeated opportunities for practicing these health behaviours (Cook & Cook 2009; Morrison 2008). Parents assist children to internalize these health practices into their daily behaviours through repeated interactions embedding the behaviours as lifelong habits. These regular practices have also demonstrated lasting effects on subsequent adult activity-related behavioural patterns (Thompson, Humbert & Mirwald 2003).

The cognitive and functional abilities of preschool children are still developing (Cook & Cook 2009; Morrison 2008). Their ability to manage and remember a large amount of health knowledge and practices at a single interaction may be challenged. To develop competence children often require information to be repeated and several opportunities to practice tasks along with appropriate encouragement (Hockenberry & Wilson 2015). The effectiveness of parental teaching depends on the extent to which this teaching has advanced a child's understanding of the health practice (Morrongiello, McArthur & Bell 2014). A child's level of understanding will impact upon their health practice compliance. If parents can enhance children's understanding of health practices such as correct hand washing compliant, the risk of preschool children contracting infectious diseases such as influenza will be lowered. Using a teaching process that includes: alerting the child to a teaching moment, providing visual cues and verbal instruction, giving encouragement and providing feedback will assist both the child and parent (Oxford & Findlay 2013) . Importantly, parental teaching strategies assist in the effectiveness of children's learning and the enhancement of the parent-child interaction through one or two way communication (Skouteris et al. 2011). In addition, providing clear and consistent messages to the child, allowing time to question, and appreciating

the child's efforts through the provision of feedback have also been found to be useful (Cook & Cook 2009; Morrison 2008).

A review of the literature identified that most research studies are focused on the association of parenting styles either related to healthy lifestyles such as healthy eating (Arredondo et al. 2006; Vereecken et al. 2009) or health practices such as internet use (Livingstone & Helsper 2008). There is minimal research investigating the teaching approaches of parents, particularly Hong Kong Chinese parents regarding how they teach their preschoolers to prevent seasonal influenza (Lam, Dawson & Fowler 2016). It is therefore worthwhile investigating how parents and their preschoolers interact to develop health practices and build prevention knowledge. The aim of this study is to provide an insight into parents' roles and teaching approaches when supporting their children's development of health practices, particularly those to prevent influenza occurring within the household.

6.2.2 Methods

This mixed methods research study employed a multiple-case approach (Cresswell 2009; Yin 2012) to gain an understanding of mothers' health teaching practices and their interaction with preschool children regarding seasonal influenza prevention. A case comprised a mother with a preschool child between three-to-five years. The approach allowed the researchers to analyze phenomena from multiple perspectives within each real-life setting and across settings to understand the similarities and differences between the cases; discover previously unknown features regarding culture specifically Chinese parental teaching and mother-child interactions related to seasonal influenza prevention (Stake 1995; Yin 2014).

Recruitment and participants

Purposive intensity sampling was used to recruit 20 Hong Kong Chinese mothers and their healthy preschool children aged from three-to-five years old. A networking approach was used to identify potential preschools. Letters and study information sheets were sent via the person-in-charge of five Hong Kong kindergartens for distribution to Chinese parents, inviting them to participate in the study by contacting the researcher. Study participants were ultimately enrolled from three kindergarten schools. The

researcher then personally invited the parents and provided a detailed explanation of the research. The selection criteria were parents with healthy three-to-five year old children who were willing to communicate and share their experiences. In total, 23 parents were contacted and 20 parents agreed to participate in this study. All participants were mothers. The gender of the participants was homogeneous because Chinese mother are usually the main caregiver of child in Hong Kong (Chan, Bowes & Wyver 2009).

Eleven families were living in private apartments and nine families were living in public estates. Nine families had three generations: grandparent, parent and child living in the same household. Eleven families had two generations: parent and child living in the same household.

Data collection

Data collection was conducted by a researcher with a history of clinical experience in family health education, health promotion, and skills in conducting family interviews. Data were obtained from multiple data sources. These sources included: a semi-structure interview guide, an observational checklist and a demographic survey. The in-depth semi-structured interviews were carried out first. Open-ended questions were used to elicit participants' teaching strategies and included "what concerns, issues or challenges do you face when trying to encourage your child to prevent influenza and carry out healthy practices" and "what are the strategies/activities you use at home to promote your child's healthy behaviours or minimize the risk of developing influenza". The responses were digitally recorded and transcribed verbatim. As part of the interview phase, closed questions in a survey format were used to collect participants' demographic data.

The mothers were then invited to demonstrate the procedure of teaching their children to wash their hands and wear a facemask. The mothers were not provided with any instructions or prompting on how to undertake this task by the researcher during the observation. The aim of this data collection technique was to identify the mother's existing knowledge and skills in teaching and supporting her child's hand washing technique. Maternal teaching strategies and mother-child interactions during the demonstration were observed and recorded using an observational checklist. A

framework was used to guide the observations that involved identifying the steps mothers took when teaching hand washing and facemask wearing (Oxford & Findlay 2013) . These steps were: alerting the child to the activity to be learned or practiced; instructing the child to perform what is expected or the steps to be taken; allowing the child to demonstrate; evaluating the standard of the child's health practice; and providing feedback to the child on their health practice performance (Oxford & Findlay 2013). The observations of mother-child interaction involved: one or two way communication; clear and age appropriate task instructions; showing appreciation of the task attempts; providing encouragement when encountering something difficult; and language style used by the mother (Oxford & Findlay 2013). Both teaching strategies and the characteristics of mother-child interaction were assessed using a dichotomous scale (yes/no) with a space for reflective notes to be written on each item.

The demographic survey, semi-structured interview guide and observational checklist were validated, using a content validity index with four-point scale ranging from 1-to-4 (not relevant=1, some relevance=2, very relevant=3, extremely relevant=4), by a panel of academic experts, community nurses and school teachers who were knowledgeable about infection control and child and family health. This index ensured that the questions were technically correct, unambiguous, culturally appropriate and able to provide adequate information to address the proposed research questions (Polit & Beck 2006).

Data Analysis

The process of data analysis was conducted concurrently with data collection, as constructs from the previous interview guided the collection of data in the next interview. The tape was replayed within one or two days after the interview with the researcher carefully listening to the questions and the tone of the responses. Each taped interview was transcribed verbatim from Cantonese to English. All communication forms including laughter, pauses in the conversation and expletives were also included in the script. After the transcription, the whole script was checked against the tape for accuracy. Back translation of the quotes from English to Cantonese, were completed to ensure the validity of qualitative data. The concordance between the interview and observation data enhanced the rigor of the findings (Yin 2012).

A thematic analysis of the interview transcripts was employed to categorize, tabulate and examine the data to address the propositions of the study (Yin 2014). Thematic analysis involves searching across a data set to find repeated patterns of meaning ((Braun & Clarke 2006). This has been identified as a procedure for the categorization of verbal and non-verbal data for the purpose of classification, summarization and tabulation (Morse & Field 2002; Yin 2014). First, the raw data from the 20 semi-structured interviews were reviewed to mark and link primary codes according to the research objectives. These codes were grouped into broad categories through repetitive scanning of the data (Yin 2014). The categories were then collated into theme clusters. Analysis continued until no new themes emerged (Creswell 2007; Morse & Field 2002; Yin 2012). Data saturation was observed when similar meanings and categories were noted from the data after the eighteenth interview. Two additional interviews were completed to confirm that the mothers were not providing new data.

A deductive approach was then, applied for pattern-matching (Yin 2012). The researcher went back to the original data, read through it repeatedly and compared the derived patterns with previously outlined predefined patterns in order to ensure no missing data and consistency with the study objectives. The themes and data extraction were independently examined by two other researchers in order to achieve an agreement on pattern matching for the purpose of internal reliability of the study (Yin 2014). Exclusions to the thematic codes were also discussed with these researchers.

The demographic and numerical data from the surveys and observational checklist revealed an overall understanding of parental teaching strategies and the interaction with their children in seasonal influenza prevention and related practices. These quantitative data enriched the qualitative analysis of each case as it provided a context for mothers' responses.

In the final stage, a comprehensive comparison was made across cases including families' demographic information, living environment, parental education level, parental teaching strategies and the characteristics of mother-child interaction in relation to hygiene practices. This cross-case analysis of the multiple cases provided an

understanding of the commonalities and differences between cases regarding hygiene practices for seasonal influenza prevention (Creswell 2007; Yin 2014).

6.2.3 Findings

Twenty Hong Kong Chinese mothers agreed to be interviewed. Nineteen mothers and their preschool children participated in the hand washing and facemask wearing observation component of this research. One of the mothers did not participate in the observation due to reluctance to be involved in the demonstration. All mothers were the main caregivers of their children, aged between 28 and 45 years. Ten mothers had completed secondary school education and ten completed tertiary education. Fifteen mothers were housewives and five mothers were full-time workers with their children being cared for by other family members (**Table 6.1**).

Table 6.1. Personal particulars of 20 participants

Characteristics	Number
Parent gender	
- Female	20
- Male	0
Parent age	
- 28 years old	2
- 30-to-35 years old	7
- 36-to-40 years old	8
- 41-to-45 years old	3
Education level completed	
- Secondary school level	10
- Tertiary level	10
Employment status	
- Housewife	15
- Full time workers	5
Child's main caregiver	
- Mothers	15
- Both father and working mother	1
- Grandmothers and working mother (shared)	4

The qualitative analysis of the interviews identified five major themes within the data. The themes were: processes used by mothers to teach personal hygiene; mother-child interaction during teaching; approaches to managing children's health behaviours; enhancing children's healthy practices; and mothers' perspective of the nurse's health promotion role. The quantitative data gleaned from the survey and observations enriched the interview findings.

Processes used by mothers **to teach personal hygiene**

The mothers reported that they did not use any specific teaching method to teach their children health practices. They sometimes kept silent during the observation session and did not provide feedback if their child was able to perform the health practices correctly.

> *If they [child] wear mask properly, the wire at upper side, I seldom provide feedback [on their health practices]. I only keep silent. (P1-M89)*

> *I do not have specific method or steps to teach them [health practices]. (P11-F292)*

The findings of the above quotes were consistent with the data observed from handwashing and face masks demonstrations. Most mothers did not fully demonstrate the five teaching steps listed on the observation checklist during the hand washing and facemask wearing sessions. All of the 19 mothers directly asked their children to participate in hand washing and facemask wearing. Seven participants gave instructions with explanations to their children concerning what was expected, or the steps to be taken in hand washing. The other 12 mothers kept silent during the hand washing procedure. Twelve mothers allowed their children to demonstrate hand washing and facemask wearing and provided sufficient time for the procedures to be completed without intervening. Seven participants allowed their children to start demonstrating the procedures. However, once their children encountered difficulties, the mothers intervened by helping their child complete the task without asking any probing question or allowing extra time to independently problem-solve. After finishing the hygienic practices, twelve mothers evaluated the child's standard of hand washing and facemask wearing according to the local government procedure guides. The other seven mothers kept silent and did not evaluate either the standard of hand washing or facemask wearing. Only one mother provided feedback such as "you do well by yourself this time and keep on this practices" to her child on the performance of hand washing and facemask wearing (**Table 6.2**).

Table 6.2 Parental teaching process of hand washing and face mask wearing

Parental teaching process of 19 participants	Yes	No
Alerts child to the activity	19 (100%)	0
Instructs child to perform what is expected	7 (33.84%)	12 (63.16%)
Allows child sufficient time to demonstrate	12 (63.16%)	7 (33.84%)
Evaluates the standard of child's health practice	12 (63.16%)	7 (33.84%)
Provides feedback to child on their performance	1 (5.26%)	18 (94.74%)

Mother-**child interaction during teaching**

Two characteristics identified during the qualitative interviews were praising children when the children: performed a task that mothers felt had exceeded their child's abilities, and if they felt their children required limited parental guidance.

> *I will only praise her when they do something good...such as if the tasks exceed her abilities, but they can do it well. Then, I will praise them. For example, under this situation, I will scold her. She misread the sign of plus and minus in mathematic calculation. Then I will scold her. (P11-F361)*

> *If there is something he is able to do for example washing his hands before eating, I won't praise him. It depends on situation. If the thing is far from his ability and I think he cannot do it but turns out he does it well. Then I will praise him. (P18-M374)*

Limited parental guidance on children's health practices was observed in the following quotes. The mother said that she did not actively teach her children health practices. She stated that she would correct the child when the health practice was incorrect.

> *I seldom talk to or teach my son how to wear the mask properly. They elicit most of the things by themselves. I only correct them when they wear the mask wrongly. (P1-M87)*

> *I will only teach her when she cannot do it. If she says, 'mum, I do not know how to do it, I do not know how to fit it, can you teach me? Then I will teach her. (P8-M377)*

The findings of the above quotes were consistent with the characteristics observed during the observation of hand washing and facemask wearing. All of the 19 mothers engaged their children in conversation when commencing the procedure performance. Questioning and answering skills were used to check children's understanding. When two children interrupted their mothers' conversations, two of the mothers stopped talking and listened to their children's requests before proceeding to the next step. Twelve mothers used language that appeared to be clear enough for their children to understand their instruction. Mothers described different aspects of hand washing when carrying out teaching to enhance their child's learning including: the location of areas on the hand to be cleaned, and hand actions used to effectively clean the hands and the colour and shape of the face mask when guiding facemask wearing. Seven mothers observed their child's practices without any explanation or description of the actions. Five mothers verbally appreciated their child when the procedure was correctly completed. Fourteen mothers remained silent when their child completed the procedure appropriately. Five children encountered difficulties during hand washing and facemask wearing. Two of the five mothers encouraged their child when they had difficulties and three remained silent. All mothers used a combination of commands and explanations when asking their child to do or not to do the health practices.

Approaches to managing children's health behaviours

The mothers reported various strategies to ensure their child followed their instructions and maintained healthy behaviours. These included: punishing the child, threatening them and giving incentives. Physical punishment and scolding were two methods regularly identified by the mothers to regulate children's misbehaviours.

> *I also think physical punishment is ... [of the] same important as praising to children. If she is naughty, I will hit her butt or her hands with cane or bare hands. Sometimes I will punish her by asking her to stand which allows time for her to calm herself. (P15-P457)*

> *I really ask her [child] a lot of times... for example, do not use her hand to touch her feet and I did it with explanation, but she still does not listen. She still does*

not change. I am out of solution. I did everything. I warned her once, I hit her hands once. (P8- M161)

When he does not listen to my instruction, I will not allow him to do something he wants to do. If he does something related to health practice wrong, I will scold him. If he still doesn't listen, I will punish him when we go home. (P9-M112)

The mothers claimed using a threatening approach and providing consequences was an effective way to stop their children's misbehaviours.

When he doesn't follow my instruction, I sometimes will tell him, "If you do not do it, I will not take you out to play". It's effective. In general, when we tell him this, he will be scared and will follow our instructions. (P12-M336)

I let my daughter see the photos of ugly fingers and told her this is the consequences of biting nails. After seeing the photos, she got scared, and then she stopped biting. I have no other ways since she did not listen to me. Therefore, I have to intimidate her. (P14-M399)

Most of the mothers used incentive such as gifts, snacks and playing to encourage or sustain children's health practice. The following quote provides an example of an incentive that was provided.

If he does it well [correct health practices steps], I will give him a stamp every time as a reward. When he collects a certain amount of stamps, he can use the stamps to exchange a present from me. His health practice has improved. (P19-M76)

Enhancing children's health practices

During the interview, the mothers identified singing and storytelling as useful pedagogies to encourage and sustain their child's health practice.

> *When he is not willing to wash his hands, I will sing the "hand washing" song with him. Then, he will wash it. If the thing he is willing to, I will do it more often. Just like singing the song can help him to wash his hands more often. (P4-M190)*

> *Taking story-telling as an example, I will ask her some questions in between story telling. I will ask her whether the behaviour showed in the storybook is correct or not, is it good to do so, or will you do that? (P5-M405)*

Mothers**' perspective of the role of the nurse in health promotion**

Mothers claimed that the community nurse could provide explanations and advice to families and their children on health related issues. The nurse could further expand their role by assisting families apply new knowledge and skills they have developed into disease prevention within the context of their home and local community. Some mothers believed that information provided by nurses would be more convincing. The following quote supports the greater involvement of nurses providing health education as the mothers felt that their children and older relatives would be more likely to follow what a nurse advises them to do.

> *Community nurses in the community can teach everyone about the prevention of flu. For example, when having flu symptoms and we do not want to take medication, we can ask [community nurse] what we can do to prevent this. At least, nurses have the knowledge compared to normal people. By asking them, they can explain more and give advice to us, this is much better. (P8- M283)*

> *I will use the knowledge obtained from the community nurse [to prevent disease/illness] since they have more knowledge on prevention of influenza and can teach us. Also they [community nurses] are more convincing. If I am the one*

who talk to elder people [in my family], they will ignore me. But, if there is a professional nurse, they may listen. (P11- F249)

In the first quote, the mother emphasized the importance of health consultation role of nurses and teachers within the community. In the second quote, the mother claims that knowledge transfer related to disease prevention from the nurse to the mother might happen during nurse-parent and nurse-family interaction, in particular, older family members.

In the next two quotes, there is a shift in focus as the mothers provide an explanation of the importance of the nurses' and teachers' roles in health education provision.

They [children] may not remember even you say it for ten times to them. But if a community nurse comes to tell them, children will remember. I think it should be effective for community nurses to go to kindergarten or primary school to promote health, particularly for kindergartens. (P17-M265)

I think children always listen to nurses. Just like they listen to their teachers. I think if the talk is held by nurses, it will be more effective. The children will listen to what nurse says. (P19-M317)

In the above quotes, the mothers identified an opportunity for the nurse to provide health promotion during the child's attendance at kindergarten. In the final quote, the mother justified the nurse's role in that children always listen to nurses, providing the nurse with a level of authority as a health educator.

6.2.4 Discussion

The findings from this study demonstrate that none of Hong Kong Chinese mothers in this study applied the whole teaching process as per our framework of five identified steps when teaching their preschool children hygiene practices to promote health and prevent seasonal influenza. Some mothers adopted controlling approaches to ensure their children's compliance in health practices or provided incentives such as gifts or snacks. The strategies mothers applied may not be optimal and therefore this study

provides insights that could assist nursing service planners to design child and family health promotion programmes to better support parents to guide the development of their children's healthy behaviours.

Enhancing effective mother**-child interaction and teaching for health**

The key determinant for successful implementation of health education programmes is the educator's, or in this case the mother's ability to communicate effectively (Parletta et al. 2012). In recent years, the focus of prevention research has shifted from the parent and child as individuals to the parent-child dyad (Skouteris et al. 2011). This reciprocal interaction relies on the level of a child's cue clarity, a parent's responses and a logical interaction sequence to ensure effective communication (Oxford & Findlay 2013) . Our study provides observational evidence of communication issues where reciprocal interaction could be enhanced. We found that while 12 mothers used language that was clear enough for their child to understand, the hand washing instructions given by seven mothers' were not understood by their children. The clarity of instruction and quality of information provided to the children could be improved by assisting new mothers to learn the required steps of practice, such as hand washing, in a systematic way.

Positive parent-child communication is identified as contributing to effective health practice learning (Parletta et al. 2012). It enables parents to support their children's health behaviour regulation, maintain involvement and act as a positive role model for their children (Riesch, Anderson & Krueger 2006). It reduces the need for the mother to rely on assertive and aversive strategies to increase child health practice compliance (Skouteris et al. 2011). In this study, punitive strategies were found to be commonly employed as a method to gain their child's compliance. Some mothers identified a lack of confidence to change their children's behaviour. Therefore enabling parents to build confidence and effective communication with their children is central to health promotion interventions to enhance child health practice learning (Parletta et al. 2012).

Interventions to support the adoption of healthy behaviours involve assisting parents to improve their knowledge and modelling skills. Practice sessions involving both parents and their children in demonstrations of these health practices are a key way forward. Parents can be supported to develop effective communication skills, knowledge about

their children's physical development and ways of learning. Scenario based learning involving cough etiquette or hand washing can guide parents and children during practice sessions. Through these hands-on interactive activities children are provided with opportunities to apply their new knowledge into everyday practice enabling parents to develop confidence (Bandura 1989; Brown et al. 2014) in guiding child health behaviour. With the support and consultation of community nurses, inappropriate and ineffective concepts and practices related to child learning and interactions can also be corrected and positive practices consolidated. Nurses can facilitate these practice sessions through face-to-face education and phone consultations or teleconferences (Comer et al. 2015; Nutbeam 2000), these strategies can provide parents with additional feedback and support post intervention.

Integrating parental teaching skills in child and family health education

In this study, some mothers who adopted a controlling approach to regulate children's health behaviours claimed they had no other way to manage their child's behaviour. Chinese parents have been reported to use controlling and restrictive approaches in child rearing (Chao 1994). Children may be required to be unquestionably obedient to their parents who may influence the use of such parenting approaches. Frequent use of restrictive or controlling approaches by parents have been associated with children's lower level of self-control when using internet (Wu et al. 2014) and children's noncompliance to healthy eating (Skouteris et al. 2011). Health professionals can support parents to employ teaching approaches to adopted healthy behaviours that encourage children using strategies that promote and celebrate child achievements (Chen & Chan 2016) .

Nurse-parent-child partnerships in health promotion

Parental expectations concerning nurses' and teachers' roles in health education were also highlighted in our study (Yamamoto & Li 2012). A multi-faceted approach involving the health sector, community partners and families in health promotion is a fundamental goal of health promotion (Cyril, Smith & Renzaho 2015). Partnerships between community nurses and teachers provide opportunities to strengthen parents' abilities to create healthy households (Lau, Springston, et al. 2012) by appropriately using health services, to assist parents set achievable goals (Landy et al. 2012) and

provide emotional support and information. This partnership is of particular importance to child rearing ensuring that families are actively involved in enhancing their health (Carr-Hill & Currie 2013). It is vital for nurses to foster relationships early on with parents and their child by: involving parents and children in conversations about health promotion (Jurkowski et al. 2013); communicating the parents', child's and nurse's expectations with regard to learning; and encouraging parents to model health behaviours and practices for their children (Riesch, Anderson & Krueger 2006). These approaches will assist in maintaining an optimal environment for health promotion and illness/disease prevention at both community and household levels.

Ethics approval and consent to participate

This study was reviewed and approved by the Hong Kong Polytechnic University Human Research and Ethics Committee (HSESC reference No.: HSEARS20140121001) and University of Technology Sydney Human Research Ethics Committee (UTS HREC approval number: 2014000072). Informed written consent was obtained from all mothers prior to the start of the interviews. Participation in the study was voluntary and the mothers were able to withdraw from the study at any time. All data were de-identified during the transcription process.

6.2.5 Conclusion

This study has provided a valuable insight into the approaches Hong Kong Chinese mothers use to teach their preschool children to prevent seasonal influenza. The findings identify the critical role of the community nurse in enhancing effective parent-child interaction for children learning health practices. Nurse-parent-child partnerships are an important consideration when planning and implementing seasonal influenza health promotion.

6.3 Chapter summary

The results from this chapter identified five major themes of the approach Hong Kong Chinese mothers used to teach their children in seasonal influenza prevention. These themes were: processes mother used to teach personal hygiene; mother-child interactions during teaching, approaches to managing children's health behaviours,

enhancing children's healthy practices and mothers' perspective of the role of the nurse in health promotion

As indicated in the findings, mothers did not use all the steps of the teaching process including alerting the child to the activity to be learned or practiced; instructing the child to perform what is expected or the steps to be taken; allowing the child to demonstrate; evaluating the standard of the child's health practice; providing the child with feedback about their health practice performance when teaching hand washing and face mask wearing. During the interaction between the mother and child, limited parental guidance on child's health practices was observed. Controlling approaches such as physical punishment was also commonly used to regulate children's health practices. Some mothers used other alternatives like storytelling and singing to enhance their children's health practice compliance. Questioning and requiring answers from their children were observed as the common method to check children' understanding on the health behaviours.

The findings of this chapter provided valuable insight into the teaching approaches and important characteristic of mother-child interaction in supporting their children's development of health practices. The key determinant for successful implementation of health education programmes is the educator's ability to communicate their meaning to the participants (Parletta et al. 2012).

The mothers highlighted the importance of the nurses' role in health education. The mother emphasized their expectations when talking about the nurses' and teachers' roles in health education. Enhancements of teaching and communication skills enable parents to develop confidence in managing child health practices (Bandura 1989; Brown et al. 2014). Thus, parental teaching and communication skills must be incorporated as a core component in the local family health interventions to ensure effective child health intervention delivery. Partnerships between community nurses and teachers provide opportunities to strengthen parents' abilities to create healthy households by appropriately using health services and promptly providing emotional support and health information.

Chapter 7 Discussion

7.1 Chapter introduction

Hong Kong Chinese parents play a key role in ensuring the ongoing health of their preschool children. The objectives of this research were: to identify the knowledge, skills, beliefs and attitudes of parents with preschool children in relation to seasonal influenza; to identify the living environment and the role of culture that impacts on a parent's health behaviour in relation to seasonal influenza; to investigate parental teaching strategies to prevent seasonal influenza and related health promotion practices and explore the potential of a nurse-led health promotion intervention to prevent seasonal influenza at a household level.

The findings of this study demonstrated that parents have different levels of functional, interactive and critical health literacy ability in the prevention of seasonal influenza. Cultural values and norms were identified as influencing the functional health literacy of parents in relation to seasonal influenza prevention. This study also found that Hong Kong Chinese parents adopted passive approaches when interacting with their child to teach healthy practices and they sometimes used physical punishments or threats to manage their children's health behaviours.

The findings indicate, there is considerable scope to better support parents to apply interactive and positive approaches to help and support their children establish healthy practices. In this chapter, the study findings are discussed in the context of the existing literature. Parent, nurse and teacher partnerships to better facilitate family engagement in health promotion interventions and promote effective parent-child interaction to teach their children healthy behaviours are emphasised.

7.2 The health literacy of Hong Kong Chinese parents in seasonal influenza prevention

In the findings of this research study, the mothers' responses to how they perceived their health practice knowledge and skill levels related to seasonal influenza prevention did not always concur with the actual health practices observed during the interviews. Importantly, parents indicated that they were interested in learning about health and the

practices that would promote and protect their families. Learning about healthy practices and exchanging this knowledge about these practices was achieved through family and community members such as: senior relatives, other parents, school teachers, social media, the internet and television. A similar report of a local study also proposed that people trusted informal source of health information from peers and friends in response to influenza prevention (Cowling et al. 2014). However, parents in this study stated that they did not appear to feel the need to verify the reliability of the obtained health messages; and even appeared ambivalent about the trustworthiness of provided health information. The parents' passive attitude toward the provision and trustworthiness of health information has the potential to place the family and their children at risk due to the potential use of inaccurate health information when making decisions (Walsh et al. 2015) about the health promotion practices they use or reject.

The parents suggested that health promotion activities, information dissemination and health consultation access could be improved through creating a regular community contact point. This contact point would serve to increase the connection between families and health professions to facilitate health promotion and illness prevention for people of all age groups, and increase community health literacy and knowledge. The following sections will provide recommendations for health promotion strategies to enhance parental health literacy in relation to seasonal influenza prevention; to ensure successful health promotion programme delivery to community stakeholders through family engagement in programme development and process evaluation.

7.2.1 Enhancing parental functional, interactive and critical health literacy

Online health seeking behaviour has become increasingly integrated into the lives of individuals encouraging them to be active health information consumers (McMullan 2006). Similar parental health seeking behaviours were observed in this study. Parents used the internet and other related forms of social media as an essential complimentary health resource to search for instant answers and relevant health information (Fiksdal et al. 2014; Ybarra & Suman 2006) and as a mechanism to exchange new health information with other parents. The internet may assist in compensating for gaps in the information provided by health professionals (Gilmour 2007; Walsh et al. 2015),

including when parents have difficulty in making timely appointments with health professionals or when scheduling conflicts arise during clinic hours (Bhandari, Shi & Jung 2014; Comer et al. 2015). As reported in this study, parents accessed health knowledge through formal or informal ways such as the health clinic, internet, mobile phone and pamphlets. Therefore, it is important to foster parental functional, interactive and critical health literacy by increasing a parent's capacities to access and effectively use health information (Nutbeam, Harris & Wise 2010; Quaglio et al. 2016), and by increasing access to health care through providing health consultation within the community (Lam, Wu & Fowler 2014).

Increasing the options for access to health information recommended by health authorities (Hickey, Gagnon & Jitthai 2016) could better facilitate parents' understanding about the nature of the disease and appropriate involvement in health promotion interventions. Health education delivered through the internet has the potential to offer a low-cost source of health information to the public (Bhandari, Shi & Jung 2014). Apart from using internet-based health education, the use of mobile health technologies such as short message service (SMS) for health message reminders provides new and innovative opportunities for health promotion and disease prevention efforts (Déglise, Suggs & Odermatt 2012; Lamont et al. 2016). The findings of this study also noted that the mobile phone is a very common communication tool for parental information exchange. Parents supported the use of text messaging as they claimed a preference for reading health information that popped up on their mobile phone. Hence, the delivery mode of health promotion education should not be limited to conventional method such as face-to-face meetings or pamphlet delivery in health clinic. An electronic integrated health promotion service such as health message reminders sent through a message service (SMS) and internet-based health education were supported as effective methods to facilitate and increase parents' utilization of health services (Healy 2006; Stockwell et al. 2015), and improve parents' functional literacy (Ybarra & Suman 2006). The study by Stockwell et al. (2015) demonstrates that text message reminders for child influenza vaccination can be effective in increasing the child vaccination uptake rate (Stockwell et al. 2015). Local health professionals could use SMS applications to remind parents to take preventive measures before the risk

period for seasonal influenza commences. This delivery mode is cost-effective (Stockwell et al. 2015) and uptake may be high as mobile phones are pervasive in Hong Kong.

In this study, parents also identified the need for a consistent contact point for health consultations in their community for better health management. Community nurses are well positioned to contribute to enhancing parents' health literacy to assist them seek and use health information and services effectively through encouraging the use of internet-based health education as well as providing support through outreach services (Hickey, Gagnon & Jitthai 2016). The understanding and uptake of health promotion information can be facilitated by engaging parents in learning through online health education and face-to-face workshops to support parents to develop competence in: functional literacy. This includes the development of health knowledge and preventive skills and confidence in performing practices independently (e.g. hand washing and coughing/sneezing manner). These interactive opportunities can frequently challenge and correct parents' misunderstandings and inaccurate concepts and practices. Nurses can play a key role in the provision of educational information, guiding parents to websites where reliable health information has been identified (Rice 2006) and providing support to them on how to interpret and integrate online information with traditional health care approaches (Ybarra & Suman 2006). These interactive activities will also enable parents to have greater control of their health through informed decision making (Nutbeam, Harris & Wise 2010).

7.2.2 Family engagement in health promotion programme development and process evaluation

Parents in this study raised issues about the absence of adequate enabling conditions that would increase their ability to take preventive action and to participate in health interventions. These conditions included: the limited availability of hand washing facilities in the community and rubbish bins with lids; and the scarcity of access to appropriate child-focused community health services as a result of uneven resource allocation for child health promotion and resources for health consultation in community.

Even though the parents in this study raised many issues about access to health promotion information and support, the local government has focused on raising public awareness of influenza infections using a range of tactics including printed materials, websites, telephone hotlines, briefing sessions, public television announcements and media interviews, along with large-scale publicity campaigns to promote personal and environmental hygiene, and various vaccination programmes (Centre for Health Promotion of Hong Kong 2010). A tension exists between this top-down preventive approach and the ability to connect at a community level with parents. This highlights limitations of the current approach in terms of its inability to create lasting behavioural change (Huber & Shapiro 2012). Using this top-down approach, parents are positioned as recipients of information and are not actively involved in family health promotion activities. They are not engaged as stakeholders in identifying health problems, developing health promotion interventions, implementing those strategies and evaluating the implementation process (Huber & Shapiro 2012). As a result, they are less likely to feel engaged in health promotion campaigns and unlikely to act upon the messages communicated.

This evidence of the lack of family engagement signals the need for greater family and community health planning and action that includes process evaluation before and during the planning stages and when implementing seasonal influenza prevention programmes (Lam, Dawson & Fowler 2014). The importance of developing a relationship between parent and nurse provides the foundation for ensuring educational content is appropriate to the needs of the children and their families (Fowler et al. 2012). The community nurse is ideally positioned to provide face-to-face workshops and consultation with parents. These interactions can encourage parents and their children to participate in the design, development and evaluation of workshops and on-line educational programmes that can be tailored to the needs of the community and individual families (Lam, Wu & Fowler 2014; Nutbeam, Harris & Wise 2010). Moreover, decisions regarding the most feasible and preferred delivery mode and timing of health promotion programmes can be made with the families to maximize participation (Benjamin Neelon et al. 2016). To ensure successful delivery of seasonal influenza prevention within communities, collaboration and partnerships are crucial among community members and public health agencies such as outreach clinics, district

councils and schools. This approach supports the provision of adequate and consistent health communication and integrates community engagement at every stage of programme development within the communities (Khubchandani et al. 2016; Lam, Wu & Fowler 2014).

7.3 Pluralistic health promotion practices exist in local family health care

The findings of this study show that Traditional health practices and beliefs have a strong influence on Hong Kong Chinese parents' practices in managing cold symptoms and the prevention of seasonal influenza. Families use both Western and Chinese medicine, drawing from both traditions to prevention disease and promote health. Five major cultural practices were identified within this study: sharing beds with family members or domestic helper; boiling white vinegar to kill air-born germs to ensure a healthy environment for child's health; diet therapy to enhance body health; self-prescribed Chinese medication to manage the child's cold symptoms; and the co-use of Western and Traditional Chinese medication to promote health and prevent seasonal influenza.

Health professionals, whether providing family health care services in the form of conventional Western medicine, Traditional Chinese medicine or the integration of these two approaches will benefit from an increased awareness of the pluralistic health promotion practices (Jamieson, Parker & Richards 2008) identified in this research study. It is crucial that health professionals caring for the child and family are aware that they may not be the only health practitioner involved in this child's and/or family's health care. The following sections will provide recommendations for the development of cultural appropriate health promotion strategies for seasonal influenza prevention.

7.3.1 Pluralistic health promotion approach to better prevent seasonal influenza

This study adds to the body of knowledge concerning medical pluralism in Hong Kong society. The findings support that the concurrent use of both Western and Chinese medicines remains the preferred practice of Hong Kong families as found in other research studies such as the study of Chung et al. in 2007. Two studies provided additional support to the findings of this research that the strategies designed to improve

health outcomes among Hong Kong Chinese families may be more effective if they are culturally appropriate and a family focused approach to health promotion is taken (Huber & Shapiro 2012; Jamieson, Parker & Richards 2008). Using culturally appropriate seasonal influenza practices and family focused approaches will assist in ensuring family acceptance of practices, ownership over these practices, compliance with and ultimately sustainability of health practices for seasonal influenza.

A review of preparedness plans for seasonal influenza pandemics in Hong Kong found that problem-solving perspectives and values of the local public are not routinely incorporated into health strategy plans to prevent seasonal influenza (Centre of Health Protection of Hong Kong 2014b). These preparedness plans do not acknowledge that the Hong Kong population has a history of sustained use of Traditional Chinese medicine, with Western medicine appearing to be the only form of medicine receiving formal government recognition. This situation has also been identified in other research conducted in Hong Kong (Chung et al. 2007). The Hong Kong Department of Health takes a strategy approach similar to that of many European countries, aiming mainly at health surveillance, harnessing and deploying available resources such as stockpiling antiviral agents and vaccines for influenza preparedness and risk reduction (Centre of Health Protection of Hong Kong 2014b; Coker & Mounier-Jack 2006; Department of Health of Hong Kong 2015). Failing to act and incorporate family practices within the preparedness plans is likely to result in culturally incongruent seasonal influenza preventive measures by health authorities (Paton et al. 2008). Health departments must acknowledge that the Hong Kong population is diverse and needs to be involved in the development and management of seasonal influenza health promotion initiatives in order to make them appropriate and favourable to different cultural groups and sensitive to current cultural practices (Gray et al. 2012).

The findings of this study also demonstrate that the existing preparedness strategies need to address the role of the private Traditional Chinese medicine practitioners. Mothers in this study reported using Traditional Chinese medicine or seeking the advice of Traditional Chinese medicine practitioners or herbalist as their first point of contact. Similar health seeking behaviours were reported in the study of Chung et al. (2007) that private Traditional Chinese medicine practitioners were the possible first point of

contact for health care in the Hong Kong community. In the above study, 3.9% out of 31,762 respondents reported that they preferred to consult Traditional Chinese medicine practitioners when they had symptoms of a medical problem (Chung et al. 2007).

The collaboration between Traditional practitioners and Western health care providers provides significant opportunities for the improvement of children's health management (Makundi et al. 2006). Insights gained from the Makundi and colleagues' study were that seasonal influenza could be better prevented and treated with improved planning, training and coordination between the provision of Western medicine and Traditional Chinese medicine. As the principle of physical assessment and symptoms differentiation underpinning Traditional Chinese medicine and Western medicine are very different, the diverse interpretation of client's physical condition may be a result. Hence, there is a need for the training of Traditional Chinese medicine practitioners to refer and report cases of influenza enabling the government surveillance system to detect the cases early enough before it has already spread. This acknowledgement of medical pluralism would assist in improving health promotion initiatives to prevent seasonal influenza**.**

7.3.2 Cultural congruent family health promotion programme

The findings of this study demonstrate that parents incorporated Chinese cultural values in their daily health practices such as diet therapy to enhance family health, herbal tea to prevent influenza infection. In order to ensure cultural appropriate health intervention provided to families and their children, partnerships between health professionals and parents need to be developed to enable family health promotion as a fundamental goal to be achieve (Cyril, Smith & Renzaho 2015). People are more likely to take appropriate action and accept recommended actions if they have been engaged in decision-making processes and programme development (Gray et al. 2012).

A key approach to involve parents is to go through community channels. Partnerships between community health professionals and the family through outreach services providing opportunities to strengthen parents' abilities to create healthy and safe households by providing health advice in a way that is meaningful, fits with their living and family circumstances, and culturally makes sense to parents such as: providing an

explanation about the malpractice of boiling white vinegar to kill air-born germs; and assisting parents set achievable goals and provide individualized health information to address an individual family's concerns. Nurses have been long acknowledged as being well positioned to take a lead role in health promotion activities (Chiverton, Votava & Tortoretti 2003; World Health Organization 2000). A vital role and skill of the community nurse is to foster relationships with parents through engaging them in health promotion conversations (Riesch, Anderson & Krueger 2006). This includes the nurse taking a proactive role in discussing with clients their preference for cultural specific health promotion practices and, if possible, how these practices can be used safely to minimize harm.

These discussions with parents provide an opportunity for prompt and appropriate health recommendation in order: to avoid negative herb-drug interactions between Traditional Chinese medicine and Western medication which may cause reduction of the drug treatment's effect on the disease (Brantley et al. 2014; Hospital Authority 2015); and to reinforce the importance of wearing a face mask to assist in preventing cross-infection among family members when their children are infected by seasonal influenza. If the bedroom space is adequate, separate sleeping practices must be encouraged to minimize prolonged and close exposure of parents to their infected child (Lam, Dawson & Fowler 2014) or assist the parent identify and use strategies to increase the distance the infected person is sleeping from other family members. These approaches support the most favorable and effective environments for health promotion and illness/disease prevention at both community and household levels.

7.4 Improving parent-child interaction in child and family health programmes

The results from Chapter 6 identified four major themes that were linked to Hong Kong Chinese parents' teaching approaches and strategies they used with their children to teach about seasonal influenza prevention. These themes were: processes parents used to teach personal hygiene; parent-child interactions during teaching child healthy practices; approaches to manage children's health behaviours; and enhancing children's healthy practices.

The study findings demonstrated that parents did not adopted a complete teaching process to teach their children's health practices to promote health and prevent seasonal influenza. The steps of teaching process include alerting the child to the activity to be learned or practiced; instructing the child to perform what is expected or the steps to be taken; allowing the child to demonstrate; evaluating the standard of the child's health practice and providing feedback to the child on their health practice performance (Oxford & Findlay 2013). Positive parent-child communication is identified as contributing to effective health practices learning (Parletta et al. 2012). Passive parent-child interactions were noted when parents were requested to teach their preschool children hygiene practices. Five parents reported that they adopted physical punishment and threatening approaches to ensure their children's compliance in health practices. Consideration of these findings has the potential to assist nursing service planners in the development of child and family health education and health promotion programmes; to inform nurses about the strategies to support parents to better guide their children's healthy behaviours.

7.4.1 Enhancing effective parent-child interaction in child health education

In recent years, researchers have investigated how parents can prevent child illness. This emphasis has shifted the focus from the parent and child as individuals to the parent-child dyad (Skouteris et al. 2011). This reciprocal interaction relies on the level of a child's cue clarity, parent contingent responses and logical interaction sequence to ensure effective communication (Oxford & Findlay 2013). The findings of this study provides observational evidence that mothers did not use all the steps of the teaching process when teaching their children in hygiene practices (as identified in Chapter 6). Parents adopted a passive approach in their health education interactions with their children. They kept silent or provided limited guidance when their children performed personal hygiene practices. While 12 mothers used language that was clear enough for their child to understand, seven mothers' instructions to their child did not appear to be very clear resulting in a lack of teaching effectiveness.

The incomplete teaching process and passive parent-child health education interaction may cause an inability by some mothers, due to their lack of confidence, to positively manage their children's behaviour. Parents' ability to communicate their meaning

effectively to their children reduces the need for the parents to rely on assertive and aversive strategies to increase child health practice compliance (Skouteris et al. 2011). Hence, enabling parents to develop effective communication with their children needs to be considered as a promising focus point for enhancing child health practice learning (Parletta et al. 2012). This enhanced parent-child communication approach requires nurses and other health professionals to have the appropriate knowledge and skills to support parents develop parental confidence and improved teaching and communication skills.

These knowledge and skills must be included as a core component when developing family health interventions. The intervention would involve two parts. The first part is the knowledge input component that only involves parents. Parents will learn important components related to the effective communication with their preschool child, children's physical and psychosocial development, their learning abilities and the significant impact of modeling the expected behaviours. The second part is the practice session involving both parents and their children in demonstrations. After the knowledge input, both parents and their children will participate in various scenarios regarding health issues such as coughing etiquette or hand washing to support the parent learn to effectively communicate when teaching their child health practice skills. Through this interactive teaching session with their children, parents have an opportunity to apply their new knowledge into practices. With the support and consultation of community nurses, inappropriate and ineffective concepts and practices related to child learning and interactions can be respectfully challenged and appropriate and effective health promotion strategies introduced and consolidated. Enhancements of knowledge and skills enable parents to develop confidence (Bandura 1989; Brown et al. 2014) in managing child health practices. In addition to face-to-face education, phone consultation or teleconference (Comer et al. 2015; Nutbeam 2000) may also be provided for parents' further consultation and support post intervention to ensure adequate communication with parents and to provide support to enable the newly learnt practices to become embedded within the family.

7.4.2 Integrating parental teaching skills in child and family health education

Integrating strategies to improve parental teaching skills in child and family health education is an important area requiring the attention of health planners. Parents' cultural health practices significantly influence their children's health behaviours (O'Connor et al. 2010). Two studies have reported that many parents generally adhere to Chinese cultural values when interacting with their children (Chao 1994; Chen & Kennedy 2004). Some parents were found to use child rearing approaches that were more controlling and restrictive (Chao 1994). Children may be required to be unquestionably obedient to their parents. The findings of this doctoral research study also support the above claims. Punitive strategies were highlighted as a method to gain their child's compliance. Mothers acknowledged that they slapped their children and withdrew pleasurable activities from their children as a form of punishment in order to regulate their children health behaviours. Some mothers claimed they had no other way to manage their child's behaviour. Observations of the mother-child interactions were found that only five mothers praised their child when they did something correctly; while the other 12 mothers did not provide their children with any positive reinforcement. The frequent use of a restrictive or controlling parenting approach has been identified to be associated with children's lower level of self-control when using the internet (Wu et al. 2014) and children's noncompliance to health eating (Skouteris et al. 2011). This approach has the potential to contribute difficulties that Chinese parents may experience in regulating their children's health habits. Parents need to attain the necessary developmentally appropriate skills to manage their children's health behaviours. Information and support is needed to enable parents to communicate effectively with their children. When teaching these approaches the content needs to be sensitive to cultural needs while maintaining the safety of the child. An essential strategy for the community nurse is the incorporation of a parental teaching skills intervention to enhance child health as a vital component in local child health promotion programmes (Chen & Chan 2016; Kennedy et al. 2014) .

7.4.3 Parent-child engagement to better monitor and sustain child's health practices

Increasing the child's functional health literacy may result in improved child health outcomes (Velardo & Drummond 2016) through engaging them in health promotion

intervention using developmentally appropriate strategies that include stories, songs and opportunities to practice skills. In this study, it was observed that parents did not always involve children in their health educational interactions. Seven mothers did not evaluate the performance of their children's health practices and 18 mothers did not provide feedback to their children on their health practice performances. It is crucial for community nurses to foster parent-child involvement to better support children's health practices development and sustainability. Providing parents with mentoring while observing parent-child interaction and parental teaching skills is an essential nursing role (Fowler et al. 2012). Enhancing parent-child interactions will provide opportunities for the nurse to mentor parents in assessment of their child's health knowledge and to modify their health practices. This partnership is of particular importance to child rearing so that parents and their child are enabled to live healthier lives (Carr-Hill & Currie 2013) and be actively involved in enhancing their health.

Parent-child-nurse partnerships in developing and designing health interventions, allow collective suggestions to be used to identify culturally specific home interventions that correspond with families and their children's actual needs (Lam, Wu & Fowler 2014). This partnership enables educational materials of suggested health behaviours to be developed in consultation with parents and children; this collaboration increases the ability of these materials to be acceptable and sustainable. Nurses can increase their effectiveness by fostering relationships with the parent and child through: parent and child involvement in the health promotion conversation (Jurkowski et al. 2013); communicating the parent's, child's and nurse's expectations; and encouraging parents to model health behaviours and practices for the child (Riesch, Anderson & Krueger 2006). Using a reflective discussion at the end of the health promotion programme may assist in providing feedback regarding parent-child communication, appropriate child developmental tasks, learning health knowledge and practices. These approaches will assist families in maintaining an optimal environment for health promotion and illness/disease prevention at both community and household levels.

7.4.4 Parent, nurse and teacher partnerships in health promotion

In this study, mothers expected nurses and teachers to deliver health education and health promotion in the community. Partnerships between community nurses and

teachers provide opportunities to strengthen parents' abilities to create healthy households (Lau, Springston, et al. 2012) through the nurse and mother co-designing health promotion strategies. This partnership ensures culturally appropriate and achievable health interventions provided to parents and their children as evidenced by parents' appropriate use of health services; setting achievable goals (Landy et al. 2012); and emotional support and relevant health information delivered to families.

Kindergartens and schools provide a focal point for the engagement of young children and their families where nurses and teachers can provide a valuable platform for health information exchange (Lam, Chan & Yeung 2013) in relation to a family's seasonal influenza prevention practices. This inter-professional collaboration between community nurses and teachers is crucial to supporting the health needs of families and their young children, and building capacity of both nurses and teachers as they are able to share knowledge and skills. This interface provides an opportunity to work with teachers to develop individualized kindergarten or school action plans for how to care for the children to prevent the cross infection of influenza and manage flu symptoms in the kindergarten or school environment. Community nurses can serve as a referral and information base for teachers and make recommendations concerning precautions to take, and practices to limit the spread of influenza.

Community health services should enable nurses to assist with tailoring up-to-date information through school websites to provide easy access for children and their families. If required, physical assessments of young children by the community nurses can be negotiated and offered, particularly during seasonal influenza pandemic. Community nurses have the knowledge and skills to reinforce the critical and distinctive seasonal influenza information such as the definition of seasonal influenza, route of transmission, sign and symptoms, and specific household preparedness (e.g. thermometers, face masks and medications for fever) (Murray 2009) to parents and teachers at their regular parent-teacher association meetings. Individual family or cultural health practices can be shared and collected in meetings. These examples provide an opportunity for parents and teachers to clarify and reinforce messages, and assist parents to rethink different families' health practices in relation to seasonal influenza.

7.4.5 Community Nursing Service re-orientation

Community nurses require support and approval to change the scope of their nursing health service and practices. As in many countries the aging population and its need for increasing services has become a serious issue in Hong Kong society (see Chapter 1 introduction). This rapidly aging population consumes a significant proportion of a community's resources (Hospital Authority 2012b). Health services for elderly people are the priority of local Community Nursing Service (Hospital Authority 2014). Most elderly people have a chronic illness and are vulnerable to contracting infection or experiencing injuries such as falls. Due to these pre-existing or unexpected conditions, the majority of health interventions provided by the community nurse, focus on disease prevention (Hospital Authority 2012a), rather than health promotion. Even though health promotion to people, families and the community is one of the key roles of community nurses (Hospital Authority 2012a), the scope of health promotion activities remains limited. A review of international evidences also reported that the approach of health services adopted by different health authorities remains mainly curative (Wise & Nutbeam 2007). Similar comments were reported in a local study by Lam and colleagues (2014) that the coverage of health promotion services provided was limited and not available to all age groups. There was a significant gap for school-age children and parents. As evidenced by this current study there was a similar lack of health promotion provision in the kindergartens. The anticipatory health promotion interventions such as strategies to maintain healthy immune responses and personal hygiene are pivotal to family and community health. These understandings raise a significant challenge to the policy makers and managers of community nursing services. They need to develop and lead reform agendas which aim to shift more health resources such as manpower deployment to the child and family health services; refocus the service approach from disease prevention to health promotion through overall structural changes of health systems and services (Wise & Nutbeam 2007) and provide regular community contact points in each district to support greater access by family and community stakeholders to health promotion services (Lam, Wu & Fowler 2014).

7.5 Chapter summary

The evidence generated by this study demonstrates that parents had different levels of functional, interactive and critical health literacy in relation to seasonal influenza prevention and related health promotion strategies. Parents demonstrated a lack of, or incomplete use of hand washing and mask wearing and a limited critical analysis of available health information obtained from different community organizations. The findings also illustrated that the traditional cultural health practices and beliefs still have a strong influence on Hong Kong Chinese parents' health practices when managing cold symptoms and seasonal influenza prevention. Families use both Western and Chinese medicine showing that families draw from both traditions in their prevention and health promotion practices as part of their commitment to ensuring their families' health.

Parental teaching method directly influence their children's understanding of the practices and their compliance to parents' health advice in relation to influenza health prevention practices. The study's observational data demonstrated that 12 Hong Kong Chinese parents used an incomplete teaching process when teaching their preschool children hygiene practices to promote health and prevent seasonal influenza. Parents adopted a passive interactional approach in teaching their children healthy practices. They kept silent and provided limited guidance when children performed hygiene practices. Five parents adopted either physical punishment or threatening approach to ensure their children's compliance in health practices.

The findings suggest that community health professions have a critical role in increasing parents' functional, interactive and critical literacy. Community nurses can make a significant contribution in enhancing parental capacity to use health information effectively through internet-based health education together with outreach services. Besides, the results provided important insight into the cultural practices and parental teaching approach of Hong Kong Chinese parents in seasonal influenza prevention. The critical role of the community nurse in enhancing parent-child interactions for children's health practices learning was also emphaized in this study.

The evidence from this study highlighted the need for a greater working alliance and partnership between nurses, parents and teachers as a crucial strategy when planning

and implementing seasonal influenza health promotion programmes for children and families in schools and communities. This partnership assists in enhancing consistent health information delivery and supports to both child and family.

The following chapter presents the details recommendations for future research, policy and practices, as well as the limitations of this study.

Chapter 8 Recommendation, strengths and limitations

8.1 Chapter summary

This research presents new findings in a variety of areas: social connections, health resources, as well as cultural factors affecting parental health literacy, and the parental teaching approach to children in seasonal influenza prevention. In adding to the value of current knowledge in the field of child and family health care, it also highlights significant deficits in the available research that requires attention. This is both in the areas of clinical research and health service research.

In this chapter, recommendations are made including the use of culturally congruent participatory approaches to designing and implementing health promotion programmes to enhance the health literacy of Hong Kong Chinese parents. The strengths and limitations of this study will be identified and recommendations made for health policy, nursing practice and future research directions.

8.2 Recommendation for research, clinical practice and health policy

8.2.1 Partnerships and effective parental teaching approach in health promotion initiatives

Closer scrutiny is required using process evaluation to ensure greater partnership and collaboration between community nurses, parents and school teachers in developing and implementing health promotion and disease/illness prevention. Conducting process evaluation would assist in ensuring tailored designs and educational content that best address the health needs of families and their children and facilitate participation by school teachers and families in health promotion interventions using kindergartens and schools as an access point.

Effective communication with children enhances their health practices learning and health behaviour development. The evidence gathered in this study indicated that parents used ineffectual teaching methods to support their children's learning to develop health practices. A lack of research exists about the relationship between the parental teaching process and child health practice compliance. An experimental longitudinal

study would be warranted to examine the impact and effectiveness of parental training on the use of structural and interactive parent-child teaching approach in establishing their child's health practices.

8.2.2 Hong Kong Chinese parents Western and Traditional Chinese Medicine utilization patterns

These research findings strongly suggest that Hong Kong Chinese parents are using both Western and Traditional Chinese medicine to manage cold symptoms and prevention of seasonal influenza. The utilization pattern of Western and Traditional Chinese medicine in seasonal influenza management among families with young children and communities requires further investigation. The investigation needed is to understand the prevalence and types of Western and Traditional Chinese medicine service use and parental health seeking patterns. Areas of investigation would include the pattern of using Western and Traditional Chinese medication and the navigation between parents' interaction with Western medicine and Traditional Chinese medicine. The outcomes of this research would assist health planners to develop relevant health promotion strategies in the preparedness plans for local seasonal influenza pandemics.

Further, large scale studies are required to verify and measure the efficacy and safety of the use of Chinese medications in seasonal influenza prevention and treatment for children. While, it is also important to determine whether the use of self-prescribed Chinese medications is linked to a delay in a child's influenza treatment. Further robust research is needed to answer this question to enable parents to make safe decisions about the management of their children's health. The focus of future research on self-prescribed Western and Chinese medications also needs to move beyond seasonal influenza to include other common child health problems such as constipation (Guerreiro, Bettinville & Herzog 2014; Mallon et al. 2015) and sleep problems (Quach et al. 2009).

8.2.3 Health policy review

Existing top-down preventive approaches to raise public awareness of influenza infections have limitations and have been challenged for their inability to create lasting behavioural changes that reach targeted populations (Huber & Shapiro 2012). Various transmission methods are used including printed materials, websites, telephone "hotlines", briefing sessions, public television announcements and media interviews, along with large-scale publicity campaigns. A comprehensive review is required to existing child and family health care policy, health promotion approaches and implications regarding seasonal influenza prevention. It helps to provide a solid foundation for future preparedness plans in this area.

To increase understanding prior to the review or development of policies, cultural beliefs and traditions need to be considered as these cultural aspects have been found to significantly influence local Hong Kong Chinese people's responses and practices to human influenza. The findings of this study provide health policy makers and service planners with beginning evidence. They can use to develop cultural congruent disease prevention and health promotion programmes for use in local Hong Kong communities. However, to continue to inform health policy ongoing evaluation is required to fully understand the dynamics of Hong Kong Chinese people's responses and practices to health promotion programmes and activities.

8.2.4 Nurse workforce surveys

One important area requiring urgent attention is the need for an explicit understanding of the competence of nurses including those that claim specialized knowledge and skills in child and family health. The research should include nurses' understanding of the measures to ensure safe use of Traditional Chinese medicine to manage seasonal influenza in local families; the number of nurses who gain related education or who do not have formal education in the use of Traditional Chinese medicines and nurses' clinical experiences in taking care of families and their young children.

8.2.5 Large scale study to examine the competence of parents in seasonal influenza prevention

A large scale research study to investigate parental functional, interactive and critical health literacy of Hong Kong parents is needed to understand their competence in relation to seasonal influenza prevention and related health promotion tactics in the local community. The outcomes of this study will assist health service planners to develop relevant health education content to include in child and family health programmes, and workshops.

8.2.6 Five key recommendations generated from this research

Recommendation 1: Partnerships and effective parental teaching approach
Process evaluation must be initiated to ensure greater partnership and collaboration between community nurses, parents and school teachers in developing and implementing health promotion and disease prevention. *An experimental longitudinal study is needed to examine the effectiveness of parental training on the use of structural and interactive teaching approach in establishing their child's health practices.*
Recommendation 2: Parents' Western and Traditional Chinese Medicine utilization patterns
Greater acknowledgement of the co-use of Western and Traditional Chinese medicine utilization is required when health professionals develop and implement health promotion programmes and activities. *The utilization pattern among families with young children requires further investigation such as the prevalence and types of Western and Traditional Chinese medicine service use and parental health seeking patterns.*
Recommendation 3: Health policy review
Pluralistic health promotion initiatives should be carefully considered in local seasonal influenza preparedness plan to ensure family's acceptances and compliance to the health advice provided by health authorities. *There is a need for a comprehensive review of child and family health care policy, health promotion approaches regarding seasonal influenza prevention in order to develop cultural congruent disease prevention and health promotion programme for use in local Hong Kong communities.*
Recommendation 4: Nurse workforce surveys
A survey to provide an explicit understanding of nurses' knowledge and training in Traditional Chinese medicine and their clinical experiences in taking care of families and their young children is needed. This information would then be available to inform the development of nursing curricula to enable nurses to effectively work with parents and their young children to promote healthy lifestyle behaviours.
Recommendation 5: Parents' competences in seasonal influenza prevention
A large scale research study is required to examine the health literacy and competence of both female and male parents in seasonal influenza prevention and their health promotion strategies.

8.3 Strengths and limitations

The major strength of this study was that it sought to explore areas of health promotion that have a crucial impact on the future health of young children and their families living in Hong Kong, as they are regularly exposed to high risk periods of seasonal influenza. This study investigated three areas that had received minimal attention in relation to seasonal influenza and preschool children: the health literacy of parents with a healthy preschool child; cultural influences on parental health practices; and their teaching approach in relation to seasonal influenza prevention. In doing so, this research has given voice to the needs of the parents and healthy children rarely engaged in health research. This study demonstrated that parents and children provide rich stories and evidences in their daily health practices with regard to seasonal influenza prevention and related health promotion strategies. Inadequate functional health literacy and ineffectual parental teaching strategies were identified that require a commitment to culturally congruent health service assessment, planning, implementation and ongoing evaluation. Rectifying these issues will enable parents to better protect their children and support their children's learning to gain lifelong health promotion and illness preventative knowledge and skills.

Another major strength of this study was that the researcher did not use Test of Functional Health Literacy in Adults (TOFHLA) or the Rapid Estimate of Adult Literacy in Medicine (REALM) to measure parents' functional health literacy regarding hand washing and cough etiquette knowledge in this study. These tools were both developed for an English-speaking adult population. The tests are not easily translated to enable assessment of the Hong Kong Chinese populations. The terminologies used in the assessment were different from that of other countries because of differences in linguistic systems and sociolinguistic aspects in different countries (Loo, Wong & Furnham 2012; Wong, Bridges, et al. 2013). Instead, the researcher took a comprehensive approach by using self-developed closed questions and semi-structured interviews to provide a broader perspective of parents' health practices. The instruments were validated by a panel of academic experts, community nurses and school teachers who are knowledgeable in influenza infection control and child and family health through content validity index. This ensured the questions were clear, unambiguous, were able to be answered and they collected adequate information to address the

proposed research aims. The questionnaire developed for this research study may contribute towards establishing a seasonal influenza health literacy assessment for communities.

The main limitation of this study was that 20 parents with their preschool children were recruited from six out of 18 districts. Despite strenuous efforts to recruit a broad range of participants, 12 parents (60%) were recruited from the same district and could be expected to experience similar environmental and other contextual influences related to seasonal influenza prevention and health promotion strategies, as compared to the parents recruited from other districts. Although qualitative research does not necessarily seek representativeness, the outcomes for interviewing participants from diverse communities may have described different health needs and practices.

Another limitation was that the gender of the participants was homogeneous in this study as they were all female. This is an important factor to be considered in future research regarding gender differences in father's health promotion practices and experiences. Extending the current research to include diverse samples in ethnicity and/or socio-economic class would be a valuable next step due to the cultural mix living within Hong Kong.

8.4 Chapter summary

Hong Kong Chinese mothers have a crucial role in ensuring their young children become competent in the use of health promotion activities that will protect them from influenza infection. This is the first study to examine the health literacy of Hong Kong Chinese families with a healthy preschool child to provide insights for seasonal influenza prevention and related health promotion strategies at the household level. The innovation factor of this research is reflected in the shortage of comparative research to provide context to the findings reported in this thesis. A large scale research study is required, as highlighted by this study, to examine the health literacy and competence of both female and male parents in seasonal influenza prevention and their health promotion strategies. The results also recommended that an experimental longitudinal study to investigate the effectiveness of parental teaching on the use of structural and interactive teaching approach in establishing their child's health practices is required.

Consideration of these findings has the potential to assist nursing service planners in the development of child and family health education and health promotion programmes; to inform nurses about the strategies to support parents to better guide their children's healthy behaviours.

The evidence from this study demonstrated that parents used both Western and Traditional Chinese medicine in managing flu symptoms and preventing influenza infection. The utilization pattern among families with young children requires further examination. This examination contributes to ensure safe health practices of seasonal influenza management for child. Meanwhile, pluralistic health promotion initiatives must be carefully considered in local seasonal influenza preparedness plan to ensure family's acceptances and compliance to the health advices from health authority. Parent-nurse partnership is an important consideration when planning and implementing culturally appropriate health promotion services and health education programmes in a local context.

One crucial area requiring attention is the need for a comprehensive understanding of nurses' knowledge and training in Traditional Chinese medicine and their experiences in taking care of families and their young children. This competence assessment would help to inform the development of nursing curricula to enable nurses to effectively work with parents and their young children to promote healthy lifestyle behaviours.

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Appendix 2: Manuscript associated with results reported in chapter 2 literature review

JCN Journal of Clinical Nursing

Journal of Clinical Nursing

REVIEW

Health promotion interventions to prevent early childhood human influenza at the household level: a realist review to identify implications for programmes in Hong Kong

Winsome Lam, Angela Dawson and Cathrine Fowler

Aims and objectives. To identify factors affecting the delivery of health promotion interventions to prevent early childhood human influenza at the household level.

Background. Yearly, influenza epidemics seriously affect all age groups, particularly those with weakened immune systems, including children. Influenza is transmitted easily from person to person through droplet and direct contact. Maintaining personal hygiene, avoiding close contact with the infected person and proper hand washing are recommended as the most effective means of preventing the transmission of influenza. However, it is not clear what programme-related mechanisms and contexts are crucial to the successful delivery of interventions in the home. This study systematically reviewed published research studies to identify factors influencing the effective delivery of health promotion programmes targeting influenza in a household.

Design. Realist review.

Methods. A realist review methodology was selected to examine what interventions are effective in preventing and managing influenza at the household level and in what circumstances. A structured search of the peer-reviewed primary research literature was undertaken using a defined search protocol.

Results. Eight studies were retrieved for the analysis. Mechanisms impacting on intervention delivery were identified, including timing of implementation, programme reach, organisational and healthcare worker involvement, mode and place of delivery, contact with infected person, health practice compliance and sustainability at home.

Conclusion. These findings suggest contextual factors that could be identified through ecological approaches to health promotion that are crucial for policymakers to consider when designing interventions.

Relevance to clinical practice. The active involvement of community nurses through an integrated household visiting programme may help to better deliver family-based health promotion interventions to prevent illnesses such as influenza in children.

What does this study contribute to the wider global clinical community?

- Contextual factors related to successful programme delivery should be considered.
- Interventions to prevent influenza infection at family level should be implemented using a health promotion approach, rather than a disease prevention approach.
- Family health promotion initiatives for child health at the household level should be promoted in the community.

Key words: child, health promotion, influenza, review

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Introduction

An individual's health is affected by multiple inter-related physical and psychological factors, as well as their relationship with environmental attributions (Lohrmann 2010, Chan 2011, Lee 2011). Yearly, influenza epidemics can seriously affect all age groups, including those with developing and weakened immune systems such as young children, older people and those with chronic illness (WHO 2009a). Human influenza is caused by the influenza viruses A, B or C. Influenza A viruses can further be subtyped, and influenza A (H1N1) is one of the examples. In Hong Kong, these viruses are common from January–March and from July–August (Centre of Health Protection of Hong Kong 2012). As a result of these seasonal fluctuations, Hong Kong residents are at risk of contracting influenza twice a year for three-month periods (Centre of Health Protection of Hong Kong 2012). The virus is transmitted easily from person to person through droplet and direct contact (WHO 2009a, Centre of Health Protection of Hong Kong 2012), particularly in overcrowded environments.

Hong Kong is a small geographical area densely populated with seven million people (Hong Kong Census & Statistics Department 2012). Living space in Hong Kong is limited, with restricted internal floor area per person, especially for those living in public estates (Jayantha & Lau 2008). It is usual for a family of four to share around 50 square metres, which translates to 12·5 square metres per person. This living area is considerably smaller than the median living space in the USA, where it has been calculated at around 67·5 square metres per person (Department of Housing & Urban Development 2007). Under such circumstances, the risk of being infected by the influenza virus is comparably higher. High rates of infection in confined spaces are supported by studies of Baker *et al.* (2000) and Fullilove and Fullilove (2000) who found that communities with overcrowding and higher levels of population density experience greater rates of respiratory disease, chronic illness and other health issues. A realist review methodology has been selected to identify contextual factors that facilitate the successful delivery of interventions at the household level This will provide important insights to enable policymakers in Hong Kong and other high-risk countries not only to prevent routine influenza transmission and other common infectious diseases, but to reduce the likelihood and severity of possible epidemics.

Background

In the last century, three pandemics of human influenza have affected the world population in 1918, 1957 and 1968, respectively. The most deadly pandemic was the 'Spanish Flu', which is thought to have killed at least 40 million people during the 1918–1919 period (WHO 2003). Two other influenza A pandemics have occurred: the Asian influenza pandemic in 1957 and the Hong Kong influenza pandemic in 1968. Both not only had devastating consequences for the economy but also resulted in significant global morbidity and mortality (WHO 2003).

More recently, an influenza A (H1N1) virus emerged to cause illness in humans, resulting in a pandemic in mid-2009 (WHO 2010). After early outbreaks in North America in April 2009, the new influenza virus spreads rapidly around the world. A total of 74 countries and territories were affected. Unlike typical seasonal flu patterns, this new influenza virus led to patterns of death and illness not normally identified as resulting from influenza infections. Most of the deaths caused by this influenza pandemic occurred among younger people, including those who were otherwise healthy. Pregnant women, younger children and people of any age with chronic medical conditions appeared to be at higher risk of illness-related complications (WHO 2010).

In recent years, antiviral drugs used to treat influenza have been an effective treatment. Vaccination is suggested as one of the most effective ways to prevent the disease or severe outcomes from the illness (WHO 2009a). However, drug therapeutic intervention may cause complications such as fever or drug allergy. In addition, new subtype variants of influenza appear from time to time and at irregular intervals (Centre of Health Protection of Hong Kong 2012). People are not always immune to new variants of the virus. Even people who are vaccinated may still become infected because of the constant changing of influenza viruses (WHO 2003). These variants may then cause epidemics (WHO 2009a).

Crucially, many diseases can be prevented or their impact on health minimised through health promotion and preventative measures (WHO 2003, National Scientific Council on the Developing Child 2010, Centre of Health Protection of Hong Kong 2012). Maintaining high levels of personal hygiene, avoiding close contact with infected persons and proper hand washing are recommended as the most effective means of preventing transmission and arresting the spread of influenza (WHO 2009a,b, Centre of Health Protection of Hong Kong 2012). The family is one of the

immediate primary sources and providers of children's health education and information (Hopper *et al*. 1992). Nurses are well placed to support parents, as the nurse's role is not only to take care of the sick but also to promote overall health and prevent the onset of illness within the community (Royal College of Nursing 2007). However, it is not clear what programme-related mechanisms are important at the household level to ensure the efficient and effective implementation of health promotion interventions promoting health behaviours that prevent influenza transmission. This study systematically reviews published primary research concerning health interventions to decrease influenza at the household level. To our knowledge, we are the first to apply a realist inquiry approach to the study of factors affecting the delivery of interventions targeting influenza within households. The present review aimed to identify interventions that have been found to prevent and manage influenza among young children in the home and to examine programmatic elements and contextual factors related to their successful delivery. We aimed to develop insights for community nursing and recommendations to guide the development of health promotion interventions.

Methods

Community interventions are complex and involve multiple components that interact in a nonlinear way. Recently, there has been an increasing emphasis on measuring the effectiveness of programmes. However, due to variability in programme implementation and policy contexts, the reasons that determine a programme's success and adoption in the community setting are not always clear (Saunders *et al*. 2005). A programme's success could be ascribed to any programme-related reasons comprising programme design, implementation and/or ability to reach the target population (Saunders *et al*. 2005), the mode of intervention delivery and the way in which healthcare workers are involved. In addition to programme contextual factors, organisational support, socio-economic, cultural and the political environment including stakeholder involvement, their interests and convictions regarding change are also vital to the success of a programme.

Realist inquiry is useful for examining the relationship between the context into which interventions are delivered and their outcomes. Such inquiry aims to determine: 'what is it about this programme that works for who in what circumstances' (Pawson 2002, Wong *et al*. 2013). Realist reviews can help to identify how interventions produce certain outcomes by exploring what processes are used, what outcomes are triggered by the various components of the intervention, how change is brought about and which contextual factors are critical for success or failure (Pawson 2002, Wong *et al*. 2013). The method emphasises an understanding of causation and how causal mechanisms are formed and constrained by social context. Realist reviews are particularly suitable for understanding complex social programmes involving human decisions and actions (Wong *et al*. 2013). A realist approach was therefore chosen for this review as it provides a rationale and tools for synthesising complex and, at times, difficult to interpret evidence from community-based programmes (Wong *et al*. 2013).

Figure 1 provides a flow chart of the process of identifying, including and excluding papers for the review. Research articles published in English from 2003–2013 were included. Using six electronic databases and Google Scholar, 502 were searched to identify quantitative and qualitative studies. Duplicate articles were identified and excluded. Searches were undertaken using the keywords: health promotion, health education, children, influenza and infectious disease. Inclusion criteria for retrieved articles were developed, based upon a checklist derived from this review's aims, a study population involving parents or families with children at the household level, the study's issue of interest, details of the research design and the outcome of the interventions. The articles were assessed and selected by screening records and examining the full-text versions according to predefined inclusion criteria. Fifty articles were selected for further examination, with the final total of eight retrieved quantitative research studies used for analysis. Studies with diverse methodologies were included to extract rich data from a variety of countries and settings to provide a comprehensive picture of intervention implementation.

The papers were read, re-read and discussed. A matrix was constructed using an Excel spreadsheet to collate information for each research study:

- Study country and setting.
- Any theories or mechanisms assumed by the research authors to explain the success or failure of the programme.
- Nature of the experimental and control interventions, including intensity and timing.
- Study design, sample size and outcome data.
- Process details such as delivery mode, use of a training package, healthcare worker training and involvement, equipment and products provided.

We systematically assessed the outcome, context and mechanisms through which the interventions produced their outcomes. Relevant data were considered trial by trial in terms of the interaction between context, mechanism and

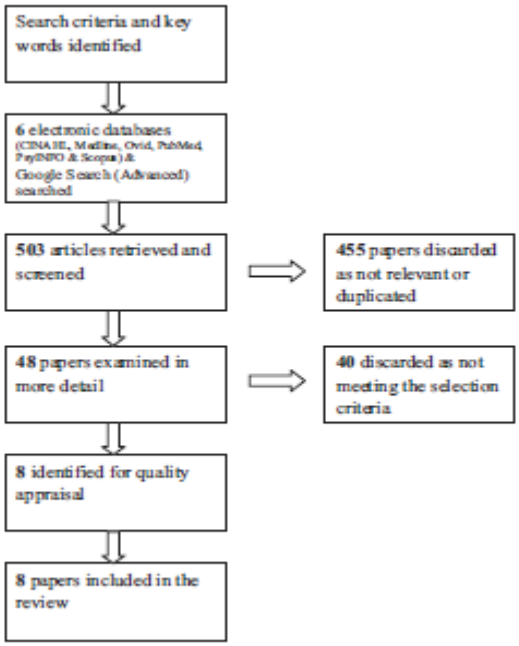

Figure 1 Identification of papers for inclusion in the review.

outcome, and then across the different trials to detect patterns and heterogeneity. We discussed preliminary conclusions and synthesised key findings using a narrative and interpretive approach (Greenhalgh *et al.* 2007).

Results

A total of eight quantitative studies formed the basis of the review. See Table 1 for a summary of the articles.

The findings of four studies were found to be statistically significant. Two papers focused on acute respiratory infection, namely human influenza (Rosen *et al.* 2009, Holloway *et al.* 2009). These studies were conducted in Israel and Nepal, respectively, and examined school health education on personal hygiene or hand washing as the preventive interventions. Two studies solved three health issues together, such as gastrointestinal, respiratory and skin infections, using the one intervention (Luby *et al.* 2005, Cole *et al.* 2012). This research was carried out in Pakistan and South Africa and adopted hand hygiene with the use of a hygiene product (e.g. plain soap or antibacterial soap) as an intervention.

Four studies reported that there were no significant differences in the prevalence of influenza resulting from the delivery of household-level interventions. These studies focused on interventions to address influenza specifically (Cowling *et al.* 2009, MacIntyre *et al.* 2009, Simmerman *et al.* 2011, Suess *et al.* 2012). These four studies were conducted in Hong Kong, Australia, Thailand and Germany, respectively. Hand washing with a hygiene product and use of face masks were the bases of the interventions.

The analysis identified various features across all studies included in the review that were found to impact upon the implementation of influenza prevention programmes at a household level (Fig. 2). These factors are described below, with examples from the pertinent studies.

Timing of programme implementation

Before disease onset

Among the eight studies included in the review, four papers involved the delivery of a health promotion intervention before disease onset (Rosen *et al.* 2009, Holloway *et al.* 2009, Luby *et al.* 2005, Cole *et al.* 2012). In these studies, all families with children within the relevant communities were invited to join the programmes. Once they were recruited to the programmes, preventive primary interventions were taught and participants applied these interventions in their homes. Primary intervention was defined as an intervention applied before the disease developed or prepathogenesis (Gordis 2009). Even though the interventions used (hand washing with a provided hygiene product and health education on personal hygiene or on hand washing) were delivered differently in these four studies, they achieved the same statistically significant result in preventing infectious disease transmission.

Post influenza onset

Four studies in the review focused on the delivery of an intervention within one to two days after the onset of influenza to prevent secondary infection (Cowling *et al.* 2009, MacIntyre *et al.* 2009, Simmerman *et al.* 2011, Suess *et al.* 2012). Preventive measures used to control acute respiratory transmission included hand washing and mask wearing. The outcome measures in these studies included the secondary attack rate of the influenza virus, adherence to hand washing and mask wearing (Cowling *et al.* 2009, MacIntyre *et al.* 2009, Simmerman *et al.* 2011, Suess *et al.* 2012). However, all of the results showed that there were no significant differences between the control and intervention groups in these four studies.

Table 1 Summary of eight studies included in the review

Reference	Aim/objectives/purpose	Context	Sample criteria and size	Method/data gathering	Findings
Luby *et al.* (2005)	To examine the effect of hand washing promotion with soap on the incidence of acute respiratory infection, impetigo and diarrhoea	Karachi, Pakistan	At least two children younger than 15 years old; at least one of whom was less than five years old; Children (n = 4691) in 906 households from 36 settlements Control: 306 households from 11 neighbourhoods Intervention: 600 households from 25 neighbourhoods	Cluster randomised controlled trial: one-year project Control: stationary for children's learning Intervention: education, meeting and use of plain soap Intervention: education, meeting and use of antibacterial soap Data collected by weekly record symptoms of all household members for one year and weight children aged under five years at baseline and every four month	(1) Incident rate of disease differed significandy between control and intervention group (2) Incident rate of disease did not differ significandy between use of plain and antibacterial soap
Cowling *et al.* (2009)	To investigate the effect of hand hygiene and use of face masks on the prevention of households transmission of influenza	Hong Kong	People (n = 407) from 259 families diagnosed with influenza A or B virus from 45 outpatient clinics; among 259 families, 794 families members aged from less than five to more than 50 year old	Cluster randomised controlled trial: seven-day intervention and first home visit scheduled within two days; second home visit at third or sixth day after first home visit Control: education on healthy lifestyle and symptom alleviation Intervention: hand hygiene group: education on proper hand washing with liquid hand soap, hand rub provided Intervention: facemask group (plus hand washing): education on surgical facemask use with surgical mask provided Data collected by self-reported diaries, interview on adherence to intervention, no. of masks and amount of soap/hand rub used and secondary attack rate confirmed by laboratory	(1) No significant difference between control and intervention group (2) Hand hygiene plus facemasks seemed to prevent household transmission of influenza virus when implemented within 36 hours of index patient symptom onset (3) Adherence to intervention varied. Intervention group reported higher adherence than control group

Table 1 (Continued)

Reference	Aim/objectives/purpose	Context	Sample criteria and size	Method/data gathering	Findings
Holloway *et al.* (2009)	To evaluate the community education intervention on treatment of acute respiratory infection (ARI)	Nepal	Children (n = 3654) aged under 5 in 2719 households from four hill districts randomly assigned to receive the intervention	One-year quantitative preintervention and postintervention study using questionnaire for data collection. The surveys included symptoms of acute respiratory illness, drug use, percentages of cases attending health facilities and receiving antibiotics	(1) Health clinic attendance rose by 13% in child under-fives with severe ARI and fell by 9% in child under-fives with mild ARI (2) Use of prescribed antibiotics increased 21% in child under-fives with severe ARI but only 1% in under-fives with mild ARI (3) Irrespective of ARI severity, the use of nonprescribed antibiotics dropped by 5% (4) Consultation with community health volunteers and use of safe home remedies increased by 6·7 and 5·7%, respectively
Macintyre *et al.* (2009)	To examine the effect of face mask use on control of respiratory virus transmission in households	Sydney, Australia	Children (n = 401) age 0–15 children with fever and either cough or sore throat; living in the families containing more than two adults and both were aged above 16 years old	Cluster randomised controlled trial: 14-day intervention with daily follow-up Control: no masks Intervention: surgical masks for two adults, to be worn at all times when in the same room as the infected child Intervention: P2 masks for two adults, to be worn at all times when in the same room as the infected child Data collected by self-reported, observation during follow-up and exit interview	(1) No significant differences were noted between control and interventions (2) <50% of participants wore masks most of the time (3) Household use of face masks was associated with low adherence and was ineffective for controlling seasonal respiratory disease
Rosen *et al.* (2009)	To examine the effects of health education intervention regarding hand washing and communicable paediatric disease such as diarrhoea or respiratory infection	Jerusalem, Israel	Preschool children (n = 1029) and 80 teachers from 40 preschool	Cluster randomised controlled trial: five-month intervention Control: no health education Intervention: education programme to the teacher Data collected by observation on change of hand-washing behaviour from teachers' and their assistance and illness absenteeism	Intervention group scored higher in every individual item of the scale

Table 1 (Continued)

Reference	Aim/objectives/purpose	Context	Sample criteria and size	Method/data gathering	Findings
Simmerman *et al.* (2011)	To examine the effect of hand washing and wearing mask in household on reduction of influenza transmission from sick child to parents	Bangkok, Thailand	Children (n = 442) with influenza and fever in 1147 households. Among these children, 221 (50%) were aged under 6	Cluster randomised controlled trial: four-week intervention and first home visit within 24 hours, then subsequent home visit on third, seventh and twenty-first day Control: receiving education on hand washing Intervention: receiving education on hand washing as well as wearing paper face mask Data collected by self daily record of symptoms and secondary attack rate confirmed by nasal and throat swabs as well as serum test	(1) Influenza transmission was not reduced by interventions (2) Influenza secondary attack rate was 21.5%. Fifty-six of 345 secondary cases were asymptomatic (3) 397 (89.8%) households reported that the index patient slept in the parents' bedroom (4) Health practice adherence was poor, especially among index case and their younger sibling
Cole *et al.* (2012)	To examine the effect of family hygiene education programme with hygiene products provided on reduction of three diseases (gastrointestinal and respiratory illness and skin infection) of children aged under 5	Cape Town, South Africa	Families (n = 685) from two regions with at least one child aged under five years old Divided into two groups: each group consisted of people living in government housing and informal housing: 307 households: (control 177; intervention 182) 378 households: (control 130; intervention 196)	Controlled trial: two-year intervention with weekly home visit Control: education solely Intervention: education plus hand hygiene product Baseline illness data collected in both groups one year before intervention. Postintervention data collected during follow-up and home visit by Sunday Family Health Chart, Burden of Illness of three disease, record on behaviour change and amount of soap/antiseptic usage	(1) Both control and intervention groups got significant reductions in three diseases (2) Intervention group had greater reductions
Suess *et al.* (2012)	To investigate efficacy, acceptability and tolerability of nonpharmaceutics intervention in households with influenza index patients	Berlin, Germany	Patients (n = 218) aged under 14 years old from 84 households, having flu symptom within two days and confirmed flu by laboratory	Cluster randomised controlled trial: eight-day intervention Control: education Intervention: mask group – surgical mask provided with information given Intervention: Mask-/hand-washing group – surgical mask and alcohol-based hand rub provided with information on the correct use of it is given Data collected by self-report daily record, questionnaire on adherence of masks use and secondary attack rate confirmed by nasal swab	(1) Intervention implemented within 36 hours after symptom onset of index case, influenza secondary attack rate of M and MH groups was significantly lower than control group (2) There was no statistically significant effect of the M and MH interventions on secondary infections (3) Household members who spent at least 18 hours each day at home were significantly more likely to develop laboratory-confirmed influenza infection

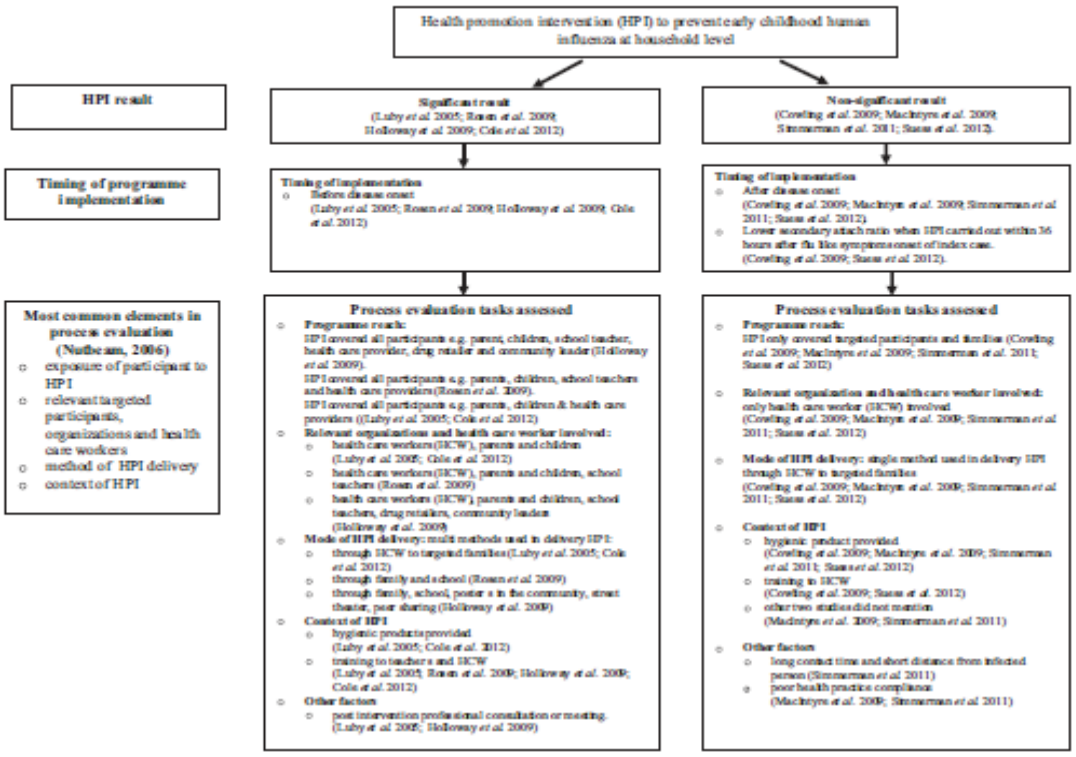

Figure 2 Concept map on identified features.

Prompt implementation of personal hygiene practice within 36 hours

The study by Cowling *et al.* (2009) reported that there were no significant differences in secondary attack rate between the control using hand hygiene only and the intervention group, who used face masks and hand hygiene. The secondary attack rate is defined as the probability that infection will occur among susceptible people within a reasonable incubation period following known contact with an infectious person or an infectious source (Halloran 2005). However, the report found that there was a decrease in the secondary attack rate among intervention group participants if health promotion interventions were delivered within 36 hours of flu symptom onset in the index patients, who were described as the first people to become infected in the households. The study of Suess *et al.* (2012) also demonstrated that household transmission of influenza could be reduced significantly using face masks and hand hygiene, when implemented within 36 hours after symptom onset of the first infected case.

Mechanisms that lead to programme success in the prevention of household influenza were triggered by an increase in participants' knowledge, skills and awareness of disease prevention and their being empowered to implement preventive measures before or at the time of disease onset.

Programme reach

Enhancement of programme success was triggered by health service accessibility to the community. Two studies (Rosen *et al.* 2009, Holloway *et al.* 2009) attributed the success of their studies to the exposure of all people within the community to the health intervention. They employed a primary care approach to avoid infectious disease transmission at home. This broader and more comprehensive approach involved strategies such as public regulations (e.g. proper

use of antibiotics and seeking medical advice when sick); instruction to drug retailers; and training for community leaders, school teachers, healthcare workers and parents with children.

Unlike these two studies, the four studies with nonsignificant results (Cowling *et al.* 2009, MacIntyre *et al.* 2009, Simmerman *et al.* 2011, Suess *et al.* 2012) only recruited infected participants and affected families. These studies concentrated on the provision of hygiene products such as face masks, soap or hand rubs and the involvement of healthcare workers in delivering health education to families.

Organisational and healthcare worker involvement in programme delivery

Mechanisms for programme success were explored in two studies. The analysis found that the two programmes where significant differences were identified between intervention and control arms not only invited families with their children, but also included different important community partners (Rosen *et al.* 2009, Holloway *et al.* 2009) to participate. School teachers, healthcare workers, drug retailers and community leaders were encouraged to support implementation of the preventive measures (Rosen *et al.* 2009, Holloway *et al.* 2009). The above findings supported wider involvement of community partners as a crucial contextual factor leading to health professional consultation availability for participants. The studies that did not find any difference between the intervention and control groups involved healthcare workers, parents and their children in the intervention implementation (Cowling *et al.* 2009, MacIntyre *et al.* 2009, Simmerman *et al.* 2011, Suess *et al.* 2012).

Mode and place of programme delivery

Two studies that outlined programmes where significant findings were noted involved the dissemination of health interventions by healthcare workers, parents with their children, child-to-child and school teachers (Rosen *et al.* 2009, Holloway *et al.* 2009). They adopted multiple modes to implement the interventions (Rosen *et al.* 2009, Holloway *et al.* 2009). Key messages regarding the prevention of infection transmission in households were conveyed to programme participants through different channels such as school, posters, street theatre and peers. This delivery approach triggered more opportunities for community participation, while research papers describing the delivery of programmes that did not find significant differences between the intervention and control only delivered the health programme through family members and healthcare workers at the household level (Cowling *et al.* 2009, MacIntyre *et al.* 2009, Simmerman *et al.* 2011, Suess *et al.* 2012).

Contact with infected persons

In a Thai study, Simmerman *et al.* (2011) demonstrated that influenza transmission was not reduced by hand washing and face mask use. The authors concluded that this may have been due to the poor face mask compliance of infected patients and shared sleeping arrangements. Based on the analysis, close contact between individuals and longer time spent with infected patients were strong predictors for secondary influenza viral infection. It was recommended that a careful analysis be completed regarding the sociocultural perspective for future health promotion studies in human influenza.

Compliance and sustainability of health practice at home

The studies by MacIntyre *et al.* (2009) and Simmerman *et al.* (2011) identified that poor face mask compliance was one of the contextual factors affecting the success of preventive health interventions. Simmerman *et al.* (2011)'s Thai study also concluded that the nonsignificant results may be triggered by the poor face mask compliance of infected children and their young siblings. Similar comments are also noted in MacIntyre *et al.* (2009)'s study that identified that <50% of participants wore masks most of the time, while other participants wore face masks rarely or never. Participants reported three reasons for not wearing face masks: discomfort, children refusing to wear the mask and children forgetting to wear the mask. Further research is needed to examine how to sustain the wearing of face masks.

Discussion

Process evaluation provides a useful conceptual framework for understanding the crucial factors and mechanisms affecting the success of the interventions detailed in the papers identified in this review. Process evaluation is a set of activities directed towards assessing progress in programme implementation (Green & Kreuter 2005, Nutbeam *et al.* 2010). Process evaluation includes a broad range of methods and measures, but the most common elements are participants' exposure and participation in the programmes, relevant stakeholders' and partners' engagement, programme delivery method and intervention context such as

changes to physical environment and assessment of intervention impact (Nutbeam *et al.* 2010).

Using the concept of process evaluation, the findings of this realistic review demonstrate that studies where influenza had been prevented were found to have a wider community reach and engage not only families but health workers, teachers, drug retailers and community leaders. Multiple strategies were also employed, including education, street theatre, posters in the community and peer sharing before the onset of influenza symptoms. In addition, interventions that demonstrated success in preventing influenza involved family compliance with healthcare behaviours in the home. Contact time and physical distance from the infected person were found to be vital to the effectiveness of health prevention interventions for seasonal influenza.

These process evaluation factors have been incorporated in the design of a framework for the development of a nurse-led health promotion visiting programme that can be employed to better facilitate the delivery of health promotion programmes in Hong Kong that can be seen in Fig. 3. This framework summarises the relationship between programme factors (left ovals) in enhancing (arrows) family health promotion initiatives (middle oval) so as to improve healthy behaviours and family health (right oval) in a household.

The framework for delivering nurse-led health promotion interventions is underpinned by the PRECEDE-PROCEED (PP) model of health promotion programme planning, using structure, process and outcome measures (Green & Kreuter 2005, Gielen *et al.* 2008). The PP model is most aligned with ecological models in health promotion, where human behaviour is viewed as being determined by both individual, social and environmental factors (Hancock 1985, 1993). The PRECEDE model is based on the premise that an education diagnosis should precede an intervention (Green & Kreuter 2005, Mirtz *et al.* 2005).

The PP model guides the development of an intervention using a systematic process involving nine phases, with the first five involving the identification of health problems and their determinants through a series of diagnostic steps (Mirtz *et al.* 2005, Gielen *et al.* 2008). The last four steps involve programme application and various forms of evaluation. Phase I focuses on the identification and evaluation of possible social problems, followed by an epidemiological diagnosis. The primary task in this phase is to determine which health problems pose the greatest threat to a given target population. Planners use epidemiological data to identify and rank the health problems. Phase III focuses on the systematic identification of behavioural health practices and environmental factors that appear to be linked to the identified health problem. Phase IV covers educational/ecological assessment including predisposing, reinforcing and enabling perspectives. Phase V takes into consideration the administration and policy aspects. This phase focuses on the administrative and organisational concerns that must be addressed prior to programme implementation. Phase VI is the implementation of the intervention, and process evaluation takes place in Phase VII. The Phase VIII impact evaluation measures the programme's effectiveness in terms of objectives and changes in predisposing, enabling and reinforcing factors. Phase IX is the outcome evaluation (Green & Kreuter 2005).

Among these nine phases, the educational/ecological assessment phase is the most pertinent to this discussion because it focuses on the identification of factors that are necessary to initiate and sustain behavioural change (Green & Kreuter 2005). This phase is a composite of three important areas: predisposing factors, enabling factors and reinforcing factors. Based on these three perspectives, these

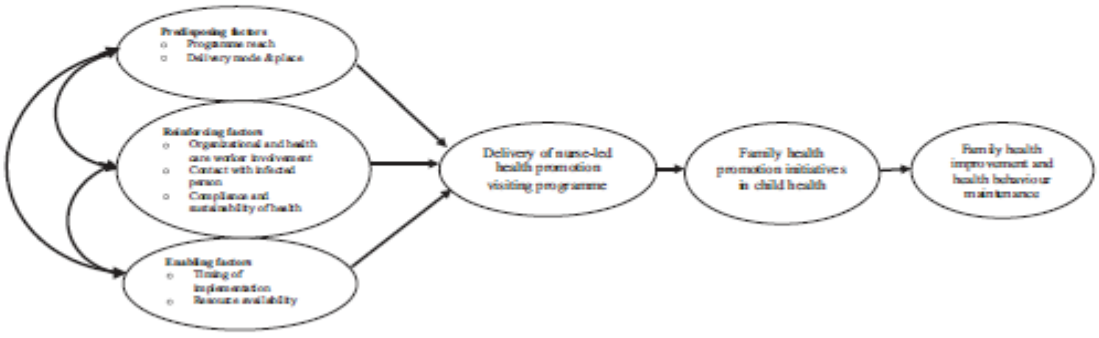

Figure 3 Conceptual framework for the development of nurse-led child and family health promotion visiting programme.

findings of the review can be better understood and used to inform the planning and design of health promotion for influenza. Community health nurses need to consider predisposing factors, including family knowledge, attitudes, beliefs, personal preferences, existing skills and self-efficacy towards the desired behaviour change (Green & Kreuter 2005).

Reinforcing factors include causes that reward or reinforce the desired behaviour changes. This can involve conducting indirect health education through social support networks and involving health professionals in consultation or healthcare worker training, for example train the trainer programmes to enable children to share their health practice with their peers in school (Reamy & Slakey 2001). Family participation, role modelling and reinforcement of children's behaviour practice in daily interactions have been found to impact upon maintaining children's healthy behaviour (Schor 2003, Gussy *et al.* 2008, Beets *et al.* 2010). However, this can only be achieved by building children's and parents' awareness of healthy practices and enhancing mutual support within families, such as reminding each other to wash hands on arriving home to initiate changes in health practices and thereby prevent seasonal influenza (McConnell *et al.* 2013).

Enabling factors are direct or indirect environmental factors facilitating health behaviour changes (Green & Kreuter 2005). These include the context of programmes/services and resources necessary for achieving an intervention outcome. For instance, the availability of hand hygiene products (contextual factor) might influence the effectiveness of hand hygiene practices (outcome) because of encouragement in adequate health promotion practices (mechanisms). The timing of intervention implementation is important. Prompt preventive measures and health promotion interventions taken (contextual factor) lead to increased community awareness and competence (mechanism) to prevent and manage influenza in the community (outcome).

Implications for programme development

Applying a health promotion approach

These findings confirmed that health promotion interventions are important for mitigation of a pandemic influenza (Cowling *et al.* 2009). Based on the analysis of the papers in this review, interventions to prevent influenza infection at a household level should be implemented using a health promotion approach, rather than a disease prevention approach. The studies show that health interventions delivered before disease onset demonstrated significant results in the prevention of infection transmission (Luby *et al.* 2005, Rosen *et al.* 2005, Holloway *et al.* 2009, Cole *et al.* 2012). The provision of adequate protection before disease onset highlights the importance of primary prevention measures (Gordis 2009). When designing and implementing health promotion activities, the message of early implementation of personal hygiene practices should be emphasised, but these require integration with other messages including those regarding healthy lifestyle, to assist immune systems and vaccination programmes.

According to the Royal College of Nursing (2007), nurses should incorporate health promotion services and health education activities into their professional roles. It was acknowledged that community nurses play a major role in shifting the health system away from a predominant focus on illness and cure, and towards increased attention to health promotion and disease prevention (International Council of Nurses 1996). It may be necessary to review existing nursing practice and strategies to redirect nursing practice from being disease-orientated towards a health promotion ideology (Mcilfatrick 2004).

Family health promotion initiatives in child health

Apart from educational institutes, the family is one of the immediate primary sources and providers of children's health education and information (Hopper *et al.* 1992). Children will be less vulnerable to influenza if sufficient support is provided by their family or community health network (Stevenson *et al.* 2009). To minimise the risk, family involvement in and support for health education and health promotion are necessary to enhance the success of interventions (Baranowski *et al.* 2000, Trevino *et al.* 2005, Ferguson *et al.* 2006). Health practice initiation and sustainability requires a family to provide an appropriate environment for children to learn and practice health-related behaviours, with parents providing regular reminders. This daily contact can also be transformed into a cost-effective way of fostering and sustaining their children's health-related practices (Perry *et al.* 1987, Schor 2003).

Under such circumstances, it is worthwhile for nursing professionals to increase their efforts in collaborating with families and communities to sustain health promotion interventions that include targeting health behaviours and preventative measures to address infectious diseases such as influenza.

Integrated and comprehensive nurse-led family-based health promotion

This review has identified the directions for future family nursing practice in the prevention of human influenza,

particularly during seasonal human influenza or pandemic influenza episodes. The findings of two studies in this review provide evidence that basic, simple and cost-effective interventions such as hand washing with a hygiene product effectively prevent not only human influenza infection transmission but also other infectious diseases with similar transmission routes, such as gastrointestinal and skin infections (Luby *et al.* 2005, Cole *et al.* 2012). This highlights the importance of not using multiple strategies, as in the case of education and social marketing interventions, but also an integrated approach to health promotion to address multiple health issues that can be understood within the framework of an ecological model of health promotion (Lee *et al.* 2007). The study by Schellenberg *et al.* (2004) identified that integrated child health management contributed to reducing infant mortality and morbidity. Nurse-led health clinics are a feature of healthcare delivery in countries such as Australia, the USA, Canada and the UK (Pulcini *et al.* 2010, Shui *et al.* 2011) and have been adopted in Hong Kong since the 1990s (Shui *et al.* 2011). Evaluations consistently show that various nurse-led interventions have resulted in improved clinical outcomes and added value to the quality of care (Shiu *et al.* 2011, Larsson *et al.* 2012). The home setting is an optimal place for health promotion and education, especially for children and their families as learning takes place within an everyday context. In a study by Li *et al.* (2009), home nursing services were identified as feasible in addressing childhood health risk factors through early intervention.

Based on the findings of this review, there is a service gap in the provision of integrated and comprehensive nurse-led family-based health promotion service to children and their families. The refocusing or enhancement of child and family health service is a potential gap that needs to be addressed by local health policymakers.

Sociocultural factors affect the health practices of families and their children (MacIntyre *et al.* 2009, Evans *et al.* 2011). These family practices can directly influence their children's health status (Lopez-Dicastillo *et al.* 2010, Yung *et al.* 2010). An American study found that ethnicity, household income, parent education level and acculturation affected different child feeding practices and concerns. Spanish-speaking Hispanics and African American parents were more likely than English-speaking Hispanics to use food as an incentive to calm the child (Evans *et al.* 2011). Sharing a bed with children who could be infected is a daily practice in some countries like Thailand (Simmerman *et al.* 2011). These factors signal the need for attention to the sociocultural context during the programme design and implementation to ensure that all opportunities for health promotion and education can be harnessed (Lopez-Dicastillo *et al.* 2010).

Complex, community-based interventions inevitably operate at multiple levels and must be interpreted in their appropriate cultural and policy context. This review has highlighted the importance of delivering socioculturally appropriate multifaceted interventions that engage families and community members in building healthy practices within the home. The individual exists within a family that plays a vital role in establishing health value, attitudes and habits, and continuously influences the health of its members (Hancock 1985, 1993). The family is not merely an incorporated component of the ecological system. Instead, it should be viewed as the entry point of initiation and the focus of primary health promotion intervention. The family is the principal unit of a sociocultural system in which behaviour patterns are learned, adapted or altered (Novilla *et al.* 2005). Therefore, the family and its influence on health should not be neglected (Schor & Menaghan 1995) as a primary valuable resource and setting for enhancing and protecting health at both individual and community levels.

The community health nurse has a significant role to play in family health, in Hong Kong as in other countries. The time has come to re-examine the service scope of community nurses, particularly when working with families with children. There is a need to review existing family nursing practice and strategies about how to include integrated and comprehensive home-based health promotion in routine practice (Mcilfatrick 2004).

An effective hand-washing approach with a hygiene product was found to be the most effective disease prevention and control method in the household. However, there was no mention of cough etiquette, which has been emphasised as a pivotal component in the management of influenza (WHO 2009a, Centre of Health Protection of Hong Kong 2012). This personal health hygiene practice poses a challenge to researchers as they might have underestimated its significance as a preventive intervention.

Conclusion

These findings suggest that interventions conducted using a primary care approach were important for the mitigation of acute respiratory infections at the household level. Hand washing with a hygiene product was also vital to prevent household transmission of the influenza virus when it was implemented within 36 hours of patient symptom onset. However, the sustainability of health practices creates a serious concern requiring further exploration. If health

practices cannot be sustained, there will be frequent recurrences of infectious diseases such as influenza. Hence, there is a need for the establishment of family health promotion interventions at a household level to maintain health practice and improve family health.

Relevance for clinical practice

The current body of evidence suggests that nurse-led family health promotion interventions should consider using an integrated and comprehensive approach, as these have been shown to ensure quality healthcare service outcomes. Future research will provide health professionals with increased insight into how structured nurse-led health promotion interventions may be effectively implemented and thereby benefit family health services.

Strength and limitations of the review

This review includes only published peer-reviewed studies and is thus susceptible to publication bias. The studies were completed in Australia, Germany, Hong Kong, Israel, Nepal, Pakistan, South Africa and Thailand. Although these diverse contexts make it difficult to generalise, it strengthens the analysis of different health promotion intervention contexts, providing policymakers with a more complete picture of the issue during the strategy planning and decision-making processes.

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The authors have confirmed that all authors meet the ICMJE criteria for authorship credit (www.icmje.org/ethical_1author.html), as follows: (1) substantial contributions to conception and design of, or acquisition of data or analysis and interpretation of data, (2) drafting the article or revising it critically for important intellectual content and (3) final approval of the version to be published.

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Appendix 3: Manuscript associated with results reported in chapter 2 literature review

Article

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Approaches to better engage parent–child in health home-visiting programmes: A content analysis

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Abstract

Home visiting is an evidence-based strategy used to enhance child and family health outcomes. Such primary healthcare endeavours demand the full participation of individual and families. We conducted a review to identify approaches to planning, executing and assessing home-visiting health promotion interventions to determine how parents and children can be best engaged. A structured search (2000–2015) was undertaken using a defined search protocol. The quality of the papers was assessed using standard appraisal tools. Sixteen studies were retrieved. A content analysis of the findings sections of the papers was undertaken and guided by the eight phases of the PRECEDE-PROCEED health promotion planning framework. The analysis found that while all the PRECEDE assessment areas were represented no studies included all phases. Parents and children did not appear to be actively involved in undertaking the assessments and evaluation of the home-visiting health promotion programmes. The findings suggest that there is a need to develop a consistent home-visiting approach that includes comprehensive assessments in the planning phases and parent and child involvement at each step of programme development, implementation and evaluation. This approach enables the development of tailored and sustainable health promotion intervention in order to achieve optimal child health outcomes.

Keywords

Children, home visiting programme, integrative review, process evaluation

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Introduction

Home visiting is a strategy widely used by health professionals to deliver interventions to enhance child and family health outcomes (Donelan-McCall et al., 2009). Importantly, the home visit provides an opportunity to identify child and family health needs in the context of their homes and facilitate early access to health support services (Brickhouse et al., 2013). Research evidence demonstrates that the preschool period is the most suitable time for parents to initiate activities to support their children to develop lifelong health behaviours (Harvard Family Research Project, 2006).

Commonly stated aims of home-visiting interventions are to promote children's healthy development and reduce children's risk behaviours (Sweet and Appelbaum, 2004). These interventions provide families with the support of health professionals, especially nurses who are able to identify risk factors for early intervention (Weisner, 2002). Evidence demonstrates that there are positive effects of health education interventions where families are actively involved in promoting physical and mental health to facilitate child development (Ciliska et al., 2001). Nurse visitors are well placed to build partnerships with families to support parents develop health promoting skills (Lam et al., 2014). Such aims can be fully realized by actively engaging parents and children in planning, implementing and evaluating health interventions to ensure tailored designs that best address their children's health needs. Interactive parent-to-child health education fosters greater autonomy and reasoning capacity for participants in comparison to didactic or authoritarian approaches (Rivard and Deslandes, 2012). Besides, enabling parents to take greater ownership in the design of health education programmes can help to ensure parents reinforce health messages in the home (Golley et al., 2011). Engaging parents and children in programmes facilitates a more comprehensive psychosocial approach to health than just focusing on the prevention of disease.

Systematic reviews in the literature are focused on the association of home-visiting programmes either to child health outcome (Peacock et al., 2013) or to child maltreatment (Mikton and Butchart, 2009). Despite the importance of parental involvement in developing health promotion and the need to focus on positive parent-to-child engagement for learning healthy behaviours, there are no reviews that synthesize the current evidence to identify ways to better engage parents and children in health home programme development. To address this knowledge gap, a review of the research literature was conducted to identify the health intervention approaches and contexts that can best meet the needs of families and their children, in particular those that improve parent–child teaching interactions to sustain healthy practices in the home.

Method

This integrative review was conducted using directed content analysis (Hsieh and Shannon, 2005). This method was chosen as the included studies had different study methodologies, interventions, sample sizes and settings that did not allow the pooling of quantitative data. Rather we aimed to identify patterns within and across the study findings that provided insight into approaches to home-visiting health promotion. The review involved a structured search of the literature using a defined search protocol and author appraisal of full text papers to ensure quality and data extraction. The PRECEDE-PROCEED (PP) health promotion planning model (Green and Kreuter, 2005) was used to analyse the literature by identifying the elements relating to the planning, implementation and evaluation of health promotion interventions. In this way, strategies and approaches that facilitate successful parental engagement could be identified in the research papers and principal lessons extracted that may be transferrable to other household contexts. The PP

framework guides the health promotion programme planner to think logically about the required outcome and work towards the programme goal. It involves eight phases, with the first four involving the identification of health issues, followed by four phases focusing on programme application, process, impact and outcome evaluation.

Search strategy

A search of the literature was undertaken using eight databases: CINAHL®, Cochrane library, Medline®, Ovid, PsycINFO, PubMed, Scopus and Web of Science. Google Scholar (advance) was also searched for publications related to the research topic not located in any of the aforementioned databases. The reference lists of relevant journal articles were searched to locate additional materials. The review question was 'what health interventions and contextual approaches have been found to better engage the parent and child in a home visiting programme?' The searches were carried out using the keywords: child health nurse/maternal and child nurses/public health nurse/community nurse/primary care nurse/health visitor and health promotion or education home visit programme/home visiting programme/home care service. Table S1 provides the review inclusion/exclusion criterion applied to the initial screening of the papers.

From the initial search of eight databases, 2582 quantitative and qualitative studies were identified. Duplicate articles and those not relevant to the review question or did not comply with the inclusion criteria were excluded. A total of 74 articles were selected for further examination, of these 59 articles were further discarded as not meeting the selection criteria or addressing the review question. One article was found through hand searching from the reference list of an included paper (Allen, 2007). Figure S1 outlines the number of papers initially retrieved and the screening process according to the PRISMA guidelines (Moher et al., 2009).

Appraisal of paper quality

The methodological rigour of 16 papers was assessed using standard tools. The quantitative studies were appraised using the Critical Review Form (Law et al., 1998) and Pluye et al. (2009) scoring system was used to assess the mixed method studies. All authors were involved in the appraisal of the papers.

Data extraction and synthesis

A content analysis was undertaken of the findings sections of all papers using the key stages outlined in the PP framework into content-related categories (Cavanagh, 1997). For the 16 eligible articles, key characteristics were identified including geographic location, study aims, study design, sample size, contextual approaches of intervention and significant findings (Evans and FitzGerald, 2002). The findings section of the papers was further examined using a template to identify key factors related to health promotion planning. The authors moved beyond identifying, listing and tabulating the intervention characteristics and training details to explore relationships within and across the selected studies. This provided a narrative summary of the data and the identification of patterns across and within the findings of the research papers demonstrating insight into the planning, implementation and evaluation of home-visiting interventions.

Findings

Sixteen papers were included in the review (Table S2). Fifteen studies employed quantitative research methods. One paper was a mixed methods study. Seven papers focused on asthma prevention. Three studies investigated child injury prevention. Two papers examined child learning and development. One paper examined the relationship between case management and the level of family needs and one focused on fruit and vegetables consumption. Another study identified the effect of home visits on dental service registration, while nine papers focused on environmental tobacco smoke.

The findings sections of the papers were examined for their attention to the three main areas that represented the eight phases of the PP framework. These are health promotion intervention assessment components, the implementation of health promotion strategies and evaluation approaches.

Assessment components

There are four phases of assessment in the Precede phase of the PP model. Figure S2 indicates the assessment phases included in the studies in the review. Six studies involved social assessments including examinations of social, emotional support for caregivers, parenting and family support (Allen, 2007), as well as parent and child psychosocial (Allen, 2007; Bracken et al., 2009) and quality of life assessments (Brown et al., 2002; Krieger et al., 2009; Primomo et al., 2006; Sweet et al., 2014).

All studies adopted epidemiological, behavioural and environmental assessments. Studies assessed language delay (King et al., 2005; Olds et al., 2004), family resources (Allen, 2007) and teaching materials (Haire-Joshu et al., 2008) and undertook skin prick allergy tests (Bracken et al., 2009; Krieger et al., 2002), and urine tests for cotinine (Yucel et al., 2014). Eleven studies undertook environmental assessments to identify: asthma triggers (Bracken et al., 2009; Brown et al., 2002; Butz et al., 2005; Krieger et al., 2002, 2009; Primomo et al., 2006; Sweet et al., 2014), the presence of ipecac (Johnston et al., 2000) and home safety inspections for injury prevention (Corrarino et al., 2001; Johnston et al., 2000; Johnston et al., 2000; King et al., 2001). Nine studies conducted behavioural assessment including measuring child: dental registration rates (Yuan et al., 2007), health service use (Brown et al., 2002; Krieger et al., 2002, 2009; Primomo et al., 2006; Sweet et al., 2014), car safety restrains (Johnston et al., 2000), fruit and vegetable intake (Haire-Joshu et al., 2008), injury rates (King et al., 2001) and days of school and parental work absence (Sweet et al., 2014).

Seven studies undertook educational and ecological assessments. Six studies assessed predisposing factors including asthma management (Brown et al., 2002; Butz et al., 2005; Primomo et al., 2006; Sweet et al., 2014), poisoning prevention knowledge (Johnston et al., 2000) and parental injury knowledge (King et al., 2001). Two studies examined reinforcing factors including parental perceptions of child health status (Primomo et al., 2006; Yucel et al., 2014).

One study examined the alignment of teaching materials to the needs of parents and children through the use of focus group interviews and questionnaires (Haire-Joshu et al., 2008).

Health promotion strategies implemented

Four main health promotion strategies were identified in the interventions included in this review: the involvement of parents and their children in health education; increasing caregiver self-efficacy; parental education and essential material supply such as smoke detectors. The study by Brown et al. (2002) aimed to increase parent and child knowledge and skills in asthma

management to reduce asthma associated morbidity and enhance caregiver quality of life. The study by Haire-Joshu et al. (2008) involved parent and child nutrition education and the modelling of healthy eating that resulted in increased fruit and vegetable servings and availability within the home. In Primomo et al.'s (2006) study, the focus of the intervention was on increasing the caregivers' self-efficacy to manage asthma through education. Another health promotion strategy employed in various studies was parental participation in an educational talk or workshop (Bracken et al., 2009; Brown et al., 2002; Butz et al., 2005; Corrarino et al., 2001; Johnston et al., 2000; Krieger et al., 2002, 2009; Sweet et al., 2014; Yuan et al., 2007; Yucel et al., 2014) to increase knowledge and skills, and parent–child interaction (Haire-Joshu et al., 2008; Kings et al., 2005; Olds et al., 2004). Material supply such as provision of smoke detectors to ensure home safety (Johnston et al., 2000) and the provision of vacuum cleaners and cleaning kits to reduce exposure to allergens (Krieger et al., 2002) were employed as key strategies in two studies.

Evaluation approaches

Various outcome measurements were applied in the studies to evaluate the effectiveness of the home-visiting programmes. The findings of two studies suggest that the programmes may reduce overall healthcare costs (King et al., 2001; Primomo et al., 2006). Child health outcomes measured included asthma symptoms (Brown et al., 2002; Krieger et al., 2002, 2009; Sweet et al., 2014), language development (King et al., 2005; Olds et al., 2004), injury reduction (King et al., 2001) and emotional regulation (Olds et al., 2004). The number of symptom-free days, medical visits (Brown et al., 2002; Krieger et al., 2002, 2009) and school and work day absenteeism (Sweet et al., 2014) were used as measurements of intervention effect on the severity of asthma attack and comments from caretakers on service quality (Krieger et al., 2002). Measurements of caregiver quality of life (Brown et al., 2002; Krieger et al., 2009; Primomo et al., 2006; Sweet et al., 2014) were also included in programme evaluations that found significantly higher quality of life at follow-up. Other measures included medication compliance (Bracken et al., 2009; Brown et al., 2002; Butz et al., 2005; Krieger et al., 2002, 2009; Primomo et al., 2006; Sweet et al., 2014), tobacco smoke exposure (Krieger et al., 2002; Primomo et al., 2006; Yucel et al., 2014), home safety (Corrarino et al., 2001; Johnston et al., 2000; King et al., 2001), dental registration rate (Yuan et al., 2007) and changing eating habits (Haire-Joshu et al., 2008). For these, 11 studies significant positive results were observed. In the study by Allen et al. (2007), the parent-home visitor relationship was the most important predictor of the intensity of interventions than the amount of contact. Mother–child interaction was observed in the study by Olds et al. (2004) that identified improvements in responsive mother–child interaction and learning.

Discussion

This review has identified examples of key phases of the PP framework across 16 studies indicating the important logical sequence of assessment, implementation and evaluation in the development of quality child home visiting programmes (Segal et al., 2012).

Participatory comprehensive assessment and evaluation to address children's needs

The analysis found that while all the PRECEDE assessment areas were represented, no one study included all four phases. Five studies employed only one assessment approach which has been

described as an inadequate to develop age-appropriate health promotion interventions and monitor the health issues of children (Allen, 2007). Parents and children did not appear to be actively involved in undertaking the assessments and evaluation of the reviewed home-visiting health promotion programmes.

Home-visiting programmes provide significant opportunities to conduct participatory comprehensive assessment and evaluations of child health activities to address the complex needs of children and families (Munroe et al., 2013). Involving parents and their children in conducting such assessments across all the first four PRECEDE phases could potentially strengthen parents' capacity to prevent and promote child health embracing both physical and psychosocial issues (Shonkoff et al., 2009). This holistic approach may also assist in improving parents' and children's access to required health services (Vuorenmaa et al., 2016).

Parent–child engagement to better sustain child health practices

No studies in the review were found to assess parent–child interaction as part of the PRECEDE assessment phases. Three studies included strategies to enhance interaction but only one evaluated this showing considerable benefit from parent–child interaction. Thus, lack of focus on parent-child engagement is problematic and indicates a considerable gap in health promotion research for home-visiting programmes despite being identified as the basis for child positive health practice establishment and sustains (Carr-Hill and Currie, 2013). Greater focus is, therefore, needed to ensure that parent–child interaction is consistently included as a crucial element of all aspects of child health promotion.

Family-centred home visiting approach

The review identified two studies that highlighted the importance of a strong parent–health professional relationship to actively engage parents and children in health education. This points to the relevance of a family-centred home visiting approach for all phases of health promotion programme design, implementation and evaluation including the development of a positive therapeutic parent–nurse relationship (Gomby et al., 1999). The parent–nurse relationship has also been identified as an important indicator of programme effectiveness (Allen, 2007). Besides, collaboratively working together with parents such improved relationships will increase a nurse's ability to assist parents identify their needs and include parents together with their children in developing and designing health interventions. Through parent–child–nurse partnerships, collective suggestions are used to identify culturally specific home interventions that correspond with families and their children's actual needs (Lam et al., 2014). The nurse's role is to provide mentoring while observing parent–child interaction and parental teaching skills (Fowler et al., 2012). Enhancing parent–child interactions will provide opportunities for the nurse to mentor parents in assessment of their child's health knowledge and to modify their health practices. Using a reflective discussion at the end of the programme may also assist in providing feedback regarding parent–child communication, appropriate child developmental tasks, learning health knowledge and practices.

Limitations

The review was limited to contemporary English language studies that due to resource implications denied insights from non-English language research. The recommendations in this article,

therefore, may not be applicable to non-English speaking settings. Content analysis was used to summarize and interpret the findings of the research papers, which is susceptible to the reviewers' own subjective interpretations. However, the analysis was undertaken by a team so that judgements could be made using the assessment of more than one reviewer. We also acknowledge the influence of our professional backgrounds from nursing, public health and the social sciences on the analysis and interpretation phases. This team process enabled us to build a collective understanding of the data regarding the factors that may improve the engagement of parents and children in health home-visiting programmes, rather than definitive causal links. A further limitation of this approach is that reproducibility is not possible; rather we aimed to achieve transparency of the process framework through which our findings were derived and explore the transferability of the findings.

Conclusion

Studies examined in this review lacked comprehensive participatory assessments as well as the assessment of part–child interaction in programme development implementation and evaluation. Comprehensive assessment involving the active engagement of and interaction between parents, their children and health professionals is crucial to enable the development of tailored, sustainable health promotion interventions that will be implemented by the family.

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Supplemental material

The online [appendices/data supplements/etc] are available at http://chc.sagepub.com/supplemental.

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Appendix 4: Demographic and health information

Interviewer: **Interviewee:** **Code No**.	**Time:** **Length of interview:**	**Date:**	**Place:**	**Posture of interviewee:**

Part I: Personal particulars:

1. Sex: M / F
2. Age:
3. Marital Status: S / M / D / Sep / W
4. What is/are the age of your child(ren)?
   1st (M/F) _____2nd (M/F) _____3rd (M/F) _____ 4th (M/F) _____
5. Who is the main caregiver of the child(ren):_____
6. Education of main caregiver:
   No formal education / Primary School Level / Secondary School Level/ Tertiary school Level
7. Employment of main caregiver: Full time _____Part time _____Other_____
8. Monthly household income HKD:
   under10, 000 10,000-20,000 20,000-40,000 over 40,000
9. Religion: _____
10. Household surface area: _____feet with_____bedroom(s)
11. How many people living there:_____
12. Child(ren) sleep with whom: _____

Part II: Family health status:

1. Does anyone in the family have a major health problem? Please list.
   _____
2. How many seasonal influenza does the preschooler(s) get each year?
   _____
3. How would you rate the overall health condition of your child(ren)?

   Excellent Very good Good Poor
4. Does the main caregiver have responsibility for providing care for older family members?

Appendix 5: A semi-structured interviewing guide

The guide is based on the objectives of the research study to develop. Questions included are as follows:

1. Have you or people living with you developed seasonal influenza?
    - If yes – who were they?

2. Do you think your knowledge and skills are adequate enough to guide your family's behaviour in preventing seasonal influenza and promoting healthy behaviour for your family?
   (may prompt the informants by a scale of 1 to 10).

   What are the strategies/activities do you use at home to promote healthy behaviours or minimize the risk of developing influenza?

3. How confident are you about adequately managing or encouraging these household activities that you have mentioned to reduce your family's risk of developing seasonal influenza?
   (may prompt the informants by a scale of 1 to 10)..

   What strategies/activities do you use at home to increase your confidence regarding promoting healthy behaviours or minimize the risk of developing influenza?

4. What are the concerns do you have (if any) about promoting health behaviours to prevent or minimise seasonal influenza for your child and other family member?

5. What concerns,issues or challenges do you face when trying to encourage your child and other family member to prevent influenza and carry out healthy practice?

6. Could you describe/explain any factors in your life that may affect your behaviour in relation to reducing your ability to protect your child and other family member against seasonal influenza?

7. To what extent do you think a nurse should be involved in providing support and education to prevent and manage influenza for your child and other family member?

Appendix 6: A questionnaire of parents' knowledge and self-efficacy on prevention of seasonal influenza.

Part I: Knowledge of hygiene practice

Items	Question	Answer
1.	When do you wash your hands with liquid soap? (Source: Centre of Health Protection of Hong Kong (2014). *Hand Hygiene An easy and effective way to prevent infection.* Retrieved 17 Jan, 2014, from http://www.chp.gov.hk/en/exhibition_details/2587/0.html)	
	1. Before touching the eyes, nose and mouth	Yes/No Every time Often Sometimes Seldom Never
	2. After blowing nose, coughing and sneezing	Yes/No Every time Often Sometimes Seldom Never
	3. Before touching your child	Yes/No Every time Often Sometimes Seldom Never
	4. After using the toilets	Yes/No Every time Often Sometimes Seldom Never
	5. Before eating	Yes/No Every time Often Sometimes Seldom Never
	6. Before handling food	Yes/No Every time Often Sometimes Seldom Never
	7. After changing diapers or handling soiled articles/clothing from children or the sick	Yes/No Every time Often Sometimes Seldom Never
	8. After handing garbage	Yes/No Every time Often Sometimes Seldom Never
	9. Before and after touching animals, poultry or their droppings	Yes/No Every time Often Sometimes Seldom Never
	10. After caring for the sick	Yes/No Every time Often Sometimes Seldom Never
	11. After touching public installation such as escalator handrail, elevator control panel or door knobs	Yes/No Every time Often Sometimes Seldom Never
	11. Before and after visiting hospitals, residential care homes	Yes/No Every time Often Sometimes Seldom Never
2.	Do you maintain adequate distance (1 metre) between you and the infected person? If not (because of small living area), do you wear mask?	Yes/No Every time Often Sometimes Seldom Never
3.	Do you clean toys and equipment regularly?	Yes/No Every time Often Sometimes Seldom Never
4.	Which one is the correct way to cough or sneeze to help prevent germs and illness? (Source: World Health Organization (2009a). *Infection-control measures for health care of patients with acute respiratory diseases in community settings: trainer's guide.* Geneva: WHO)	
	1. Cough/sneeze into your hands	Yes/No Every time Often Sometimes Seldom Never
	(answer) 2. Cough/sneeze into the fold of your arm covering up your mouth and nose. Turn your head away from others.	Yes/No Every time Often Sometimes Seldom Never
	3. Cough/sneeze out in the open	Yes/No Every time Often Sometimes Seldom Never
5.	When do you receive the flu vaccination this year? When do(es) your child(ren) receive the flu vaccination this year?	Yes/No Every time Frequency:_____
		Yes/No Every time Frequency:_____
6.	Do you put on a face mask on while having respiratory symptoms?	Yes/No Every time Often Sometimes Seldom Never

7.	Do you cover both your nose and mouth with tissue paper when coughing or sneezing?	Yes/No Every time Often Sometimes Seldom Never
8.	Which of the following is (are) correct way(s) to do with tissues after sneezing and blowing your nose?	
	(answer) 1. Wrap up respiratory secretion with tissue paper and discard it into garbage bins with lids.	Yes/No Every time Often Sometimes Seldom Never
	2. Wrap up respiratory secretion with tissue paper and discard it into garbage bins without lids.	Yes/No Every time Often Sometimes Seldom Never
	(answer) Wrap up respiratory secretion with tissue paper and flush them away in the toilet.	Yes/No Every time Often Sometimes Seldom Never
9.	Which one is correct way to do after contacting respiratory secretion or touching objects soiled with respiratory secretions?	
	(answer) 1. Perform hand washing with liquid soap and water immediately	Yes/No Every time Often Sometimes Seldom Never
	2. Perform hand washing with water immediately	Yes/No Every time Often Sometimes Seldom Never
	3. Clean hands with >70% alcoholic-based hand-rub	Yes/No Every time Often Sometimes Seldom Never
10.	Do you touch your mask once it is secured on your face? If you must do so, do you wash your hands before and after touching the mask?	Yes/No Every time Often Sometimes Seldom Never
		Yes/No Every time Often Sometimes Seldom Never
11.	Do you change mask at least daily? Replace the mask immediately if it is damaged or soiled?	Yes/No Every time Often Sometimes Seldom Never

Part II: Self efficacy in perceived effectiveness of your initiative

Items	Question	Answer				
1.	How confident are you that your knowledge and practices on hand washing, face mask wearing and cough/sneeze etiquette contribute to your family member's health?	complete confident	very confident	moderately confident	slightly confident	not at all confident
2.	How confident are you that your knowledge and practices on hand washing, face mask wearing and cough/sneeze etiquette contribute to other family member's or community health?	complete confident	very confident	moderately confident	slightly confident	not at all confident
3.	How confident are you that your strategies ensure a safe and clean environment for your child(ren)?	complete confident	very confident	moderately confident	slightly confident	not at all confident
4.	How confident are you that your strategies ensure the sustainability of your family members in hand washing, face mask wearing and cough/sneeze etiquette?	complete confident	very confident	moderately confident	slightly confident	not at all confident
5.	How confident are you that your strategies overcome the barrier of health practice? e.g. hand washing, wearing mask and cough/sneeze etiquette.	complete confident	very confident	moderately confident	slightly confident	not at all confident
6.	How confident are you that you are the role model health practice to your child(ren)?	complete confident	very confident	moderately confident	slightly confident	not at all confident
7.	How confident are you to remind others family members on hand washing, face mask wearing and cough/sneeze etiquette?	complete confident	very confident	moderately confident	slightly confident	not at all confident

Appendix 7: Observational checklist

Practice on face mask wearing and hand washing

The parent will be asked to demonstrate with her child, how she would teach them to do the following skills. If the mother says the child is already competent at these skills: ask if the child can demonstrate the skills for you. Then ask what strategies the mother used to assist the child learn these skills

Putting on face mask

(Source: **C**entre of Health Protection of Hong Kong (2014). *Use mask properly Protect ourselves and protect others.* Retrieved 17 Jan, 2014, from http://www.chp.gov.hk/en/exhibition_details/2721/0.html)

Items	Steps	Put √ when the item is achieved
1.	Pick up the mask with clean hands	
2.	Coloured side of the mask faces outwards, with the metal strip uppermost. Put on the mask with both clean hands. Ties the string or place the loops	
3.	Spread out the folds to cover the chin.	
4.	Mould the metal strip to fit the shape of the nose	

Putting off face mask

(Source: **C**entre of Health Protection of Hong Kong (2014). *Use mask properly Protect ourselves and protect others.* Retrieved 17 Jan, 2014, from http://www.chp.gov.hk/en/exhibition_details/2721/0.html)

Items	Steps	Put √ when the item is achieved
1.	Avoid touching the outside of the mask when taking off. If you must do so, wash hand before touching the mask.	
2.	Discard mask into garbage bin with lid Observe: Does the garbage bin with or without lid	
3.	Wash hand with liquid soap	

Hand washing with liquid soap

(Source: **C**entre of Health Protection of Hong Kong (2014). *Hand Hygiene an easy and effective way to prevent infection.* Retrieved 17 Jan, 2014, from http://www.chp.gov.hk/en/exhibition_details/2587/0.html)

Items	Steps	Put √ when the item is achieved
1.	Wet hands with water	
2.	Apply enough liquid soap to cover all hand surfaces	
3.	Rub hands palm to palm	
4.	Right palm over left dorsum with interlaced fingers and vice versa	
5.	Palm to palm with fingers interlaced	
6.	Backs of fingers to opposing palms with fingers interlocked.	
7.	Rotational rubbing of left thumb clasped in right palm and vice versa	
8.	Rotational rubbing, backwards, and forwards with clasped fingers of right hand in left palm and vice versa	
9.	Wrists are rubbed	
10.	Rinse hands with water	
11.	Dry hand thoroughly with a single use towel/tissue paper	
12.	Use towel/tissue paper to turn off faucet	
13.	Rub all parts of the hands including the wrists with proper hand hygiene technique for at least 20 seconds.	

Appendix 8: Field notes for observations

Part I: Home environment

Items	Home setting:	Reflective notes
1.	**Description of environment:** Tidiness: Face mask and thermometer available Liquid soap and tissue available for hand washing Toys storage	

Part II : Parental teaching strategies

Items	Teaching framework	Reflective notes
1.	Alerts the child to the activity to be learned/practiced	
2.	Instructs the child to perform what is expected or the steps to be taken; (uses explains while demonstrating actions)	
3.	Allows the child to demonstrate; (before intervening or taking over)	
4.	Evaluates the standard of child's health practice	
5.	Provides feedback to child on their health practice performance	
Items	**Parent-child interaction – if the child is present during the interview**	
1.	Is it a one way or two-way communication? ▪ Is the child included in the conversation? ▪ What happens when the child interrupts the parent?	
2.	Is the language clear enough for child to understand? E.g. Any use of descriptive language that adds value extends the potential for the child's learning	
3.	What is language style used? E.g. Commands, explains, asks or suggestion, wonders with the child etc?	
4.	Is there any appreciation/praise if the child is doing something correctly or trying hard? E.g. good work	
5.	Is there any encouragement to child when doing something inappropriately or finding it difficult? E.g. Yes, you can do it.	

Part III : Tactical structured observation on health practices

Items	Where and when do parent/child interact?	How is the scene set up?	Who are present?	How do initial interactions occur?	How does parent or child claim attention?	Which events are significant?
1. Hand washing						
2. Face mask wearing						
3. Cough/ sneeze etiquette						

Appendix 9: The Hong Kong Polytechnic University human research ethics committee (HREC) approval for research project

THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

To	Lam Yuk Yin (School of Nursing)		
From	KWONG Wai Yung, Chair, Departmental Research Committee		
Email	hsenid@polyu.edu.hk	Date	10-Feb-2014

Application for Ethical Review for Teaching/Research Involving Human Subjects

I write to inform you that approval has been given to your application for human subjects ethics review of the following project for a period from 30-Apr-2014 to 31-Dec-2017:

Project Title:	The Capacity of Hong Kong Families to Reduce Childhood Seasonal Influenza
Department:	School of Nursing
Principal Investigator:	Lam Yuk Yin
Reference Number:	HSEARS20140121001

Please note that you will be held responsible for the ethical approval granted for the project and the ethical conduct of the personnel involved in the project. In the case of the Co-PI, if any, has also obtained ethical approval for the project, the Co-PI will also assume the responsibility in respect of the ethical approval (in relation to the areas of expertise of respective Co-PI in accordance with the stipulations given by the approving authority).

You are responsible for informing the Departmental Research Committee in advance of any changes in the proposal or procedures which may affect the validity of this ethical approval.

You will receive separate email notification should you be required to obtain fresh approval.

KWONG Wai Yung

Chair

Departmental Research Committee

Page 1 of 1

Appendix 10: University of Technology, Sydney human research ethics committee (HREC) approval for research project

-----Original Message-----
From: Research.Ethics@uts.edu.au [mailto:Research.Ethics@uts.edu.au]
Sent: Friday, April 04, 2014 6:08 AM
To: Angela.Dawson@uts.edu.au; Cathrine.Fowler@uts.edu.au; Yuk Lam; Research.Ethics@uts.edu.au
Subject: HREC Approval Granted

Dear Applicant

Thank you for your response to the Committee's comments for your project titled, "The Capacity of Hong Kong Families to Reduce Childhood Seasonal Influenza". Your response satisfactorily addresses the concerns and questions raised by the Committee who agreed that the application now meets the requirements of the NHMRC National Statement on Ethical Conduct in Human Research (2007). I am pleased to inform you that ethics approval is now granted.

Your approval number is UTS HREC REF NO. 2014000072 Your approval is valid five years from the date of this email.

Please note that the ethical conduct of research is an on-going process. The National Statement on Ethical Conduct in Research Involving Humans requires us to obtain a report about the progress of the research, and in particular about any changes to the research which may have ethical implications. This report form must be completed at least annually, and at the end of the project (if it takes more than a year). The Ethics Secretariat will contact you when it is time to complete your first report.

I also refer you to the AVCC guidelines relating to the storage of data, which require that data be kept for a minimum of 5 years after publication of research. However, in NSW, longer retention requirements are required for research on human subjects with potential long-term effects, research with long-term environmental effects, or research considered of national or international significance, importance, or controversy. If the data from this research project falls into one of these categories, contact University Records for advice on long-term retention.

You should consider this your official letter of approval. If you require a hardcopy please contact Research.Ethics@uts.edu.au.

To access this application, please follow the URLs below:
* if accessing within the UTS network: http://rmprod.itd.uts.edu.au/RMENet/HOM001N.aspx
* if accessing outside of UTS network: https://remote.uts.edu.au , and click on "RMENet - ResearchMaster Enterprise" after logging in.

If you have any queries about your ethics approval, or require any amendments to your research in the future, please do not hesitate to contact Research.Ethics@uts.edu.au.

Yours sincerely,

Professor Marion Haas
Chairperson
UTS Human Research Ethics Committee
C/- Research & Innovation Office
University of Technology, Sydney
T: (02) 9514 9645
F: (02) 9514 1244
E: Research.Ethics@uts.edu.au
I: http://www.research.uts.edu.au/policies/restricted/ethics.html
P: PO Box 123, BROADWAY NSW 2007
[Level 14, Building 1, Broadway Campus]
CB01.14.08.04
Ref: E11

Appendix 11: Information sheet

INFORMATION SHEET

The capacity of Hong Kong Families to Reduce Childhood Seasonal Influenza at household level

You are invited to participate in a study supervised by Professor Cathrine Fowler and Dr. Angela Dawson and conducted by Ms Lam Yuk Yin, Winsome, who is a PhD student of Faculty of Health at the University of Technology, Sydney. Ms Lam Yuk Yin, Winsome, is now teaching in The Hong Kong Polytechnic University, School of Nursing as an Advanced Practice Nurse. The research proposal has been approved by The Hong Kong Polytechnic University Human Research and Ethics Committee.

Study Aim

The aim of our research study is to examine the capacity of Hong Kong families, who have preschool children, to promote heath to reduce the risk of seasonal influenza. The research team would like to learn more about parents' concerns and health promotion strategies, and the social determinants that impact on parents' health promotion behaviour in relation to seasonal influenza in households.

Participants

You as the parent and primary care giver of your child and your preschool child (3 to 5 year old) are invited to participate**.**

Procedures

The research activities will take approximately 60 to 90 minutes at a mutually agreeable time, date and venue. The information you share will be digitally recorded. In Part1 you will be engaged in:

- an individual interview to explore your parental experiences of prevention and health promotion to seasonal influenza.
- completing a short questionnaire to collect demographic data, and information about your knowledge and confidence in relation to your prevention of seasonal influenza and health promotion strategies.

Part II of the data collection will involve both you and your child as you:

- interact with your child; teach them how to wear a face mask and wash their hands. We are interested in the strategies you use to support your child's learning.

The recording of your interview will be transcribed verbatim for analysis. The information gathered from demographic sheet and short questionnaire will also be integrated for analysis. Data may be shared and clarified with you for validation, if requested.

Discomfort/ Inconveniences expected

None anticipated

Benefits

It is anticipated that the collected information will enhance our understanding of parents' ability to use health promotion strategies to reduce their children's risk or prevent the onset of seasonal influenza in daily activities and interactions. This in turn will facilitate the development of a quality health promotion home service in our community.

Risks

No potential risks anticipated in this project.

Confidentiality, anonymity and privacy

Data obtained from the interview will only be viewed by the research team and will be stored securely. Personal information will never be disclosed in the research report or other related documents. The consent forms and data with any identifying information will be kept and destroyed five years after dissemination of the findings.

You have every right to withdraw from the study anytime before or after the interview without penalty of any kind. All information related to you will remain confidential, and will be identifiable by codes known only to the researcher.

If you have any complaints about the conduct of this research study, please do not hesitate to contact Dr Virginia Cheng, Secretary of the Human Subjects Ethics Sub-Committee of The Hong Kong Polytechnic University in writing (c/o Research Office of the University) stating clearly the responsible person and department of this study.

If you would like to get more information about this study, please contact Ms Lam Yuk Yin, Winsome on tel. no. 9732-5809 and email address: winsome.lam@polyu.edu.hk

Thank you for your interest in participating in this study.

Investigators
Ms Lam Yuk Yin, Winsome
Professor Cathrine Fowler and Dr. Angela Dawson

Appendix 12: Consent form

香港理工大學

THE HONG KONG
POLYTECHNIC UNIVERSITY

護理學院
School of Nursing

香港 九龍 紅磡
Hung Hom Kowloon Hong Kong

CONSENT TO PARTICIPATE IN RESEARCH

Title: The capacity of Hong Kong Families to Reduce Childhood Seasonal Influenza at a household level.

I _____ hereby consent to participate in the captioned research supervised by Professor Cathrine Fowler and Dr. Angela Dawson and conducted by Ms Lam Yuk Yin, Winsome.

I understand that information obtained from this research may be used in future research and published. However, my right to privacy will be retained, i.e. my personal details will not be revealed.

The procedure as set out in the attached information sheet has been fully explained. I understand the benefit and risks involved. My participation in the project is voluntary.

I acknowledge that I have the right to question any part of the procedure and can withdraw at any time without penalty of any kind.

Name of parent: _____
Signature of parent: _____
Name of child: _____
Signature of parent or Guardian (if applicable): _____
Name of researcher: _Ms Lam Yuk Yin, Winsome_____
Signature of researcher: _____
Date: _____

Appendix 13: Manuscript associated with results reported in chapter 4 findings part I

PLOS | ONE

RESEARCH ARTICLE

The Health Literacy of Hong Kong Chinese Parents with Preschool Children in Seasonal Influenza Prevention: A Multiple Case Study at Household Level

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OPEN ACCESS

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Abstract

Background

Health literacy influences individual and family health behaviour, health services use, and ultimately health outcomes and health care costs. In Hong Kong, people are at risk of seasonal influenza infection twice a year for three-month periods. Seasonal influenza is significantly associated with an increased number of hospitalized children. There is no research that provides an understanding of parents' health knowledge and their access to health information concerning seasonal influenza, nor their capacity to effectively manage influenza episodes in household. Such knowledge provides valuable insight into enhancing parents' health literacy to effectively communicate health messages to their children and support healthy behaviour development through role modelling.

Methods

A multiple case study was employed to gain a multifaceted understanding of parents' health literacy regarding seasonal influenza prevention. Purposive intensity sampling was adopted to recruit twenty Hong Kong Chinese parents with a healthy three-to-five year old preschool child from three kindergartens. A content analysis was employed to categorize, tabulate and combine data to address the propositions of the study. Comprehensive comparisons were made across cases to reveal the commonalities and differences.

Results

Four major themes were identified: inadequate parents' knowledge and reported skills and practices related to seasonal influenza prevention; parental knowledge seeking and exchange practices through social connection; parents' approaches to health information and limited enabling environments including shortage of health resources and uneven resource allocation for health promotion.

Conclusions

The findings recommend that community health professionals can play a critical role in increasing parents' functional, interactive and critical health literacy; important elements when planning and implementing seasonal influenza health promotion.

Introduction

Health literacy comprises "the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health" [1]. It enables individuals to exert a degree of control over their decision making which in turn determines health outcomes [2]. Health literacy influences individual and family health behaviour, health services use, and ultimately health outcomes and health care costs [2–4]. Health literacy can be categorized into functional, interactive and critical health literacy [2] that deliver benefits to individuals, families and society. Functional health literacy is supported through reading and writing skills that enable people to function effectively in everyday situations. It involves knowledge of risks, health services and readiness to comply with prescribed actions and participate in population health programs. Interactive health literacy concerns an individual's capacity to act independently with the motivation and self-confidence to apply new information to solve problems in different circumstances, influence social norms and interact well with social groups. Finally critical health literacy involves the application of advanced cognitive skills to critically analyze information to exert greater control over life events and can lead to building community empowerment to address the social determinants of health.

Research shows that there is an association between low health literacy and poor health outcomes [5–7]. Individuals and communities with low levels of health literacy have been found to have higher rates of health care service use, lower information seeking behavior [8] and lower influenza vaccination up take rates [6] than those with high levels of health literacy. The health literacy of parents has an effect on family life style and behavior [9–11] that directly affects the health outcomes of children in their care [12].

Younger children along with pregnant women, and people with chronic medical conditions are at a higher risk of seasonal influenza infection than other groups in the population [13]. In Hong Kong influenza is significantly associated with increased hospitalization rate of child under five years of age [14]. The numbers of children hospitalized as a result of influenza highlights the need for policy makers to focus on improving existing family health promotion strategies to avert child illness and plan effective preparedness and response systems to address future influenza epidemics [15]

The level of Hong Kong Chinese parents' health literacy, in terms of parental knowledge and practices in relation to preventing and managing seasonal influenza prevention is unknown. There is no research that provides an understanding of parents' health knowledge and access to health information concerning influenza, nor their capacity to effectively manage flu episodes in the home. Such knowledge could provide valuable insight into ways of enhancing parents' health literacy so they can not only effectively communicate health messages to their children but support the development of healthy behavior through role modeling [16]. Parents are well positioned to reinforce their children's healthy practices through their daily interactions and make informed decisions concerning health care use as they spend significant time with their children. This includes the practice of hand washing and cough etiquette as

recommended by the WHO and Hong Kong Department of Health as effective measures to prevent the spread of influenza [17–19]. Apart from these preventive measures, evidence exists supporting the use of facemasks by an influenza infected person to reduce influenza viral transmission [20]. Two studies found that close contact and the longer the time spent with an infected person were strong predictors for contracting an influenza viral infection [21]. While early implementation of correct facemask wearing after the onset of symptoms decreased the chance of viral transmission [22]. This implies that wearing a facemask on its own is not enough to prevent influenza viral transmission. Maintaining an optimal distance of one metre between individuals and prompt facemask wearing are both important to enhance the effectiveness of seasonal influenza prevention [15]. A key strategy in many countries has been the annual provision of an influenza vaccination for high-risk groups such as young children and older people with chronic illness to prevent and reduce influenza transmission and related complications [17, 23–25]. In Hong Kong's public clinics, free influenza vaccination is only provided to elder people aged over 65 with having chronic illness in public clinics [26]. Children between the age of six months and less than six years may receive subsidized vaccination from private doctors. This might be the reason for only 9% of 401 parents allowing their children to receive influenza vaccination in a local study [24]. Low vaccination rates associated with low parental knowledge of influenza vaccination and perceptions of side effects were also reported in this study.

The Centre of Health Protection of Hong Kong (CHP) [27] has focused on raising public awareness of influenza infections using a variety of methods including printed materials, websites, telephone hotlines, briefing sessions, public television announcements and media interviews, along with large-scale publicity campaigns to promote personal and environmental hygiene, and various vaccination programs [27]. This top-down preventive approach has its limitations and has been challenged for its inability to create lasting behavioural change that reaches all populations [28]. Using this approach, parents are positioned as recipients of information and are not actively involved in family health promotion activities. They are not engaged as stakeholders in identifying health problems, developing health promotion strategies, implementing those strategies and evaluating the implementation process [28]. As a result, they are less likely to feel engaged in health promotion campaigns and unlikely to act upon the messages communicated in these efforts. In a survey finding of 513 Hong Kong citizens by the Public Opinion Program (2013) on hand washing and mask wearing behaviour. Despite considerable health communication campaigns this survey found, around half of the parents did not practice recommended hand washing and mask wearing techniques when they had flu symptoms. Among those parents, one quarter were parents of children aged below 15 years [29].

This paper reports on a study to explore the health literacy of Hong Kong Chinese parents with preschool child/ren regarding seasonal influenza prevention. The aim of this paper is to provide useful insights into the design and delivery of health promotion initiatives to address influenza at both community and population level.

Methods

Research Approach

A multiple-case study design was employed to investigate functional, interactive and critical health literacy of parents' seasonal influenza prevention in different family context. A case comprised a parent with preschool child/ren between three-to-five years from a range of preschools and family backgrounds. The approach allowed the researchers to analyze phenomena from multiple perspectives within each real-life setting and across settings to understand the

similarities and differences between the cases [30, 31]. A multiple-case study approach is advantageous because it is thought to produce substantial and robust results beyond the limitations of a single case study [30]. This research approach can enable the discovery of previously unknown features regarding seasonal influenza prevention and family health promoting behaviours, providing in-depth knowledge of human realities and ascribed meanings [32–34].

Participants

Purposive intensity sampling was used to provide rich information that manifested the phenomenon of health literacy among parents with preschool children. A networking approach was used to identify potential preschools. Letters and study information sheets were sent via the person-in-charge of five Hong Kong kindergartens for distribution to Chinese parents, inviting them to participate in the study by contacting the researcher. Finally, three kindergartens agreed to join the study. The researcher then personally invited the parents and provided a detailed explanation of the research. The selection criteria were parents with a healthy three-to-five year old preschool child/ren who were willing to communicate and share their experiences. Twenty mothers and their healthy preschool children from three kindergartens were recruited.

The three kindergartens were from three out of 18 Hong Kong districts. They were located in Kowloon City, Shum Shui Po and Wan Chai respectively. Two kindergartens were non-profit and co-educational preschools. One was a private independent and co-educational kindergarten. The 20 families came from six districts. Twelve families were from Shum Shui Po, three families from Kowloon city, two from Kwun Tong and one from Kwai Tsing, Yuen Long and Wan Chai correspondingly (Fig 1).

Twenty participants were mothers and the main caregivers of their children; aged from 28-to-42 years old. Three families had one child; fourteen had two children and three families had three children. Ten mothers had received secondary school education and ten completed tertiary education. Fifteen mothers were housewives and five mothers were full-time workers with their children being cared for by other family members (Table 1).

Data Collection

Individual semi-structured interviews using open and closed questions were undertaken and field notes were taken to record the observations of parent-child health education activities. The interviews were digitally recorded and then transcribed verbatim for data analysis, with the purpose of understanding parents' functional, interactive and critical literacy on seasonal influenza prevention and health practices. Open-ended questions to elicit participants' seasonal influenza health practices and related health promotion activities included: "what strategies/activities do you use at home to increase your confidence regarding promoting healthy behaviours or minimize the risk of developing influenza?"; and "what are the concerns you have (if any) about promoting health behaviours to prevent or minimise seasonal influenza for your child and other family member?" Closed questions sought to collect: demographic data, knowledge of influenza prevention including hand washing, cough etiquette knowledge, mask wearing and related practices. The closed questions were based upon a review of relevant literature that included infection control measures of patients with acute respiratory diseases in community settings [18] and procedures guiding hand washing and facemask wearing [35, 36]. The closed questions were then, validated, using a content validity index, by a panel of academic expert, community nurses and school teachers who were knowledgeable about infection control and child and family health. This index ensured that the questions were technically correct, unambiguous, culturally appropriate and able to provide adequate information to address the

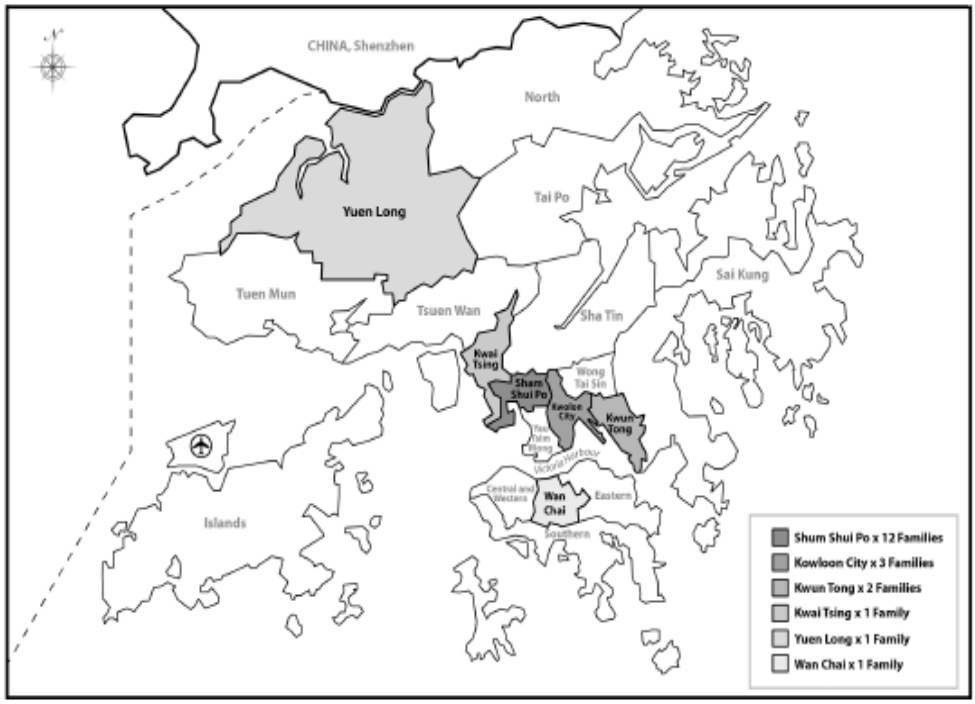

Fig 1. The location of 18 districts in Hong Kong.

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proposed research questions [37]. Parents' knowledge and skills to guide their family's behaviour in seasonal influenza prevention and promoting healthy behaviour were investigated using a Likert scale with one representing the least adequate to ten indicating the most adequate. The frequency of parents' hygiene practices were assessed using a five level scale: every time, often, sometimes, seldom and never. Field notes were taken to record the observations during interviews that included noting the tidiness of the home environment, facemask use and the availability of a thermometer, liquid soap and tissues for hand washing and drying, toy storage and parent-child interaction in relation to health practices.

Data Analysis

A content analysis of the interview transcripts was employed that consisted of examining, categorizing, tabulating and combing the data to address the propositions of the study [30]. First, the researcher reviewed the raw data from the 20 semi-structured interviews and then identified the primary codes by marking and linking them according to the research objectives. The codes were grouped into broad categories through repetitive scanning of the data [30]. Categories within the text that yielded certain themes were collated into theme clusters. Analysis continued until no new themes emerged, as data saturation occurred [33, 38, 39]. A deductive approach was then, applied for pattern-matching [38]. The researcher went back to the original data, read through it repeatedly, compared the derived patterns with previously outlined predefined patterns in order to ensure no missing data and consistency with research objectives. The themes and data extract were independently examined by two other researchers in

Table 1. Demographic data of 20 families.

Personal particulars of 20 participants:	
Sex of participants	20 mothers
Age of participants	2 were 28 years old
	7 were between 30–35 years old
	8 were between 36–40 years old
	3 were between 41–45 years old
How many children in the families?	3 families had 1 children
	14 families had 2 children
	3 families had 3 children
Employment of main caregivers	15 housewife
	5 full time worker
Who is/are the main caregiver(s) of the child (ren)?	15 children were care by mothers
	1 child was cared by both father and working mother
	4 children were cared by grandmothers and working mothers.
Education of main caregivers	10 mothers received secondary school education
	10 mothers received tertiary education
Monthly household income (HKD)	1 was under 10,000
	10 were 10,000–20,000
	5 were 20,000–40,000
	4 were over 40,000

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order to achieve an agreement on patterns matching for the purpose of internal reliability of the study [30]. Exclusions to the thematic codes were also identified and discussed with these researchers.

The demographic, numerical data and observations revealed an overall understanding of parental health practices in seasonal influenza prevention. These data provided a context for parent response enriching the analysis of each case as it provided a context for parent responses.

In the final stage, a synthesis of findings was undertaken [30, 33]. The researcher made a comprehensive comparison across cases including families' demographic information, living environment, parental health knowledge and practices. This cross-case analysis of the multiple cases provided an understanding of the commonalities and differences between cases in regard to seasonal influenza prevention [30, 33].

Ethical Considerations

This study was reviewed and approved by the Hong Kong Polytechnic University Human Research and Ethics Committee (reference no.: HSEARS20140121001) and University of Technology Sydney Human Research Ethics Committee (approval number: 2014000072). All participants provided informed written consents were obtained from all parents before the interviews commenced. For the children, written informed consents were also obtained from their parents for the inclusion of children in the observation process. Observations included parent and child face mask wearing, hand washing and cough etiquette practices. Participation in the study was voluntary with an understanding they could withdraw from the interviews at any time.

Findings

The analysis identified four major themes across the data. These themes were: parents' knowledge and reported skills and practices in relation to seasonal influenza prevention; parental knowledge seeking and exchange practices; parents' approaches to health information and enabling environments for health promotion.

Parents' Knowledge and Reported Skills and Practices

In response to the closed questions about the adequacy of parents' knowledge and skills to guide their family's behaviour in seasonal influenza prevention and promoting healthy behaviour, thirteen (65%) out of the 20 who responded identified they had adequate knowledge and skills (rated seven-to-eight out of ten points on the scale). Three (15%) scored 6-to-6.5 points as having moderate knowledge and skills. Three participants indicated 5 points and 1 gave themselves 4 points.

However, parent responses to how they perceived their knowledge and skills levels did not concur with their actual health practices descriptions. Considerable gaps were noted in parents' responses to their perceived hygiene practices with their actual health practices observed during interviews. All parents reported that they washed hands after blowing their nose, coughing and sneezing; before eating and before handling food (Table 2). However, their actual health practices did not concur with their descriptions. (Table 3)

Fourteen (70%) reported they did not or only sometimes washed their hands after caring for the sick. 14 (70%) reported they did not or only sometimes washed their hands after going to the toilet. Eighteen (90%) stated they did not know the distance that should be maintained from an infected person and 14 (70%) reported that they did not put on a facemask every time when experiencing flu symptoms (one parent said they never wore a mask). No parents were able to demonstrate all the steps required for proper hand washing and 15 parents (75%) washed their hands for less than 20 seconds. Thirteen (65%) said that they did not or only sometimes washed their children's toys. Eight (40%) reported that they discarded used tissues in rubbish bins without a lid (four parents did not know to use a garbage bin with a lid) (Table 2).

In response to the open-ended questions, parents were uncertain when the seasonal influenza peak seasons were and the distance they should maintain from an influenza infected person.

"I only know it's around January to March. For July and August (summer time), I think that the heat from the sunlight will kill the germs. I don't know it's also the peak period (of seasonal influenza)." (P20-M83)

"I did not pay attention to the distance to be kept from the sick one; I only know that it is advised not to stay too close with them." (P10-M117)

Parents said they did not wear a facemask throughout the whole disease course.

"When I start to feel sick, I will wear a facemask for the first few days. But after taking the medications and my health condition is under control with less sneezing and cough, I will stop wearing it. I will not wear a facemask throughout the whole disease course." (P17-M74)

"I will not wear it if I only have symptoms like runny nose or cough. (I will not wear it) throughout the disease course. I wear it only in those days my condition is most serious." (P19-M187)

Parents stated that they would reuse facemasks if they did not look soiled.

Table 2. Knowledge and skills of hygiene practices.

Knowledge of hygiene practices (N = 20)	Frequency of hygiene practices				
	No	Every time	Often	Sometimes	Seldom
When do you (parent) wash your hands with soap?					
Before touching the eyes, nose and mouth	9	2	0	8	1
After blowing nose, coughing and sneezing	0	20	0	0	0
Before eating	0	20	0	0	0
Before handling food	0	20	0	0	0
Before touching your child	12	3	0	5	0
After caring for the sick	5	6	0	9	0
After touching public installation such as escalator handrail, elevator control panel or door knobs	11	6	0	3	0
Do you maintain adequate distance (1 metre) between you and the infected person?	13	3	1	3	0
If you do not maintain adequate distance (1 metre) between you and the infected person, do you wear mask?	17	0	0	3	0
Do you clean toys and equipment regularly?	5	4	3	4	4
Do you put on a facemask on while having respiratory symptoms?	3	6	6	4	1
Which of the following is correct thing to do with tissues after sneezing and blowing your nose? Wrap up respiratory secretion with tissue paper and discard it into garbage bins without lids. (N ≠ 20)	0	7	1	0	0
Do you touch your mask once it is secured on your face?	7	1	3	5	4
Do you wash your hands before and after touching the mask?	17	1	0	1	1
Do you change mask at least daily. Replace the mask immediately if it is damaged or soiled?	3	17	0	0	0
Do you know how adequate should the distance be kept between you and the infected person?	Don't know	18	Know	2	
Skills on hand washing: (N = 19)	**Perform**		**Do not perform**		
Backs of fingers to opposing palms with fingers interlocked.	12		7		
Rotational rubbing of left thumb clasped in right palm and vice versa.	4		15		
Rotational rubbing, backwards, and forwards with clasped fingers of right hand in left palm and vice versa	4		15		
Wrists are rubbed	9		10		
Rub all parts of the hands including the wrists with proper hand hygiene technique for at least 20 seconds.	4		15		

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"[What do you do when you have a facemask on and want to blow your nose?] *I will put the mask on one ear first, then blow my nose and wear it back on again." (P17-M94)*

"I will change the mask once a day. Sometimes, if my cough is not that serious, I will fold the mask up and put it in an envelope for later use." (P19-M212)

"If my mask is not too dirty and I do not cough too often, I will reuse it (the mask). I will fold it up and use a tissue to wrap around it for later use." (P20- M184)

The parents identified that they did not always wash their hands properly. Some claimed that washing their hands only with water was adequate for cleaning their hands.

"The proper procedure of washing hands is very long. I only use a very short period of time when washing my hands. I will not wash it seriously; the procedure and the time are not enough." (P4-M126)

Table 3. Observations on parent-child interaction in relation to health practices.

Participants	Identified hygiene practices issues	Observations: Parent-child interaction in relation to hygiene practices
P4	Child did not cover mouth and nose when coughing	Son coughed without covering his mouth. Mother gave no response or action to his coughing.
P9	Child did not cover mouth and nose when coughing	Son was playing the digital games. He coughed several times without covering his mouth. Mother gave no response or action to his coughing
P12	Mother did not wash hands before touching her face and nose.	Mother did not wash her hand before and after touching her face and nose for several times during interview.
P14	Mother did not wash hands before taking a pack of lemon tea to her son and did not remind her son to wash his hands before drinking.	Son requested to his mother that he wanted to drink a pack of lemon tea. Mother gave him one pack of lemon tea but did not remind her son to wash his hands before drinking.
P15	Mother did not wash hands before taking a cup of jelly out of the refrigerator for her child and did not remind her daughter to wash hands before eating.	When playing the toys, daughter suddenly requested to eat a cup of jelly. Mother took it out of the refrigerator without washing her hands first. She gave the jelly directly to her daughter without reminding her to wash her hands before eating.
P18	Mother did not wash hands before preparing the bread for her child to eat.	Son told his mother he wanted to eat bread. Mother passed the boy to the domestic helper to help him to wash hand. Mother went to kitchen and took out the bread for her son to eat but she did not wash her hands before touching the bread.
P20	Mother did not remind her child to wash hands before eating.	When playing with the toys, daughter told her mother that she wanted to eat seaweed. Mother asked her to take the seaweed out from the drawer by herself without reminding her to wash her hands. Daughter ate seaweed without washing her hands.

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"We usually wash our hands just simply like this. We do it in a simple way. We do not wash it step-by-step, following the instructions." (P14-M306)

"If their (children) hands are not too dirty, I will not force them to use soap to wash their hands. Ha.. .ha. . ." (P19-M350)

"Emm. . . I basically use it [liquid soap when wash hands] as well. But I think that it's not necessary to use soap all the time because I think it's already good enough to use water for cleaning hands." (P20-M322)

Parents reported that they did not know the ratio of water to bleach when performing domestic cleaning. For example:

"I think it [bleach to water ratio] is really troublesome to follow the ratio of 1:99. I will just roughly add bleach to a large bucket of water as long as it's diluted." (P19-M117)

"1:49 is for cleaning. . . I don't remember. I cannot differentiate when to use 1:99 and when to use 1:49." (P20-M88)

Parents described that they did not have a regular schedule to clean children's toys. They only cleaned the toys when they were dirty.

"Sometimes the toys are contaminated by the droplets from sneezing; it's better to use alcohol to spray them. However, I did not do so. I did not intentionally clean his toys. Really!" (P10-M150)

"I use towel to wipe [their toys]. Emm. . . when they were little, I used diluted Dettol to disinfect them. But now I seldom clean their toys. If their toys have a bit of dust, I will use water only to wipe them. My husband always says that the best method to clean household is to use water." (P19-M90)

Parents did not throw their used tissue papers into a lidded rubbish bin. They discarded the tissue in the first available garbage bin. Some parents stated that they had uncovered rubbish bins at homes.

"When throwing rubbish, it depends the location, which one is more convenient, then I will throw into that bin. When throwing, I seldom notice whether it [rubbish bin] has a lid or not." (P8-M83)

"Because it's really really dirty. If I am at home, I will use a tissue to cover my nose when I am sneezing. Then I will throw the used tissue into the bin, however the bin does not has a lid." (P10-M160)

Parental Health Knowledge Seeking and Exchange

Parents reported three common sources for their information seeking and exchange. They were social connection, public service announcement and a community contact point.

Social Connection as a Means for Seeking and Exchanging Health Information. The research data illustrated parents' social connections to different family and community members, social media, the internet and television as sources of health knowledge and practices. Parents identified they accessed knowledge through formal and informal means including direct face-to-face meetings, phone talking, group gathering, attending health clinic and sending messages. The most common method used by parents to share and gain health information communication with other people and parents was through a mobile messaging application. This allowed them to get instant message and exchange messages without having to pay.

"I know that there is a website for Department of Health, but I have not visited it ever before. We used to just read information popped up from mobile phone or website. We are not used to visiting the website from the government." (P10- M315)

"Other parents and I have a WhatsApp group. Whoever children are sick, the parents will take initiatives to tell one another. For example, parents will share the health status of their children, which disease their children get? Then, other parents will be posted on the situation and know what to be taken in order to prevent spreading of the disease among the group." (P16-M172)

For parents a common source of health information was from the internet

"I will actively look at which type of disinfectant is good. I will take a look at books or go to some websites as well, those websites for mothers. Some topics, for example saying that his son is always sick, there will be conversations about that for a while, and then I will take a look at other people's experience." (P4-251)

"We also share on which type of soup we should boil [to prevent flu or health promotion against flu]. I usually go into websites, for example Baby Kingdom. Inside, other users will teach you boiling specific soup to expectorate sputum." (P17-M107)

In the following quotes, discussion with neighbors and news heard from public media fueled decisions not to vaccinate. These discussions were about complications and side-effects affecting those children who had been vaccinated.

"I am afraid that there is a negative reaction after vaccination. (P6_M101)

I am afraid of the reaction after vaccination. There are a lot of news which reported the side effects of vaccination." (P6_GM37)

"The parent living upstairs said that after flu vaccination, her children still got a fever and unwell. Therefore, I did not let my children receive the vaccination since I am afraid that they will get sick after injection." (P13- M151)

Parents reported the significance influence of knowledge exchange through intergenerational learning between parent and their elders. The following quotes provide examples of these health promotion messages.

"When I am looking back to my health practice, to certain extend, I think my practices are influenced by my parents or family members." (P4-M316)

"I heard it [boiling dried vegetables and pig's lung soup] *from elder people. . .* [it] *clear the residue of western mediations away from our bodies since they* [medications] *will stay in our bodies after we take them. So it's better to clear them away* [from body]*". (P11-F178)*

"The other parents share this method, eating Bo Ying Dan to prevent influenza with me. I also learn it from previous generations." (P20-M194)

Receiving Public Service Announcement. Parents recognized the wider community as a source of health information. School teachers, health professionals and government posters were all identified as health promotion sources:

"If the school distributes notices back home, I will take a look at it. . . Some kind of notices or anything pamphlets, my children take back, I will have a look at them."(P3-M203)

"There are leaflets in the child and maternal clinic as well as television. When we are waiting for doctor consultation, the television will broadcast health information on flu, sometimes they will teach you about personal hygiene." (P8-M255)

"There are posters placed [regarding prevention of influenza] *at the entrance of library, near the places for monthly magazines. I did see posters placed there." (P15-P323)*

Parents claimed that their health promotion practices were enhanced through government television advertisements.

"Every time when I see an advertisement about government providing free vaccinations, then I know it is the time to bring them to have vaccinations." (P16-M88)

"If it's the peak season of influenza, and when the television broadcasts news about the prevention of influenza, I will ask him to wash his hands more frequently." (P11-F40)

A Community Contact Point for Seeking Health Information. Parents described that nursing services could provide a dissemination point for health information to enhance parents' knowledge and skills in prevention of seasonal influenza.

"There should be a contact point for nurses to hold health education talks. Just like community center, at least when the mothers are free, they can bring the children to attend the talks. If there is no such arrangement in the community, we don't know where to learn and how to prevent seasonal influenza." (P7-M468)

"The best method to promote flu prevention is to find a contact point. Which means. . .more elder people ask questions in the contact point, then they will spread out the learned knowledge/information to others. This is the better way." (P11-F254)

Parents suggested community nursing services might include health consultation. Through the consultation, parents' misunderstanding and concerns about health issues might be addressed and often reduced.

". . . There are many children living in this estate. It is a good if community nurse is here. We can get the information from community nurses. I remember one of my experiences before; I don't know what happen to my baby daughter. I dialled to the nurse. . .the maternal and child health centre nearby. Phone call is a convenient way to seek advice in emergency occasion. It is good to get prompt information. At least there is a person who can calm you down first." (P6-M432)

"[Having a community nurse within the estate] *is convenient for everyone. It is convenient for the neighbours; we don't have to go to clinic which is far away from us, for enquiry. We can ask her what to eat when having influenza. What medication to eat when having a cough. Questions like which type of medication is the best will be asked as well. Asking the best medications for the fastest recovery of influenza. Since we do not know a lot, we will definitely ask questions about the type of mediations to buy or the best medication first." (P2-M155)*

Parents' Approaches to Health Information

The interviews analysis found that parents were interested in learning about health from a variety of sources including: YouTube, government websites, and commercial marketing and were mostly accepting of the information presented. However, the parents had no intention of verifying the obtained health information and potential issues about the reliability and quality of the information were raised:

"I surf the websites to see anything related. Sometimes, I will also browse YouTube. . . I rely on these to obtain information. I follow and act on what people say without the need for clarification." (P1-M217)

"Those are what the promotion says [they promote health]. Ha. . .Ha. . . (Laughing). They [commercials] *will mention about the effect or what will be enhanced physically afterwards. Adults like us will take in comparatively less instead but we think that children need more protection; therefore I will buy these* [healthy product] *for them. I get no intention to verify the information, but sometimes they* [commercial companies] *will quote their sources or from some statistics etc." (P3-M256)*

While some parents trusted the advertisement provided about a product other parents were more critical of the information provided by the commercial company. In the first quote the parent appeared ambivalent about the trustworthiness of a product.

"I watched the television and they broadcasted their commercial, showing that Evergreen H_2O multi purposes disinfectant cleaner is used for mopping the floor. I really do not know whether it's effective or not. I really do not think about whether it's effective or not." (P11-F74)

In this second quote the parent was much more critical of the impact on her child's body.

"Credibility is very important to me. My choice definitely is based on its credibility. It is very important because it [Bo Ying Dan] *is taken into their* [children's] *bodies." (P20-M202)*

Enabling Environments for Health Promotion

A Shortage of Health Resources. The parents felt that inadequate health resources provided in the community hindered their health practices. Some parents highlighted the difficulty of finding lidded rubbish bin in the streets.

"Well. . .There's no reason for me to find one with a lid. If there is a bin without a lid beside you, it doesn't make sense for you to walk to a further one. I know, but all the bins near this area do not have a lid." (P2-M78)

"If I am on the street, I will throw the rubbish to the bin without cover as most of the rubbish bins have no lids. I get no choice. I only can throw them to these bins [without lids]." (P5_M83)

Parents complained about the inadequate public hand washing facilities nearby and the lack of liquid soaps in the public toilets.

"I think the soap provided in the public toilets is not enough. There isn't any all of time." (P15-P304)

"We do not have a habit of cleaning his hands after holding the hand rails of escalators. I won't be able to find a washroom to wash hands immediately." (P18-M45)

Parents emphasised the need to deliver health information resources before disease onset. She recommended broadcasting government health promotion advertisements before the onset of seasonal influenza. It allowed time for parents to improve their preparation to prevent seasonal influenza.

"Emm. . . Sometimes I know it [peak influenza season] *only after watching promotion commercials produced by the government in television. Which means I know it only after the flu has come? It's too late to prevent." (P14-M270)*

"Government advertisements start promoting when it has already been the peak period of influenza. It has already been too late. Government should remind people a bit earlier." (P14-M272)

Resource Allocation for Health. Resource development was identified as disproportionally focused on the health needs of the elderly rather than on children.

"Yes. . . The resources of this district are mainly for elderly people. It put a large proportion [health resources] on them. But I can't see that they have put any resources on children. Apart from vaccination for children, I can't see any resources allocating to them [children]." (P10-F42)

"Maybe the resources of Child and Maternal Health Clinic are not enough. When my child was up to two years old, people there [in clinic] *told me there is no need to come to clinic again since all follow-up consultations were finished. If there is nothing special, no need to attend the clinic. But, I just think. . .I want to know. . .more on child development or the eating issue of child. . .what I need to pay attention on it." (P16-M261)*

Discussion

Enhancing Functional, Interactive and Critical Literacy

Functional, Interactive and critical health literacy can be fostered by increasing parents' capacities to access and effectively use health information [2] as well as providing health consultation in the community [40]. The internet is a common access point for people searching for health information [41]. Online seeking behavior has become increasingly integrated into the lives of health consumers encouraging them to be active health information consumers [42]. Similar health seeking behaviour was also found in this study. Parents used the internet as a complimentary health resource to search for information [41, 43] and exchanged new health information with other parents. This may have compensated for gaps in the provision of information by health professionals [44], including when parents have difficulty making timely appointments with health professions or when scheduling conflicts arise during clinic hours [45].

Apart from internet-based health education, the use of mobile health technologies such as short message service (SMS) for health message reminder provides new and innovative opportunities for health promotion and disease prevention efforts [46]. This telecommunication for health promotion is feasible in local text as cell phone use in Hong Kong is very common. The SMS application is a cost-effective health promotion method [47] as it will not cost parent's money when receiving health message. The text messages reminder for seasonal influenza prevention such as childhood vaccination and personal hygiene practices can reach parents in advance. Therefore, parents are able to take preventive measures before seasonal influence comes. In this study, similar health seeking behaviour also reported. Parents claimed that they prefer reading the information popping up from mobile phone.

In order to address parents' needs associated with the change in their seeking behaviours, an electronic integrated health promotion service such as SMS health message reminder and internet-based health education has been recommended as effective ways to facilitate and increase parents' uses of health services [48], and improve parents' functional literacy [43, 49]. Community nurses could contribute to enhancing parents' functional, interactive and critical literacy to use health information and service effectively through internet-based health education together with outreach services such as health workshops and consultation session [50]. By participating and learning through workshops, parents' functional literacy such as health knowledge and skills, and interactive literacy such as developing confidence performing practices independently such as hand washing or coughing/sneezing manner can be further consolidated. Interactive opportunities will challenge parents' misunderstandings and inaccurate

concepts can be corrected. Nurses can play a key role in the provision of educational information, guide parents to websites where reliable health information can be found [51] and provide support as they learn to interpret and integrate online information with traditional health care approaches [43]. These interactive activities enable parents to develop critical literacy skills for the application of health practices in different situations and have greater control of their health through informed decision making [2]. Encouraging parents to participate in the design, development and evaluation of on-line educational programs will ensure educational content is appropriate to the needs of the community [2, 40].

Process Evaluation and Community Engagement in Program Development

In this study parents raised issues about the absence of adequate enabling conditions that inhibited their ability to take preventative action and to participate in health interventions [52]. These conditions included: the limited availability of hand washing facilities and rubbish bin with lid, access to appropriate child-focused community health services, and community resources for health consultation.

A potential need is for greater community health planning and action that includes: process evaluation before and during planning stages and when implementing seasonal influenza prevention programs [15] in order to address the actual needs of the families. To ensure successful delivery of seasonal influenza prevention within communities, collaboration and partnerships is crucial among community members and public health agencies such as outreach clinics, district councils and schools. This approach ensures adequate health communication and integrates community engagement at every stage of program development [40].

Strength and Limitation

In this study, the authors did not use Test of Functional Health Literacy in Adults (TOFHLA) or the Rapid Estimate of Adult Literacy in Medicine (REALM) to measure parents' functional health literacy regarding hand washing and cough etiquette knowledge as they were both developed for English-speaking adult population. The tests are not easily translated to enable assessment of the Hong Kong Chinese populations. The terminologies adopted in the assessment were different from that of other countries because of differences in linguistic systems and sociolinguistic aspects in different countries [53, 54]. The authors took a comprehensive approach by using closed questions and semi-structured interviews to provide a broader perspective of parents' health practices. The questionnaire developed for this research study may contribute towards establishing a seasonal influenza health literacy assessment for communities.

A limitation of this study is that 20 parents with their preschool children were recruited from six out of eighteen districts. Despite strenuous efforts to recruit a maximum diversity of participants, 12 parents (60%) were recruited from the same district and could be expected to perceive similarly environmental influences on seasonal influenza prevention and related health promotion strategies somewhat, as compared to the parents recruited from other districts.

Conclusion

A multiple-case study was adopted to examine functional, interactive and critical health literacy of parents' seasonal influenza prevention and related health promotion practices. The findings from this study demonstrated that many parents have insufficient functional and critical health literacy in relation to seasonal influenza prevention and related health promotion.

Parents demonstrated a lack of, or incomplete hand washing and mask wearing and a limited critical analysis of available health information obtained from different community organizations. Community nurses could contribute to enhance parental capacity to use health information effectively through internet-based health education together with outreach services. The findings also suggest that community health professions take a critical role in increasing parents' functional and critical literacy; vital elements when planning and implementing seasonal influenza health promotion intervention.

Author Contributions

Conceived and designed the experiments: WL AD CF. Performed the experiments: WL. Analyzed the data: WL AD CF. Contributed reagents/materials/analysis tools: WL AD CF. Wrote the paper: WL AD CF.

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Appendix 14: An example of theme development

Quotes	Codes	Categories	Themes
"I only know it's around January to March. For July and August (summer time), I think that the heat from the sunlight will kill the germs. I don't know it's also the peak period (of seasonal influenza)." (P20-M83)	Parents were uncertain when the seasonal influenza peak seasons were and the distance they should maintain from an influenza infected person.	Parents got insufficient knowledge in seasonal influenza prevention	Parents' knowledge and reported skills and practices in relation to seasonal influenza prevention
"I did not pay attention to the distance to be kept from the sick one; I only know that it is advised not to stay too close with them." (P10-M117)			
"I think it [bleach to water ratio] is really troublesome to follow the ratio of 1:99. I will just roughly add bleach to a large bucket of water as long as it's diluted." (P19-M117)	Parents did not know the ratio of water to bleach when performing domestic cleaning.		
"1:49 is for cleaning… I don't remember. I cannot differentiate when to use 1:99 and when to use 1:49." (P20-M88)			
"When I start to feel sick, I will wear a facemask for the first few days. But after taking the medications and my health condition is under control with less sneezing and cough, I will stop wearing it. I will not wear a facemask throughout the whole disease course." (P17-M74)	Parents said they did not wear a facemask throughout the whole disease course.	Parents' inappropriate skills and health practices in relation to seasonal influenza practices	
"I will not wear it if I only have symptoms like runny nose or			

cough. (I will not wear it) throughout the disease course. I wear it only in those days my condition is most serious." (P19-M187)	
"[What do you do when you have a facemask on and want to blow your nose?] I will put the mask on one ear first, then blow my nose and wear it back on again." (P17-M94) "I will change the mask once a day. Sometimes, if my cough is not that serious, I will fold the mask up and put it in an envelope for later use." (P19-M212)	Parents would reuse facemasks if they did not look soiled.
"If my mask is not too dirty and I do not cough too often, I will reuse it (the mask). I will fold it up and use a tissue to wrap around it for later use." (P20- M184)	
"The proper procedure of washing hands is very long. I only use a very short period of time when washing my hands. I will not wash it seriously; the procedure and the time are not enough." (P4-M126)	The parents did not always wash their hands properly. Some claimed that washing their hands only with water was adequate for cleaning their hands.
"We usually wash our hands just simply like this. We do it in a simple way. We do not wash it step-by-step, following the instructions." (P14-M306)	
"If their (children) hands are not too dirty, I will not force them to use soap to wash their hands. Ha...ha…" (P19-M350)	

"Emm… I basically use it [liquid soap when wash hands] as well. But I think that it's not necessary to use soap all the time because I think it's already good enough to use water for cleaning hands." (P20-M322)	
"Sometimes the toys are contaminated by the droplets from sneezing; it's better to use alcohol to spray them. However, I did not do so. I did not intentionally clean his toys. Really!" (P10-M150)	Parents did not have a regular schedule to clean children's toys. They only cleaned the toys when they were dirty.
"I use towel to wipe [their toys]. Emm… when they were little, I used diluted Dettol to disinfect them. But now I seldom clean their toys. If their toys have a bit of dust, I will use water only to wipe them. My husband always says that the best method to clean household is to use water." (P19-M90)	
"When throwing rubbish, it depends the location, which one is more convenient, then I will throw into that bin. When throwing, I seldom notice whether it [rubbish bin] has a lid or not." (P8-M83)	Parents discarded the used tissue in the first available garbage bin. Some parents stated that they had uncovered rubbish bins at homes.
"Because it's really really dirty. If I am at home, I will use a tissue to cover my nose when I am sneezing. Then I will throw the used tissue into the bin, however the bin does not has a lid." (P10-M160)	

"I know that there is a website for Department of Health, but I have not visited it ever before. We used to just read information popped up from mobile phone or website. We are not used to visiting the website from the government." (P10- M315) "Other parents and I have a WhatsApp group. Whoever children are sick, the parents will take initiatives to tell one another. For example, parents will share the health status of their children, which disease their children get? Then, other parents will be posted on the situation and know what to be taken in order to prevent spreading of the disease among the group." (P16-M172) "I will actively look at which type of disinfectant is good. I will take a look at books or go to some websites as well, those websites for mothers. Some topics, for example saying that his son is always sick, there will be conversations about that for a while, and then I will take a look at other people's experience." (P4-251) "We also share on which type of soup we should boil [to prevent flu or health promotion against flu]. I usually go into websites, for example Baby Kingdom. Inside, other users will teach you boiling specific soup to expectorate sputum." (P17-M107)	Parents identified they accessed knowledge through formal and informal means including direct face-to-face meetings, phone talking, group gathering, attending health clinic and sending messages. The most common method to share and gain health information communication was through a mobile messaging application. Parents said the common source of health information was from the internet	Social connection as a means for seeking and exchanging health information	Parental knowledge seeking and exchange practices

I am afraid that there is a negative reaction after vaccination. (P6_M101) I am afraid of the reaction after vaccination. There are a lot of news which reported the side effects of vaccination." (P6_GM37) The parent living upstairs said that after flu vaccination, her children still got a fever and unwell. Therefore, I did not let my children receive the vaccination since I am afraid that they will get sick after injection. (P13- M151)	Parent heard the news from public media and neighbors making them not to vaccinate.
"When I am looking back to my health practice, to certain extend, I think my practices are influenced by my parents or family members." (P4-M316) "I heard it [boiling dried vegetables and pig's lung soup] from elder people… [it] clear the residue of western medications away from our bodies since they [medications] will stay in our bodies after we take them. So it's better to clear them away [from body]". (P11-F178) "The other parents share this method, eating Bo Ying Dan to prevent influenza with me. I also learn it from previous generations." (P20-M194)	Parents reported the significance influence of knowledge exchange through intergenerational learning between parent and their elders.

"If the school distributes notices back home, I will take a look at it… Some kind of notices or anything pamphlets, my children take back, I will have a look at them."(P3-M203) "There are leaflets in the child and maternal clinic as well as television. When we are waiting for doctor consultation, the television will broadcast health information on flu, sometimes they will teach you about personal hygiene." (P8-M255) "There are posters placed [regarding prevention of influenza] at the entrance of library, near the places for monthly magazines. I did see posters placed there." (P15-P323)	Parents recognized school teachers, health professionals and government posters were health promotion sources.	Receiving Public Service Announcement
"Every time when I see an advertisement about government providing free vaccinations, then I know it is the time to bring them to have vaccinations." (P16-M88) "If it's the peak season of influenza, and when the television broadcasts news about the prevention of influenza, I will ask him to wash his hands more frequently." (P11-F40)	Parents' health promotion practices were enhanced through government television advertisements.	
"There should be a contact point for nurses to hold health education talks. Just like community center, at least when the mothers are free, they can bring the children to attend the talks. If there is no such arrangement in the community, we don't know where to learn and how to prevent seasonal influenza."	Parents described that nursing services could provide a dissemination point for health information in seasonal influenza prevention.	A community Contact Point for Seeking Health Information

(P7-M468) "The best method to promote flu prevention is to find a contact point. Which means...more elder people ask questions in the contact point, then they will spread out the learned knowledge/information to others. This is the better way." (P11-F254)	
"… There are many children living in this estate. It is a good if community nurse is here. We can get the information from community nurses. I remember one of my experiences before; I don't know what happen to my baby daughter. I dialled to the nurse…the maternal and child health centre nearby. Phone call is a convenient way to seek advice in emergency occasion. It is good to get prompt information. At least there is a person who can calm you down first." (P6-M432)	Parents suggested community nursing services might include health consultation for information clarification.
"[Having a community nurse within the estate] is convenient for everyone. It is convenient for the neighbours; we don't have to go to clinic which is far away from us, for enquiry. We can ask her what to eat when having influenza. What medication to eat when having a cough. Questions like which type of medication is the best will be asked as well. Asking the best medications for the fastest recovery of influenza. Since we do not know a lot, we will definitely ask questions about the type of medications to buy or the best medication first." (P2-M155)	

Appendix 15: Manuscript associated with results reported in Chapter 5 findings part II (Submitted to *Journal of Community Health Nursing* and is under review)

Article title: The role of culture in relation to the seasonal influenza prevention practices of Hong Kong Chinese parents with preschool children

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Abstract

To explore the role of culture in the seasonal influenza prevention practices of Hong Kong Chinese parents with a healthy preschool child, a mixed methods multiple-case study approach was used. Purposive intensity sampling was employed. A thematic analysis was adopted to examine the qualitative data and the quantitative data were assessed descriptively. Five themes were: sharing beds; boiling white vinegar to kill air-born germs; diet therapy to enhance health; self-prescribed Chinese medication to manage cold symptoms; and the co-use of Western and traditional Chinese medications. Nurse-parent partnerships using pluralistic health promotion approach was recommended to better prevent seasonal influenza.

Keywords: Community nursing, cultural issues, influenza

Background

Individual and family health knowledge and practices, including health literacy are affected and shaped by culturally related principles and norms (Adair et al., 2004; Christensen, 2004). In Hong Kong, seasonal influenza is common in the periods from January-to-March and July-to-August. Influenza is easily transmitted and particularly affects those with immature or compromised immune systems such as young children and the elderly with chronic illness (Centre of Health Protection of Hong Kong, 2016; World Health Organization, 2009). (Centre of Health Protection of Hong Kong, 2012). Hong Kong Chinese parents have been found to use both Western medicine and Traditional Chinese medicine remedies (T. F. Lau et al., 2005) to manage their children's cold symptoms and prevent their children from seasonal influenza infections. These include the use of herbal preparations such as Sang Ju Yin, Yu Ping Feng San, Folium Isatidis and Radix Scutellariae (T. F. Lau et al., 2005). Differences in the health practices of families in Western and Asian societies have been noted in the literature (Yamashiro & Matsuoka, 1997). For example diet therapy, which is based upon a cultural belief in the energy giving effects of food is used in many Chinese families to achieve health to maintain balance by "heating" or "cooling" the body (Chen, 2001). While foods such as honey or lemon drinks that seem to have soothing properties are often applied to prevent colds in Western families (Paul et al., 2007).

Hong Kong is highly westernized but the population is largely Chinese. Traditional Chinese Medicine and Western medicine continue to be integrated into long established health practices (Lam, 2001). Traditional Chinese medicine includes different types of treatments such as herbal preparations, diet therapy, the use of animal organs, massage to stimulate blood circulation and acupuncture to treat a range of conditions (Ludman & Newman, 1984). The principles underpinning Traditional Chinese Medicine and Western medicine are very different (Lam, 2001). Chinese medicine is informed by the philosophical, ethical and religious tradition of Taoism that emphasizes harmony between human beings and nature providing peace of mind (Chen, 2001). To attain health, an individual must regulate him or herself to fit the rhythms of the universe. The concepts of health and illness among Chinese people have long been influenced by the harmony of the forces of Yin and Yang (Chen, 2001). The imbalance of these forces within and between human body and its atmosphere is believed to cause illness. In contrast to Chinese medicine, Western medicine is based on the use of empirical or measurable evidence derived from the biomedical sciences including genetics and involves medical technology to diagnose, treat, and prevent injury and disease.

The Hong Kong local health authorities have employed social marketing campaigns to promote personal and environmental hygiene strategies to prevent seasonal influenza. In addition, resources have been targeted at increasing immunization rates through vaccination programmes (Centre for Health Promotion of Hong Kong, 2010). Maintaining personal hygiene including proper hand washing and cough etiquette, and having a seasonal influenza vaccination are recommended as the most effective methods to prevent the spread of seasonal influenza (Centre of Health Protection of Hong Kong, 2014a; Jennings, Monto, Chan, Szucs, & Nicholson, 2008; World Health Organization, 2009).

Hong Kong is a small densely populated territory of over seven million people (Hong Kong Census and Statistics Department, 2012). It is common for a family of four to live in an apartment with a total area of 40 square metres. Chinese values emphasize the development of interdependence and family closeness (Chen, 2001), these beliefs also influence parents' childrearing practices such as sharing beds. In Hong Kong and many Asian countries, child-parent bed sharing is commonly observed in families (Liu, Liu, & Wang, 2003; Yang & Hahn, 2002). Under such circumstances, if a family member is infected with seasonal influenza, it is easily spread to other family members

within overcrowded living areas. Therefore, the use of anticipatory interventions becomes crucial to reduce the risk of cross infection including on-going strategies to maintain healthy immune responses and personal hygiene. Hong Kong Chinese mothers are highly involved in child care which is often their priority concern (Chan, Bowes, & Wyver, 2009). As children often stay at home with their mothers for large amounts of time, mothers are in a strong position to reinforce children's health practices through daily interaction and reminders. Mothers are role models for children to learn and behave (Bodrovea & Leong, 2007).

A review of the literature on seasonal influenza prevention, found that most research studies focus on the: factors affecting vaccination uptake such as influenza infection knowledge (Hofstetter, Barrett, & Stockwell, 2015; Liao, Cowling, Lam, & Fielding, 2011; Lohiniva, Barakat, Dueger, Restrepo, & El Aouad, 2014) or perceived benefit from flu vaccination and perceived severity from seasonal influenza (Kwong, Lam, & Chan, 2009; J. T. F. Lau, Au, Tsui, & Choi, 2012; Zijtregtop et al., 2009); methods to increase influenza vaccination uptake rate (Stockwell et al., 2015); and the use of face masks and effective hand hygiene to prevent household influenza infection (Cowling et al., 2009). There is limited research in the peer reviewed literature exploring the role of culture in seasonal influenza prevention practices of Hong Kong Chinese parents with young children at a household level. The aim of this study is to provide an understanding into the role of culture in Chinese parents' health practices to prevent influenza. The findings will be of use for community nurses when working with Chinese communities in planning health promotion programmes, health services as well as influenza preparedness plans.

Methods

Research Design

We undertook a mixed methods research study using a multiple-case approach (Cresswell, 2009; Yin, 2012). A case comprised a parent with a child between three-to-five years from a range of Hong Kong preschools and family backgrounds. This study approach permits the researchers to: examine phenomena from multiple views within and across each real-life setting, analyse the commonalities and variances between the cases and, discover previously unknown features regarding the culturally specific health

promotion practices of parents related to seasonal influenza prevention (Stake, 1995; Yin, 2014).

Recruitment and Participants

A networking approach was used to identify potential preschools. Letters and study information sheets were delivered to parents via the principals of five kindergartens that invited the parents to join the study by contacting the researcher. Three kindergartens agreed to facilitate the contact with potential parents. Parents indicating a willingness to communicate and share their experiences were contacted by the researcher, a detailed explanation of the research was then provided. Purposive intensity sampling was used to recruit parents. In total, 23 parents were contacted and 20 parents with healthy young children under five years agreed to participate in this study.

Data Collection

Semi-structured interviews using open and closed questions were conducted in parents' homes. Field notes were also used to record the observations taken during the interviews. Digitally recorded interviews were transcribed verbatim for data analysis, with the aim of understanding parental health promotion strategies for seasonal influenza prevention and their health promotion practices to minimize the impact of flu symptoms or their onset. Open questions included: "can you describe how your family/cultural practices affect your decision making about the management of seasonal influenza"; and "do any of your family members use alternative medicine to protect your child from seasonal influenza"? Demographic data were collected including household surface area, number of people living there and the child's sleeping arrangements. Observations were documented using an observation guide and field notes. Observations were made concerning the home environment, parent-child interaction and medication storage with regard to prevention of seasonal influenza. The interview and observation guide were developed after a review of relevant literature and discussion with two researchers, colleagues and school teachers experienced in child and family health promotion. A validation process occurred using academic experts, community nurses and school teachers who were knowledgeable about infection control, child and family health and preschool education. This validation process ensured that

the instrument was culturally appropriate, explicit, technically correct and able to provide sufficient information to address the proposed research questions (Polit & Beck, 2006).

Data Analysis

A thematic analysis was used to examine, categorize, tabulate the interview data to address the study objectives (Yin, 2014). First, the transcripts from the 20 semi-structured interviews were reviewed to mark and link primary codes according to the research propositions. These codes were clustered into broad categories through repetitive reading of the data (Yin, 2014). The categories were then grouped into thematic clusters. Analysis continued until no new themes emerged (Creswell, 2007; Morse & Field, 2002; Yin, 2012). Data saturation was observed when similar meanings and categories were noted from the data after the eighteenth interview. Two additional interviews were further finished to confirm that no new data were provided by the parents. A structured approach was taken to establish patterns across these data (Yin, 2012). The first author (WL) returned to the data, re-reading numerous times to make comparisons with previously outlined predefined patterns to ensure consistency with the study objectives and identify data that may have been missed. The other authors (AD and CF) independently assessed the identified themes and data extraction process and consensus was reached on the findings thereby ensuring rigour (Yin, 2014).

The demographic data, observations and field notes revealed culturally related health promotion practices used by Hong Kong Chinese parents in seasonal influenza prevention. These data enriched the qualitative analysis of individual cases and provided a family context for the parent responses.

In a last stage, the families' demographic data, home settings, level of parental education, living environment, and culture related health promotion practices were compared comprehensively across cases. This cross-case analysis provided a thorough understanding of the similarities and variances between families regarding health practices for seasonal influenza prevention (Creswell, 2007; Yin, 2014). The concordance between the interview and observation data enhanced the rigor of the findings (Yin, 2012).

Ethical Considerations

Ethical approval was obtained from the Hong Kong Polytechnic University Human Research and Ethics Committee and University of Technology Sydney Human Research Ethics Committee Human Research and Ethics Committees. The consents allow publishing and reporting of individual data. Parents voluntarily join the study and were informed that they could withdraw from the research at any time. All data were de-identified during the transcription process.

Findings

Twenty Hong Kong Chinese parents agreed to be interviewed. They were all mothers, aged between 28-and-45 years and the main caregivers of their preschool children. Ten mothers completed secondary school education. Ten mothers had finished tertiary education. Fifteen mothers were housewives. Five were full-time employees and their children were cared for by other family members. Nine families had three generations: grandparent, parent and child living in the same household. Eleven families had two generations: parent and child living in the same household.

The qualitative analysis of the interviews identified five major cultural practices within the data. The practices were: sharing beds; boiling white vinegar to kill air-born germs in the air; diet therapy to enhance health; self-prescribed Chinese medication to manage child's cold symptoms and the co-use of Western health products; and traditional Chinese medication to prevent seasonal influenza. The data gleaned from the observations enriched the interview findings.

Sharing Beds

Sharing a bed with small children is a common practice by Hong Kong Chinese families (Liu et al., 2003). Many children sleep with their parents, domestic helpers or siblings even when they are ill. The following two examples illustrated this theme.

> No matter whether my child is sick or not, she still sleeps with me. If I am sick, it's impossible for me to wear a mask to sleep. She likes to stick and sleep with me. (P8-M22)

> Elder daughter sleeps with her dad and younger son sleeps with me. I won't specifically sleep separately with them when I get flu. It's the same. (P11-M23)

The findings of the above quotes were consistent with the situations observed during the home interviews. The household surface area of the 20 participative families ranged from 30 metres to 100 meters. The total number of people living in the household is from four-to-eight people. In relation to sleeping habit, three mothers reported that they will let their children sleep alone in their bed as usual when children get flu symptoms. Seventeen mothers claimed that sharing a bed was their usual practices no matter whether their children were sick or not sick. Bed sharing allows the mother to take care of their child in a convenient way, particularly when the child is sick. Among these 17 mothers, 13 mothers claimed that they sleep with their children. One mother said her son shares a bed with his elder brother. Three mothers stated their children slept with the domestic helper.

[Table 1 near here]

Boiling White Vinegar to Kill Air-Born Germs

Parents reported that they boiled white vinegar to ensure the environment was healthy for their children's health. Parents claimed they followed other people in doing this practice even though they stated they did not know whether it worked or not.

> I boiled white vinegar for the effect of disinfection. It will kill the bacteria in the air. When it is peak season of avian flu, flu etc., we follow other friends to boil the vinegar. People say that we can put the boiled vinegar near the window and then let it evaporate in the air. Let wind blow it around the flat. It gets no harm and why not to try. I just boil few times in a year. (P6-M81)

> Emm…Yes, boiling white vinegar can kill germs. This kind of way is very common back in the days. In the serious time of flu infection, all white vinegars were sold out. Ha...ha… Even no one proves that boiling white vinegar is an effective way in killing germs. I still will do it. It's better than having nothing done. (P15-M213)

Diet Therapy to Enhance Health

Parents reported that they made different types of Chinese soups that include boiling products such as Crocodile meat soup, the lungs of a pig, the Glabrous Greenbrier Rhizome and Ching Bo Leung to enhance health. The glabrous greenbrier rhizome and Ching Bo Leung are two different kinds of Chinese herbs which are common ingredients used in making Chinese soups.

> I usually boil Chinese soup. I like Glabrous Greenbrier Rhizome most because it clears away the heat and detoxifies the waste products from our bodies. (P1-M59)

> I always ask my mum to boil like Ching Bo Leung to remove heat from our bodies... Those soups help you expel the dampness out from our body. Before, children got a cough for a certain period; grandmother then boiled crocodile meat soup for them since this soup helps to relieve cough. (P3-M355)

> We usually boil soup with dried vegetables and pig's lung for them to drink. Pig's lung is used to clear the heat from our bodies as well as moisturize our lungs. (P11-M192)

The above quotes demonstrate that mothers integrated the principle of Traditional Chinese Medicine in their daily diet regime. Parents also reported that different Chinese soups have functions such as to clear heat and dampness from the body to maintain balance of heat and cold inside the body.

Self-Prescribed Chinese Medication to Managing a Child's Colds Symptoms

The most common health practices parents spoke of in order to manage their children's colds symptoms were the use of self-prescribed Chinese medication such as Monkey Bezoar Powder and Bo Yi Dan. This helps to avoid seasonal influenza development. Monkey Bezoar Powder is Calculus Macacae Mulattae powder and used to clear away excessive phlegm, relieve coughing and ease breathing.

> I will let my younger son take Monkey Bezoar Powder which is kidney stone of monkey mixing it with some Chinese herbs. After taking one time of Rhesus Macaque Bezoar, his cough diminished a lot. He becomes energetic. Sometimes, after taking some western medications, he feels very sleepy and may sleep for a whole day. (P18-M173)

> I will give them Bo Ying Dan to eat when their colds symptoms are minor. I will let them take for consecutive two days if they sneeze and have runny nose. They seldom need to consult the doctor after eating Bo Ying Dan. (P20-M116)

Co-Use of Western Health Products and Traditional Chinese Medication to Prevent Seasonal Influenza

Parents reported that they applied different methods from different perspectives to prevent seasonal influenza. The most often cited approach was the use of both Western health products such as vitamin C and cod liver oil and Chinese medications such as herbal tea and Bo Ying Dan (a pill to treat fever, sneezing, cough, restlessness and crying at night). These Chinese medicines act to dispel wind, clear away heat and eliminate phlegm.

> I usually give them vitamins C, cod liver oil etc. to eat to increase their body resistant. I buy and try various healthy products. (P1-M45)

> Children take vitamin C, fish oil and blueberry [for better eye sight] as supplements every day. All are for better body resistance. (P3-M249)

Parents also claimed that they drank herbal tea to promote health and prevent influenza.

> Not only for treating flu, you can drink herbal tea in normal days for flu prevention. When children have flu, they will usually drink herbal tea. It is already enough to help them recover from flu. (P13-M239)

Parents gave their children Bo Ying Dan to enhance their body's resistance to prevent seasonal influenza.

> After he starts going to school, I let him eat Bo Ying Dan even he's not sick. The purpose of taking it is to increase his body resistance. (P18-M188)

During the home interviews Western health products such as vitamin C and bilberry capsules and Chinese medications such as Bo Ying Compound and Pure Pearl Powder were observed in three households. Table 2 outlines the medications that were observed in participants' homes.
[Table 2 near here]

Discussion

The findings from this study demonstrates that traditional cultural health practices and beliefs still have a strong influence on Chinese Hong Kong parents' practices in managing colds symptoms and prevention of seasonal influenza. Parents draw from both traditions in their prevention and health promotion practices in their attempt to maintain the health of their families. The results provide insights about family use of Western and Chinese medicine and can assist community nurses in planning and developing community disease prevention and health promotion programmes with Chinese communities.

Pluralistic Health Promotion approach to Better Prevent Seasonal Influenza

This study adds to the body of knowledge concerning medical pluralism in Hong Kong society. The findings support that the concurrent use of both Western and Chinese medicines remains the preferred practice of Hong Kong families as found in other research studies such as the study of Chung et al. in 2007 (Chung, Wong, Woo, Vi Lo, & Griffiths, 2007). Two studies provide additional support to the findings of this research that the strategies designed to improve health outcomes among Hong Kong Chinese families may be more effective if they are culturally appropriate and a family focused approach to health promotion is taken (Huber & Shapiro, 2012; Jamieson,

Parker, & Richards, 2008). There are limited studies that consider the use of alternative medicine and how it may influence decision making concerning seasonal influenza prevention practices including vaccination uptake (Bleser, Elewonibi, Miranda, & BeLue, 2016). The study by Bleser et. al. (2016) reported that the influenza vaccination uptake rate is lower among children whose families practiced alternative medicine hence a focus on education among such families may be useful. Using culturally appropriate seasonal influenza practices and family focused approaches will help to engender family acceptance of and compliance with evidence based health practices that will reduce influence transmission and management.

A review of preparedness plans for seasonal influenza pandemics in Hong Kong found that culturally based problem-solving perspectives and values of the local public are not routinely incorporated into health strategy plans to prevent seasonal influenza (Centre of Health Protection of Hong Kong, 2014b). The Hong Kong Department of Health takes a strategic approach similar to that of many European countries, aiming mostly at health surveillance and harnessing and deploying available resources such as building up a good stock of antiviral agents and vaccines for influenza preparedness and risk reduction (Coker & Mounier-Jack, 2006; Department of Health of Hong Kong, 2015). Failing to act and incorporate family practices may result in culturally incongruent seasonal influenza preventive measures (Leininger, 2002; Paton, Parkes, Daly, & Smith, 2008). Health departments must acknowledge socio-cultural practices and include family members in the development and management of seasonal influenza health promotion initiatives in order to make them appropriate and responsive (Gray et al., 2012).

Our study raises implications concerning professionals who should be involved in the public health response to influenza epidemics. Mothers in our study reported using Traditional Chinese medicine or seeking the advice of Traditional Chinese Medicine practitioners or herbalist as their first point of contact. Seasonal influenza could be better prevented and treated with improved planning, training and coordination between Western medicine, nursing and Traditional Chinese Medicine practitioners. This will require additional training for Traditional Chinese Medicine practitioners with an emphasis on referral and reporting cases of influenza to enable government surveillance systems to detect the cases at the on-set of an epidemic. This

acknowledgement of medical pluralism may help to improve health promotion initiatives to prevent seasonal influenza**.**

Nurse-Parent Partnerships to Enable Cultural Congruent Health Promotion

Involving the health sector and families in health is a fundamental goal of family health promotion (Cyril, Smith, & Renzaho, 2015). People are more likely to take appropriate action and accept suggested actions if they have been engaged in decision-making processes and programme development (Gray et al., 2012). Partnerships between community health nurses and families through outreach services can provide opportunities to strengthen the ability of parents to create healthy households. Nurses are able to counsel families and provide health advice in ways that are meaningful and culturally appropriate. This could include explanations of the efficacy of boiling white vinegar to kill air-born germs; to assist parents set achievable goals and provide individualized health information to address individual family concerns. It is vital for health professionals to foster relationships with parents by engaging parents in conversations about health promotion (Riesch, Anderson, & Krueger, 2006). Health professionals must be proactively involved discussing culturally specific health practices such as the use of traditional Chinese medication and bed sharing practices. Such discussions provide opportunities for prompt and appropriate health recommendations that could ensure effective prevent, management and treatment of influenza. For example if the bedroom space is adequate, separate sleeping practices must be encouraged to minimize prolonged and close exposure of parent to infected child (Cowling et al., 2009). These approaches support the most favorable environment for health promotion and illness/disease prevention at both community and household levels.

In our findings, for several families recruiting domestic helpers to take care of the child is a common practice. In such cases, health professionals should involve such workers and consider using non-written materials or language appropriate teaching materials during outreach health consultation visits.

Conclusion

This study provided valuable insight into the cultural practices of Chinese Hong Kong mothers in the prevention of seasonal influenza and its treatment. The results of this study demonstrate that the traditional cultural health practices and beliefs still have a strong influence on the Hong Kong Chinese parents' practices in managing colds symptoms and prevention of seasonal influenza. Parents draw from both Western and Chinese traditions in their prevention and health promotion practices in their attempt to maintain the health of their families. The findings recommended that pluralistic health promotion approach should be carefully considered in local seasonal influenza prevention programme to ensure a family's acceptance and compliance to the health advice from the health authority. Nurse-parent partnership is an important consideration when planning and implementing culturally appropriate health promotion services in a local context.

Limitations

In this study, the gender of the participants was homogeneous as all were female. This is an important factor to be considered in future research regarding gender differences in father's health promotion practice and experience. Extending the current research to include diverse samples in ethnicity and/or socio-economic class would be a valuable next step.

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Table 1: Observations on home environment and setting

Participant	Reported household surface area by mothers	Number of people living there	Child sleeping arrangements
P1	66 metres	4 adults and 3 children	Child sleeps with her elder brother in same bed. When sick, child will sleep with her mother.
P2	45 metres	2 adults and 2 children	Child sleeps with mother in same bed. When sick, he also sleeps with mother.
P3	70 metres	2 adults and 2 children	Child sleeps alone in lower deck of bunk bed. When sick, she also sleeps alone in her bed.
P4	80 metres	3 adults and 2 children	Child sleeps with domestic helper in same bed. When sick, she also sleeps with domestic helper.
P5	45 metres	5 adults and 2 children	Child sleeps with mother in same bed. When sick, she also sleeps with mother.
P6	55 metres	2 adults and 3 children	Child sleeps alone in her own bed of bunk bed. When sick, she also sleeps alone in her bed.
P7	45 metres	5 adults and 3 children	Child sleeps with mother in same bed. When sick, she also sleeps with mother.
P8	45 metres	4 adults and 1 children	Child sleeps with mother in same bed. When sick, she also sleeps with mother.
P9	30 metres	2 adults and 2 children	Child sleeps with his elder brother in same bed. When sick, child will sleep with his mother.
P10	35 metres	2 adults and 2 children	Child sleeps with his elder brother in same bed. When sick, he also sleeps with his elder brother.
P11	38 metres	2 adults and 2 children	Child sleeps with mother in the same bed. When sick, child also sleeps with his mother.
P12	35 metres	2 adults and 1child	Child sleeps with mother in the same bed. When sick, child also sleeps with his mother.
P13	35 metres	4 adults and 3 children	Child sleeps with mother in the same bed. When sick, child also sleeps with his mother.
P14	40 metres	3 adults and 2 children	Child sleeps with mother in the same bed. When sick, child also sleeps with his mother.
P15	50 metres	4 adults and 2 children	Child sleeps with mother in the same bed. When sick, child also sleeps with her mother.
P16	100 metres	3 adults and 2 children	Child sleeps alone in her bed. When sick, child will sleep with her mother in the same bed.
P17	70 metres	4 adults and 2 children	Child sleeps with mother in the same bed. When sick, child also sleeps with his mother.
P18	100 metres	3 adults and 2 children	Child sleeps with domestic helper in same bed. When sick, she also sleeps with domestic helper.
P19	50 metres	2 adults and 2 children	Child sleeps alone in lower deck of bunk bed. When sick, she also sleeps alone in her own bed.
P20	75 metres	3 adults and 2 children	Child sleeps with domestic helper in same bed. When sick, she also sleeps with domestic helper.

Table 2: Western health products and Chinese medication storage observations

Participants	Medications observed in households
P1-P2	Nil
P3	Several bottles of vitamin C, bilberry and Bo Ying Compound were stored on a shelf.
P4-P5	Nil
P6	Several bottles of vitamin C, fish oil, Bo Ying Compound and Pure Pearl Powder were stored on a shelf.
P7-P16	Nil
P17	Several boxes of Bo Ying Compound were stored on a shelf.
P18-P20	Nil

Appendix 16: Manuscript associated with results reported in chapter 6 findings part III

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RESEARCH ARTICLE Open Access

The approaches Hong Kong Chinese mothers adopt to teach their preschool children to prevent influenza: a multiple case study at household level

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Abstract

Background: In Hong Kong, the population is at risk of seasonal influenza infection twice a year. Seasonal influenza is significantly associated with the increased hospitalization of children. Maintaining personal hygiene and vaccination are the most effective measures to prevent influenza infection. Research demonstrates a positive relationship between the health practices applied by parents and the behaviour of their children highlighting the importance of parental heath education. However, there is minimal research that provides an understanding of how Hong Kong Chinese parents teach their children to prevent seasonal influenza.

Methods: Mixed methods research was undertaken that employed a multiple-case study approach to gain an understanding of parental teaching practices regarding seasonal influenza prevention. Purposive intensity sampling was adopted to recruit twenty parents and their healthy children. A thematic analysis was employed to examine the qualitative interview data and the quantitative survey data were examined descriptively. These data were then integrated to provide a more rigorous understanding of parental teaching strategies. Comparisons were made across cases to reveal commonalities and differences.

Results: Five major themes were identified: processes parents used to teach personal hygiene; parent-child interaction during teaching; approaches to managing children's health behaviours; enhancing children's healthy practices; and parents' perspective of the role of the nurse in health promotion.

Conclusions: This study provided valuable insight into the approach of Hong Kong Chinese parents in teaching their children to prevent seasonal influenza. The results indicate that parents can be better supported to develop effective strategies to teach their preschool children hygiene practices for seasonal influenza prevention. Partnerships with community nurses can play a role in building effective parent-child interactions to enhance children's learning and adoption of healthy practices.

Keywords: Parental teaching, Seasonal influenza, Parent-child interaction

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Background

In Hong Kong, influenza is usually common in the periods from January to March and July to August [1]. The virus is transmitted from person-to-person through droplet and direct contact [1, 2]. Yearly influenza epidemics can seriously affect all age groups but particularly those with immature or compromised immune systems such as young children and the elderly with chronic illness [1, 3]. The viruses causing influenza are constantly changing. Exposure to these new virus variants can potentially lead to influenza epidemics [2, 3]. Maintaining personal hygiene including proper hand washing, cough etiquette and regular seasonal influenza vaccination uptake [1, 4] are recommended as the most effective measures to prevent the spread of influenza [3, 5].

Research demonstrates a positive relationship between the health practices used by parents and children's behaviour [6]. A study by Song et al. (2013) demonstrates that parents' hand washing practices are significantly correlated with children's hand hygiene practice and research suggests that the hand hygiene behaviour of adults is likely to be the result of lessons learned in childhood [7]. Young children spend extended periods of time with their parents ideally positioning parents, through their daily interactions, to teach and reinforce their children's health knowledge and practices. Without family involvement, health practices are unlikely to be sustained once the health promotion intervention ceases [8].

The preschool period is recommended as the most suitable time for parents to initiate and support their children to develop lifelong health behaviours [9]. Preschool children learn health knowledge and practices as a result of parental modelling and repeated opportunities for practicing these health behaviours [10, 11]. Parents assist children internalize these health practices into their daily behaviours through repeated interactions embedding the behaviours as lifelong habits. These regular practices have also demonstrated lasting effects on subsequent adult activity-related behavioural patterns [12].

The cognitive and functional abilities of preschool children are still developing [10, 11]. Their ability to manage and remember a large amount of health knowledge and practices at a single interaction may be challenged. To develop competence children often require information to be repeated and several opportunities to practice tasks along with appropriate encouragement [13]. The effectiveness of parental teaching depends on the extent to which this teaching has advanced a child's understanding of the health practice [14]. A child's level of understanding will impact upon their health practice compliance. If parents can enhance children's understanding of health practices such as correct hand washing compliant, the risk of preschool children contracting infectious diseases such as influenza will be lowered. Using a teaching process that includes: alerting the child to a teaching moment, providing visual cues and verbal instruction, giving encouragement and providing feedback will assist both the child and parent [15]. Importantly, parental teaching strategies assist in the effectiveness of children's learning and the enhancement of the parent-child interaction through one or two way communication [16]. In addition, providing clear and consistent messages to the child, allowing time to question, and appreciating the child's efforts through the provision of feedback have also been found to be useful [10, 11].

A review of the literature identified that most research studies are focused on the association of parenting styles either related to healthy lifestyles such as healthy eating [17, 18] or health practices such as internet use [19]. There is minimal research investigating the teaching approaches of parents, particularly Hong Kong Chinese parents regarding how they teach their preschoolers to prevent seasonal influenza. It is therefore worthwhile investigating how parents and their preschoolers interact to develop health practices and build prevention knowledge. The aim of this study is to provide an insight into parents' roles and teaching approaches when supporting their children's development of health practices, particularly those to prevent influenza occurring within the household.

Methods

This mixed methods research study employed a multiple-case approach [20, 21] to gain an understanding of parents' health teaching practices and their interaction with preschool children regarding seasonal influenza prevention. A case comprised a parent with a preschool child between 3-to-5 years. The approach allowed the researchers to analyze phenomena from multiple perspectives within each real-life setting and across settings to understand the similarities and differences between the cases; discover previously unknown features regarding culture specifically Chinese parental teaching and parent-child interactions related to seasonal influenza prevention [22, 23].

Recruitment and participants

Purposive intensity sampling was used to recruit 20 Hong Kong Chinese parents and their healthy preschool children aged from 3-to-5 years old. A networking approach was used to identify potential preschools. Letters and study information sheets were sent via the person-in-charge of five Hong Kong kindergartens for distribution to Chinese parents, inviting them to participate in the study by contacting the researcher. Study participants were ultimately enrolled from three kindergarten schools. The researcher then personally invited the parents and provided a detailed explanation of the

research. The selection criteria were parents with healthy 3-to-5 year old children who were willing to communicate and share their experiences. In total, 23 parents were contacted and 20 parents agreed to participate in this study.

Eleven families were living in private apartments and nine families were living in public estates. Nine families had three generations: grandparent, parent and child living in the same household. Eleven families had two generations: parent and child living in the same household.

Data collection

Data collection was conducted by a researcher with a history of clinical experience in family health education, health promotion, and skills in conducting family interviews. Data were obtained from multiple data sources. These sources included: a semi-structure interview guide, an observational checklist and a demographic survey. The in-depth semi-structured interviews were carried out first. Open-ended questions were used to elicit participants' teaching strategies and included "what concerns, issues or challenges do you face when trying to encourage your child to prevent influenza and carry out healthy practices" and "what are the strategies/activities you use at home to promote your child's healthy behaviours or minimize the risk of developing influenza". The responses were digitally recorded and transcribed verbatim. As part of the interview phase, closed questions in a survey format were used to collect participants' demographic data.

The mothers were then invited to demonstrate the procedure of teaching their children to wash their hands and wear a facemask. The mothers were not provided with any instructions or prompting on how to undertake this task by the researcher during the observation. The aim of this data collection technique was to identify the mother's existing knowledge and skills in teaching and supporting her child's hand washing technique. Maternal teaching strategies and parent-child interactions during the demonstration were observed and recorded using an observational checklist. A framework was used to guide the observations that involved identifying the steps parents took when teaching hand washing and facemask wearing [15]. These steps were: alerting the child to the activity to be learned or practiced; instructing the child to perform what is expected or the steps to be taken; allowing the child to demonstrate; evaluating the standard of the child's health practice; and providing feedback to the child on their health practice performance [15]. The observations of parent-child interaction involved: one or two way communication; clear and age appropriate task instructions; showing appreciation of the task attempts; providing encouragement when encountering something difficult; and language style used by the parent [15]. Both teaching strategies and the characteristics of parent-child interaction were assessed using a dichotomous scale (yes/no) with a space for reflective notes to be written on each item.

The demographic survey, semi-structured interview guide and observational checklist were validated, using a content validity index with four-point scale ranging from 1-to-4 (not relevant = 1, some relevance = 2, very relevant = 3, extremely relevant = 4), by a panel of academic experts, community nurses and school teachers who were knowledgeable about infection control and child and family health. This index ensured that the questions were technically correct, unambiguous, culturally appropriate and able to provide adequate information to address the proposed research questions [24].

Data analysis

The process of data analysis was conducted concurrently with data collection, as constructs from the previous interview guided the collection of data in the next interview. The tape was replayed within 1 or 2 days after the interview with the researcher carefully listening to the questions and the tone of the responses. Each taped interview was transcribed verbatim from Cantonese to English. All communication forms including laughter, pauses in the conversation and expletives were also included in the script. After the transcription, the whole script was checked against the tape for accuracy. Back translation of the quotes from English to Cantonese, were completed to ensure the validity of qualitative data. The concordance between the interview and observation data enhanced the rigor of the findings [21].

A thematic analysis of the interview transcripts was employed to categorize, tabulate and examine the data to address the propositions of the study [22]. First, the raw data from the 20 semi-structured interviews were reviewed to mark and link primary codes according to the research objectives. These codes were grouped into broad categories through repetitive scanning of the data [22]. The categories were then collated into theme clusters. Analysis continued until no new themes emerged [21, 25, 26]. Data saturation was observed when similar meanings and categories were noted from the data after the eighteenth interview. Two additional interviews were completed to confirm that the mothers were not providing new data.

A deductive approach was then, applied for pattern-matching [21]. The researcher went back to the original data, read through it repeatedly and compared the derived patterns with previously outlined predefined patterns in order to ensure no missing data and consistency with the study objectives. The themes and data extraction were independently examined by two other researchers in order to achieve an agreement on pattern

matching for the purpose of internal reliability of the study [22]. Exclusions to the thematic codes were also discussed with these researchers.

The demographic and numerical data from the surveys and observational checklist revealed an overall understanding of parental teaching strategies and the interaction with their children in seasonal influenza prevention and related practices. These quantitative data enriched the qualitative analysis of each case as it provided a context for parents' responses.

In the final stage, a comprehensive comparison was made across cases including families' demographic information, living environment, parental education level, parental teaching strategies and the characteristics of parent-child interaction in relation to hygiene practices. This cross-case analysis of the multiple cases provided an understanding of the commonalities and differences between cases regarding hygiene practices for seasonal influenza prevention [22, 26].

Results

Twenty Hong Kong Chinese mothers agreed to be interviewed. Nineteen mothers and their preschool children participated in the hand washing and facemask wearing observation component of this research. One of the mothers did not participate in the observation due to reluctance to be involved in the demonstration. All mothers were the main caregivers of their children, aged between 28 and 45 years. Ten mothers had completed secondary school education and ten completed tertiary education. Fifteen mothers were housewives and five mothers were full-time workers with their children being cared for by other family members (Table 1).

Table 1 Personal particulars of 20 participants

Characteristics	Number
Parent gender	
- Female	20
- Male	0
Parent age	
- 28 years old	2
- 30-to-35 years old	7
- 36-to-40 years old	8
- 41-to-45 years old	3
Education level completed	
- Secondary school level	10
- Tertiary level	10
Employment status	
- Housewife	15
- Full time workers	5
Child's main caregiver	
- Mothers	15
- Both father and working mother	1
- Grandmothers and working mother (shared)	4

The qualitative analysis of the interviews identified five major themes within the data. The themes were: processes used by parents to teach personal hygiene; parent-child interaction during teaching; approaches to managing children's health behaviours; enhancing children's healthy practices; and parents' perspective of the nurse's health promotion role. The quantitative data gleaned from the survey and observations enriched the interview findings.

Processes used by parents to teach personal hygiene

The mothers reported that they did not use any specific teaching method to teach their children health practices. They sometimes kept silent during the observation session and did not provide feedback if their child was able to perform the health practices correctly.

> If they [child] wear mask properly, the wire at upper side, I seldom provide feedback [on their health practices]. I only keep silent. (P1-M89)

> I do not have specific method or steps to teach them [health practices]. (P11- F292)

The findings of the above quotes were consistent with the data observed from handwashing and face masks demonstrations. Most mothers did not fully demonstrate the five teaching steps listed on the observation checklist during the hand washing and facemask wearing sessions. All of the 19 mothers directly asked their children to participate in hand washing and facemask wearing. Seven participants gave instructions with explanations to their children concerning what was expected, or the steps to be taken in hand washing. The other 12 mothers kept silent during the hand washing procedure. Twelve parents allowed their children to demonstrate hand washing and facemask wearing and provided sufficient time for the procedures to be completed without intervening. Seven participants allowed their children to start demonstrating the procedures. However, once their children encountered difficulties, the mothers intervened by helping their child complete the task without asking any probing question or allowing extra time to independently problem-solve. After finishing the hygienic practices, twelve mothers evaluated the child's standard of hand washing and facemask wearing according to the local government procedure guides. The other seven parents kept silent and did not evaluate either the standard of hand washing or facemask wearing. Only one mother provided feedback such as "you do well by yourself this time and keep on this practices" to her child on the performance of hand washing and facemask wearing (Table 2).

Table 2 Parental teaching process of hand washing and facemask wearing

Parental teaching process of 19 participants	Yes	No
Alerts child to the activity	19 (100 %)	0
Instructs child to perform what is expected	7 (33.84 %)	12 (63.16 %)
Allows child to demonstrate	12 (63.16 %)	7 (33.84 %)
Evaluates the standard of child's health practice	12 (63.16 %)	7 (33.84 %)
Provides feedback to child on their performance	1 (5.26 %)	18 (94.74 %)

Parent-child interaction during teaching

Two characteristics identified during the qualitative interviews were praising children when the children: performed a task that mothers felt had exceeded their child's abilities, and if they felt their children required limited parental guidance.

> I will only praise her when they do something good… such as if the tasks exceed her abilities, but they can do it well. Then, I will praise them. For example, under this situation, I will scold her. She misread the sign of plus and minus in mathematic calculation. Then I will scold her. (P11-F361)

> If there is something he is able to do for example washing his hands before eating, I won't praise him. It depends on situation. If the thing is far from his ability and I think he cannot do it but turns out he does it well. Then I will praise him. (P18-M374)

Limited parental guidance on children's health practices was observed in the following quote.

> I seldom talk to or teach my son how to wear the mask properly. They elicit most of the things by themselves. I only correct them when they wear the mask wrongly. (P1-M87)

> I will only teach her when she cannot do it. If she says, 'mum, I do not know how to do it, I do not know how to fit it, can you teach me? Then I will teach her. (P8-M377)

The findings of the above quotes were consistent with the characteristics observed during the observation of hand washing and facemask wearing. All of the 19 mothers engaged their children in conversation when commencing the procedure performance. Questioning and answering skills were used to check children's understanding. When two children interrupted their parents' conversations, two of the mothers stopped talking and listened to their children's requests before proceeding to the next step. Twelve mothers used language that appeared to be clear enough for their children to understand their instruction. Mothers described different aspects of hand washing when carrying out teaching to enhance their child's learning including: the location of areas on the hand to be cleaned, and hand actions used to effectively clean the hands and the colour and shape of the face mask when guiding facemask wearing. Seven mothers observed their child's practices without any explanation or description of the actions. Five mothers verbally appreciated their child when the procedure was correctly completed. Fourteen mothers remained silent when their child completed the procedure appropriately. Five children encountered difficulties during hand washing and facemask wearing. Two of the five mothers encouraged their child when they had difficulties and three remained silent. All mothers used a combination of commands and explanations when asking their child to do or not to do the health practices.

Approaches to managing children's health behaviours

The mothers reported various strategies to ensure their child followed their instructions and maintained healthy behaviours. These included: punishing the child, threatening them and giving incentives. Physical punishment and scolding were two methods regularly identified by the mothers to regulate children's misbehaviours.

> I also think physical punishment is … [of the] same important as praising to children. If she is naughty, I will hit her butt or her hands with cane or bare hands. Sometimes I will punish her by asking her to stand which allows time for her to calm herself. (P15-P457)

> I really ask her [child] a lot of times… for example, do not use her hand to touch her feet and I did it with explanation, but she still does not listen. She still does not change. I am out of solution. I did everything. I warned her once, I hit her hands once. (P8- M161)

> When he does not listen to my instruction, I will not allow him to do something he wants to do. If he does something related to health practice wrong, I will scold him. If he still doesn't listen, I will punish him when we go home. (P9-M112)

The mothers claimed using a threatening approach and providing consequences was an effective way to stop their children's misbehaviours.

> When he doesn't follow my instruction, I sometimes will tell him, "If you do not do it, I will not take you out to play". It's effective. In general, when we tell him this, he will be scared and will follow our instructions. (P12-M336)

> I let my daughter see the photos of ugly fingers and told her this is the consequences of biting nails. After seeing the photos, she got scared, and then she stopped biting. I have no other ways since she did not listen to me. Therefore, I have to intimidate her. (P14-M399)

Most of the mothers used incentive such as gifts, snacks and playing to encourage or sustain children's health practice. The following quote provides an example of an incentive that was provided.

> If he does it well [correct health practices steps], I will give him a stamp every time as a reward. When he collects a certain amount of stamps, he can use the stamps to exchange a present from me. His health practice has improved. (P19-M76)

Enhancing children's health practices

During the interview, the mothers identified singing and storytelling as useful pedagogies to encourage and sustain their child's health practice.

> When he is not willing to wash his hands, I will sing the "hand washing" song with him. Then, he will wash it. If the thing he is willing to, I will do it more often. Just like singing the song can help him to wash his hands more often. (P4-M190)

> Taking story-telling as an example, I will ask her some questions in between story telling. I will ask her whether the behaviour showed in the storybook is correct or not, is it good to do so, or will you do that? (P5-M405)

Parents' perspective of the role of the nurse in health promotion

Mothers claimed that the community nurse could provide explanations and advice to families and their children on health related issues. The nurse could further expand their role by assisting families apply new knowledge and skills they have developed into disease prevention within the context of their home and local community. Some mothers believed that information provided by nurses would be more convincing. The following quote supports the greater involvement of nurses providing health education as the mothers felt that their children and older relatives would be more likely to follow what a nurse advises them to do.

> Community nurses in the community can teach everyone about the prevention of flu. For example, when having flu symptoms and we do not want to take medication, we can ask [community nurse] what we can do to prevent this. At least, nurses have the knowledge compared to normal people. By asking them, they can explain more and give advice to us, this is much better. (P8- M283)

> I will use the knowledge obtained from the community nurse [to prevent disease/illness] since they have more knowledge on prevention of influenza and can teach us. Also they [community nurses] are more convincing. If I am the one who talk to elder people [in my family], they will ignore me. But, if there is a professional nurse, they may listen. (P11- F249)

In the first quote, the mother emphasized the importance of health consultation role of nurses and teachers within the community. In the second quote, the mother claims that knowledge transfer related to disease prevention from the nurse to the mother might happen during nurse-parent and nurse-family interaction, in particular, older family members.

In the next two quotes, there is a shift in focus as the mothers provide an explanation of the importance of the nurses' and teachers' roles in health education provision.

> They [children] may not remember even you say it for ten times to them. But if a community nurse comes to tell them, children will remember. I think it should be effective for community nurses to go to kindergarten or primary school to promote health, particularly for kindergartens. (P17-M265)

> I think children always listen to nurses. Just like they listen to their teachers. I think if the talk is held by nurses, it will be more effective. The children will listen to what nurse says. (P19-M317)

In the above quotes, the mothers identified an opportunity for the nurse to provide health promotion during the child's attendance at kindergarten. In the final quote, the mother justified the nurse's role in that children always listen to nurses, providing the nurse with a level of authority as a health educator.

Discussion

The findings from this study demonstrate that none of Hong Kong Chinese mothers in this study applied the whole teaching process as per our framework of five identified steps when teaching their preschool children hygiene practices to promote health and prevent seasonal influenza. Some parents adopted controlling approaches to ensure their children's compliance in health practices or provided incentives such as gifts or snacks. The strategies parents applied may not be optimal and therefore this study provides insights that could assist nursing service planners to design child and family health promotion

programmes to better support parents to guide the development of their children's healthy behaviours.

Enhancing effective parent-child interaction and teaching for health

The key determinant for successful implementation of health education programmes is the educator's, or in this case the parent's ability to communicate effectively [27]. In recent years, the focus of prevention research has shifted from the parent and child as individuals to the parent-child dyad [16]. This reciprocal interaction relies on the level of a child's cue clarity, a parent's responses and a logical interaction sequence to ensure effective communication [15]. Our study provides observational evidence of communication issues where reciprocal interaction could be enhanced. We found that while 12 mothers used language that was clear enough for their child to understand, the hand washing instructions given by seven mothers' were not understood by their children. The clarity of instruction and quality of information provided to the children could be improved by assisting new mothers to learn the required steps of practice, such as hand washing, in a systematic way.

Positive parent-child communication is identified as contributing to effective health practice learning [27]. It enables parents to support their children's health behaviour regulation, maintain involvement and act as a positive role model for their children [28]. It reduces the need for the mother to rely on assertive and aversive strategies to increase child health practice compliance [16]. In this study, punitive strategies were found to be commonly employed as a method to gain their child's compliance. Some mothers identified a lack of confidence to change their children's behaviour. Therefore enabling parents to build confidence and effective communication with their children is central to health promotion interventions to enhance child health practice learning [27].

Interventions to support the adoption of healthy behaviours involve assisting parents to improve their knowledge and modelling skills. Practice sessions involving both parents and their children in demonstrations of these health practices are a key way forward. Parents can be supported to develop effective communication skills, knowledge about their children's physical development and ways of learning. Scenario based learning involving cough etiquette or hand washing can guide parents and children during practice sessions. Through these hands-on interactive activities children are provided with opportunities to apply their new knowledge into everyday practice enabling parents to develop confidence [29, 30] in guiding child health behaviour. With the support and consultation of community nurses, inappropriate and ineffective concepts and practices related to child learning and interactions can also be corrected and positive practices consolidated. Nurses can facilitate these practice sessions through face-to-face education and phone consultations or teleconferences [31, 32], these strategies can provide parents with additional feedback and support post intervention.

Integrating parental teaching skills in child and family health education

In this study, some mothers who adopted a controlling approach to regulate children's health behaviours claimed they had no other way to manage their child's behaviour. Chinese parents have been reported to use controlling and restrictive approaches in child rearing [33]. Children may be required to be unquestionably obedient to their parents who may influence the use of such parenting approaches. Frequent use of restrictive or controlling approaches by parents have been associated with children's behavioural problems such as internet misuse [34] and unhealthy eating [16]. Health professionals can support parents to employ teaching approaches to adopted healthy behaviours that encourage children using strategies that promote and celebrate child achievements [35].

Nurse-parent-child partnerships in health promotion

Parental expectations concerning nurses' and teachers' roles in health education were also highlighted in our study [36]. A multi-faceted approach involving the health sector, community partners and families in health promotion is a fundamental goal of health promotion [37]. Partnerships between community nurses and teachers provide opportunities to strengthen parents' abilities to create healthy households [38] by appropriately using health services, to assist parents set achievable goals [39] and provide emotional support and information. This partnership is of particular importance to child rearing ensuring that families are actively involved in enhancing their health [40]. It is vital for nurses to foster relationships early on with parents and their child by: involving parents and children in conversations about health promotion [41]; communicating the parents', child's and nurse's expectations with regard to learning; and encouraging parents to model health behaviours and practices for their children [28]. These approaches will assist in maintaining an optimal environment for health promotion and illness/disease prevention at both community and household levels.

Limitations

Further experimental studies are warranted to examine the impact and effectiveness of parental training on the use of structural and interactive parent-child teaching approaches in establishing their child's health practices. In this study, the gender of the participants was

homogeneous as all were female. This is an important factor to be considered in future research regarding gender differences in father's health teaching experience and capacity. Extending the current research to include diverse samples in ethnicity and/or socio-economic class would be a valuable next step. Finally, the sequence of the data collection may have altered or impacted upon the mothers' health practices, because the interviews were conducted before the observation of the teaching session.

Conclusion

This study has provided a valuable insight into the approaches Hong Kong Chinese mothers use to teach their preschool children to prevent seasonal influenza. The findings identify the critical role of the community nurse in enhancing effective parent-child interaction for children learning health practices. Nurse-parent-child partnerships are an important consideration when planning and implementing seasonal influenza health promotion.

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Authors' contributions
All authors participated in the study design. WL was responsible for data collection. All authors contributed to the analysis of data and in drafting the manuscript. All the authors read and approved the final version of the manuscript.

Competing interests
The authors declare no competing interests.

Consent for publication
The participants have given consent to publish. Data has no individual details and is handled confidentially.

Ethics approval and consent to participate
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