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EXPLORING THE HEALTH INFORMATION NEEDS OF PILGRIMS FOR THE PROTECTION AGAINST INFECTIOUS DISEASES DURING MASS MUSLIM GATHERINGS (HAJJ)

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A research report submitted to the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg in partial fulfilment of the requirements for the degree of Master of Science in Nursing

Johannesburg, 2017

DECLARATION

I, Dalhat Mohammed Nasir hereby declare that this research report is a product of my own research effort. To the best of my knowledge it has never been previously presented for any degree or certificate at any other University. It is being submitted for the degree of Master of Science in Nursing Science at the University of the Witwatersrand Johannesburg and sources of information have been acknowledged by way of references.

Signature.....

Date.....13th June, 2017.....

Protocol Number **M160414**

DEDICATION

This research work is dedicated to the Almighty Allah the king of all kings, my beloved parents: Hajia Rahannatu Ahmed Anche and Late Alhaji Nasiru Mohammed Charanchi (may his soul rest in perfect peace) and PharmacistYusif Nasiru who always standby me.

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Finally, I would like to thank the participants for their role in the research process. This study would have been impossible without their contribution

ABSTRACT

The Hajj is widely recognized as the world's largest and globally most diverse kind of mass gathering. This annual five day gathering takes place in the city of Mecca and includes between 2.5 and 3.5 million participants. This poses a great concern by the organizers as the risk for the spread of infectious disease due to overcrowding is greatly increased. These diseases are increasingly being recognized as a potential threat to both local and international public health systems. The lack of understanding of the infectious diseases that originate and disseminate during the Hajj was raised in the Jeddah declaration. Furthermore, despite the protective measures put in place, poor health practices from selective use of the measures by the participants contributes to the increased risks. Exploring the health information needs of the pilgrims attending Hajj, would help in knowing what is required to reduce poor health practices and simplify and improve compliance with protective measures against infectious diseases before, during and after Hajj, and this will help in minimising the spread of infectious diseases in the Hajj.

The aim of this study was to explore the health information needs of the pilgrims attending Hajj in order to know what was required to reduce poor health practices and simplify and improve compliance with protective measures against infectious diseases before, during and after Hajj, and this would help in minimizing the spread of infectious diseases in the Hajj.

In this study, a qualitative research design was used and focus group discussion using semi-structured questions was conducted. The members were purposely recruited and divided into four groups, two groups of males and two of females. The division of participants into focus groups was in part done in compliance with the Muslim beliefs. Data were collected using a focus group discussion with semi-structured questions that was recorded using a tape recorder. These discussions were transcribed verbatim before being analyzed using thematic analysis.

The findings of the study showed that pilgrims need a holistic health educational program that addresses their experiences of illnesses and chosen format as educational pamphlets are no longer effective. The findings also revealed that collaboration, surveillance and screening of pilgrims for diseases prior to departure are useful as they help in spreading messages of health and diseases issues with simplicity and yield effective result as well as identifying those at risk of contracting infectious diseases, spreading infectious diseases and exacerbating their diseased conditions.

The study recommends the use of digital technology such as an app for phone to send health information to participants and promptly identify and manage individuals who develop illness during mass gathering events like Hajj. It also recommends the incorporation of mass gathering medicine into the curriculum of Nursing program in order to effectively train and equip nurses with better preparation measures against infectious diseases during mass gatherings like Hajj.

KEY WORDS: Hajj, Health Education, Infectious Diseases, Mass gathering, Protective measures.

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CHAPTER ONE

OVERVIEW OF THE STUDY

1.0 INTRODUCTION

This research report explored the health information needs of Pilgrims attending Hajj, the largest global mass gathering, in order to develop a program that will simplify compliance to infection prevention measures. The rituals carried out during hajj place Pilgrims in close contact with each other. The proximity of the Pilgrims to each other is often less than a meter thus increasing the risk of cross infection. Whilst Saudi Arabia increases the number of healthcare workers in the Mecca area during hajj "nurses working in hospitals and clinics during the hajj are also at risk of contracting infectious diseases which they in turn could spread" Shuman, 2013).

Chapter one is the overview of the study. The reader is introduced to the background of the study, the aims and objectives of the study, the significance, the researcher's assumptions, chapter division and the summary. In addition, the principles for ensuring trustworthiness, ethical considerations and research methods are briefly discussed. Lastly the study outline has been included.

Harvard referencing style has been used. Where the publications contain four or more authors, the initial citing will include only the first three authors. In subsequent citing only the name of the primary author will be used. All authors will be included in the referencing at the end of the report.

1.1 BACKGROUND OF THE STUDY

Hajj is the last of the five pillars of Islam. It is known as the largest recurring religious gathering on the globe with attending pilgrims numbering between 2.5 to 3.5 million each year (Benkouiten, Charrel, Belhouchat *et al.*, 2013; Memish, Zumla, Alhakeem *et al.*, 2014b). It is compulsory for each and every physically, mentally and economically sound Muslim to participate once in their life time in the Hajj. The Hajj is performed every year, for five days from 8th - 13th day of the last month in the

Islamic calendar. During this period, Muslims from all over the globe converge on Mecca, and this puts a strain on the available environmental, social and medical resources (Memish et al.,2014). It also raises concerns of an increased risk for local and international spread of infections during the event. For this reason, overcrowding associated infectious diseases become a great concern to organizers, participants and infection control professionals of the Hajj (Memish, *et al.*, 2014b). The concerns become more intensified because of the simplicity in acquiring and spreading certain infectious diseases such as acute respiratory and gastro-enteral infections. The situation is exaggerated during the Hajj due to the close proximity of pilgrims, sharing of overcrowded accommodation, extreme environmental temperatures and a dusty environment (Benkouiten *et al.*, 2013; Memish *et al.*, 2014b). For instance, during Circumambulation of the Kaaba the average crowd density is often 6 persons per square meter and may be as many as 9 -11 persons per square meter (Gautret, Benkouiten, Al-Tawfiq *et al.*, 2015a). Evidence to effects of closeness on spread of infections was presented by studies conducted on attendants of the Hajj that showed an increasing prevalence of infectious respiratory diseases including Influenza virus, Rhinovirus, Streptococcus pneumonia, Tuberculosis, Cholera, Middle East respiratory syndrome coronavirus (MERS-COV), H1N1 influenza, and Brucellosis, Gastro-enteritis and skin infections (Al-Asmary, Al-Shehri, Abou-Zeid *et al.*, 2007; Alqahtani, Rashid and Heywood, 2015a; Benkouiten, Charrel, Belhouchat *et al.*, 2014b; Kandeel, Deming, Elkreem *et al.*, 2011). Benkouiten, Brouqui and Gautret (2014a) reported that during the 2012 Hajj, 90 percent of returning French Pilgrims presented with respiratory symptoms including a cough, sore throat, running nose and many other symptoms on their return from Hajj (Benkouiten *et al.*, 2014a). In the same study a high prevalence of respiratory diseases among Iranian, Malaysian and Indonesian pilgrims during the 2012 Hajj season was reported. In a retrospective study conducted via the Geo-Sentinel Surveillance Network on 25,867 returned international travellers, it asserts that annually, one third of international travellers present with infectious gastrointestinal diseases upon returning home from their travels (Swaminathan, Torresi, Schlagenhauf *et al.*, 2009). In an integrative literature review carried out by Gautret, Benkouiten, Sridhar *et al.* (2015b), it was shown that gastroenteritis and diarrhoea were the main gastrointestinal threats to the pilgrims during Hajj. These threats were found to be greater because of the pilgrims' poor knowledge about the

aetiology of the diseases (Gautret *et al.*, 2015b). In a prospective study conducted in 2005, Khan, Ishag, Ahmad *et al.* (2006) showed that cardiovascular diseases were the second cause of morbidity and mortality among pilgrims at Hajj. This is however a non-infectious condition and will not be discussed in this report. During Hajj health care workers especially nurses working in hospitals and clinics during the Hajj are also at risk of contracting infectious diseases which they in turn could spread (Shuman, 2013). The risks occur while the health care workers manage infected patients in out-patients' clinics as well as hospitals in Mecca. Shuman (2013) and Zumla, Hui and Perlman (2015) report that there has been an increase in the number of patients confirmed with Middle East Respiratory Syndrome Corona Virus (MERs-CoV) in Saudi Arabia. The incidence has increased from 114 cases in 2013 to 1180 in 2015 with 483 deaths in the Saudi Arabian hospitals positioned in the vicinity of the Hajj gathering. Respiratory diseases are the predominant health challenges faced by pilgrims and health care workers at Hajj followed by gastrointestinal diseases. After the 2012 Hajj season, a cross sectional study conducted among returning pilgrims to Ghana revealed a high prevalence of viral respiratory infections. About 77.6% of 839 pilgrims presented with Influenza A, Rhinoviruses and Respiratory Syncytial Viruses (Annan, Owusu, Marfo *et al.*, 2015). It has however been clearly illustrated in the literature that pneumonia is the most common cause of hospitalization during Hajj (Al-Gamdi, Akbar, Qari *et al.*, 2003). Pneumonia is a condition that increases the workload of both health facilities and healthcare workers, particularly nurses who are the core of Saudi Arabian preventive care and the nursing-based health care system (Al-gamdi,Akbar,Qari et al.,) Many patients with pneumonia are admitted to hospital thus having a direct effect on the cost to the local health services.

It is unquestionable that both importation and exportation of infectious diseases are highly significant at Hajj due to overcrowding conditions caused by the numbers of pilgrims as well as the health behaviour of the pilgrims. During mass gatherings, the possibility of importation and exportation of infectious diseases is high and this poses great challenges for the organizers and participants as well as health care providers especially as the diseases and their effects vary with location and type of the gatherings (Memish *et al.*, 2014b). These diseases are aggravated by factors that could be reduced by

effective health promotion on how to manage these factors such as extreme climatic conditions, crowd size, demographic profile of the participants, sensitivity of host environments and others (Gautret, Benkouiten, Sridhar *et al.*, 2015c; Lombardo *et al.*, 2008)

The transmission of infectious diseases during Hajj are facilitated by various factors such as accommodation in tents shared by as many as 80 people, food from street vendors, poor health literacy of pilgrims, poor condition of public toilets, and drinking of unpasteurized camel milk (Alqahtani, Sheikh, Wiley *et al.*, 2015b; Gautret, Benkouiten, Gaillard *et al.*, 2013; Gautret, Soula, Parola *et al.*, 2009b). For this reason, Saudi Arabia provides access for pilgrims to more than 9 well-resourced and equipped hospitals free of charge regardless of their reason for accessing the facility. Unfortunately for the Saudi Arabian government, some pilgrims attend Hajj specifically for free medical care when they contract diseases (Bakhsh, Sindy, Baljoon *et al.*, 2015). In addition to free medical services, Saudi Arabia provides protective measures against transmission of infections such as vaccination, wearing of facemasks and hand hygiene for the pilgrims to use during the Hajj (Alqahtani *et al.*, 2015a; Benkouten *et al.*, 2014a). These measures are used selectively by the pilgrims resulting in variability and inconsistency of compliance rate (Alqahtani, Wiley, Tashani *et al.*, 2016). The selectivity regarding the use of protective measures might not be unconnected to the manner in which the preventive measures and infection prevention education have been structured because during Hajj, health education is basically provided to pilgrims using pamphlet and evidence shows that most people do not like reading a pamphlet (Alqatani *et al.*, 2016). Berg, Hedelin and Sarvimäki (2005) argue that individualistic and behavioural health directed information is necessary for a holistic health promotion that could reduce infectious diseases and improve compliance with protective measures during community gatherings. Consequently the Jeddah Declaration of 2010 recommended that the "World Health Organization (WHO) should be solicited to adopt health education and awareness programs of mass gatherings that would be evidence-based, scientifically monitored and coordinated with member countries" (Memish and Alrabeeah, 2011:2). The Saudi Arabian health education and awareness program on mass gatherings was established in 2012 and is aimed at providing a promotive and preventive healthcare approach by participating countries as well

as health education to the pilgrims during Hajj in order to reduce selective utilization of the protective measures by the pilgrims (Memish *et al.*, 2014). The program should be nurse driven prior to and during Hajj in order to provide evidence based holistic health care awareness against infectious diseases during Hajj for the protection of pilgrims because nurses understand processes of modifying people's health-behaviour and thus, play a central role in preventive health and health promotion (Whitehead, 2001).

A central concern is that despite all efforts put in place for pilgrims' protection against infectious diseases, many pilgrims are reported to be poorly informed and selective with regard to the use of the infection protective measures. During Hajj, infectious diseases emerge and spread both locally and globally and become epidemic as seen in the outbreak of the 2001 and 2002 Meningitis epidemics. This was considered to be as a result of many pilgrims being poorly informed (Balaban, Stauffer, Hammad *et al.*, 2012; Yezli, Assiri, Alhakeem *et al.*, 2016). The manner in which protective measures are used remains a concern and the reasons for these pilgrims' actions of selective compliance remains unexplained in the most recent literature (Alqahtani *et al.*, 2016). Researchers such as Gautret, Soula, Delmont *et al.* (2009a); Memish (2002); and Sridhar, Belhouchat, Drali *et al.* (2015) have shown that this action of selective compliance is more common among French, Australian and Sub-Saharan pilgrims. These groups of pilgrims form the majority of those attending Hajj. Lack of education about the protective measures has been identified as the reason for this selective compliance with the protective measures by Rafiq, Rashid, Haworth *et al.* (2009) and Balaban, Stauffer, Hammad *et al.* (2013). This opinion was however discounted by the most recent studies of Alqahtani, Wiley, Tashani *et al.* (2016) and Gautret *et al.* (2009b) who identified that pilgrims are indeed aware of the measures and the perceived risks of respiratory infections. Selective use of these measures remains an important issue (Alqahtani *et al.*, 2015b,Gautret *et al.*, 2009a). Selective compliance regarding protective measures might be related to anecdotal studies that show that the users prefer measures that are based on individualistic and behavioural perspectives, strategies that look at and cover individuals' experiences and culture in order to increases compliance with the protective measures. In support of that, Benkouiten *et al.* (2014a) suggest that the extent to which

global and local public health security is being negatively affected during mass gatherings, requires something proactive to be done.

It is thus necessary for all stakeholders to participate in the preparation of the individuals who travel to mass gatherings such as the Hajj. The emphasis for the pilgrim should be on maintaining one's own health and observing measures put in place to maintain the health and safety of all attending the gathering (Berg et al., 2005). This approach would place the pilgrim at the centre of any services. The service should be nurse driven because nurses exhibit a holistic approach in health promotion and prevention and are also the first point of contact with the health services (Berg et al., 2005). Nurses also drive the infection prevention strategies and are responsible for maintaining the practice of Infection prevention and Control. The approach should be holistic and should provide care that takes the pilgrims' culture and religious beliefs into consideration in order to simplify measures and improve compliance during Hajj (Berg et al., 2005).

This study explored the health information needs of the pilgrims attending Hajj. It also explored what was required to reduce poor health practices. In addition, it looked at what would simplify and improve compliance with protective measures against infectious diseases before, during and after Hajj, in an attempt to minimize the spread of infectious diseases.

1.2 PROBLEM STATEMENT

During the Hajj, 2.5 to 3.5 million Muslims from all over the globe assemble in Mecca. Transmission of infection is difficult to control due to overcrowding, poor compliance with the infection prevention and control measures, unhygienic habits, shared and overcrowded accommodation and communal living. It is documented that there is an incidence of about 30% of pilgrims that are infected or contract infections during Hajj. This is augmented by the selective utilization of the existing protective measures and a poorly structured health education program using a pamphlet which pilgrims do not frequently read or are not interested in reading and remain unaware of what is

expected of them before and during Hajj with regards to their health (Al-Zahrani et al., 2007). This poses a health threat to the participants, the organizers and the countries of origin on the return of the pilgrims because most pilgrims do not read the pamphlets given before and during Hajj and thus, remain functionally ignorant about the protective measures such as vaccination, social distancing and use of face masks (Gautret *et al.,* 2009b). To prevent this threat to the pilgrims' health, efforts must be made to explore the health information needs of pilgrims wishing to attend Hajj in order to reduce poor health practices and improve compliance with existing protective measures against infectious diseases before, during and after Hajj.

1.3 PURPOSE OF THE STUDY

The purpose of this study was to explore the health information needs of the pilgrims attending Hajj so that, the information could be used to reduce poor health practices and improve compliance with protective measures against infectious diseases before, during and after Hajj in an attempt to minimize the spread of infectious diseases during the Hajj.

1.4 RESEARCH QUESTIONS

What are the health information needs of pilgrims attending Hajj.

1.5 OBJECTIVES OF THE STUDY

To explore the perceptions of illness in pilgrims who have attended Hajj and their infection prevention practices.

To explore the sources of the health information of people attending Hajj.

To explore the health information needs of pilgrims attending Hajj.

1.6 SIGNIFICANCE OF THE STUDY

The study is important due to the fact that the findings could be used to improve the pilgrims' level of health awareness and this may result in a reduction in the morbidity during Hajj.

The study may serve as a medium for drawing the attention of the Saudi Arabian Government and other countries whose citizens participate in the Hajj annually, to the need for collaborative intervention for the improvement of all pilgrims' level of health awareness.

Infectious diseases pose economic and other challenges to the Saudi Arabian Government, the countries of origin of pilgrims' and the pilgrims themselves. This is due to the cost of treating these conditions in countries where health care services and facilities are under sourced in many instances. Therefore, by exploring the health needs of the Pilgrims, this study will help in simplifying compliance measures and recommend ways of breaking the possible barriers to compliance. This will result in reducing the risk of contracting infectious diseases thus avoiding unnecessary health care costs by improving the health awareness level of the pilgrims on the importance of full compliance with the measures during the Hajj.

1.7 PARADIGMATIC PERSPECTIVES

Paradigm literally means a model, belief, pattern, world view or set of criteria, concepts or thoughts that guide how things are being done. In research, paradigms are defined by Weaver and Olson (2006) as sets of standards and rules or pattern of beliefs and practices that regulate and guide researcher's actions and beliefs within a field of study in order to enable someone to differentiate the actual from the non- actual aspects of the research. Paradigms have two research perspectives: positivist paradigm and interpretive paradigm. An interpretive paradigm was adopted for this study because it views reality and truth as creation of individuals that could only be known through an individual or individual groups' voices, concerns and practices (Michel, 2008; Weaver *et al.*, 2006). The interpretive paradigm shares a philosophical foundation with qualitative methodology on which this study is designed. It is chosen as the best paradigmatic perspective for this study because it gives

logical connection of concepts in a research study that assist in conceptualising a framework and guide a research approach (Pretoruis, Van Dyk, Small *et al.,* 2016) It also incorporates a nursing perspective and context to this research.

1.7.1 Meta-Theoretical Assumptions

Assumptions are generally defined as realistic beliefs, acts of faith, statements or principles that are accepted to be true but lack support of scientific or empirical evidence (www.slideshare.net 2013). In this study, assumptions were based on the interpretive paradigm that relates to the nursing profession based on the metaparadigm of four key concepts that define all nursing theories. These concepts are:

- **Person**

Nursing is essentially based on a nurse-client relationship. In nursing, a client means a person who is conceptualized as a unique being characterized by biopsychosocial and spiritual dimensions. A person is an open system that interacts and interfaces with their surroundings in the process of striving to maintain a healthy life. Modern nursing advocates the use of health promotion to empower and improve a person, a family unit, a community and/or a large gathering of people health awareness through health education. This helps in promoting positive persons behaviours in interacting with the environment (Arnold and Boggs, 2015). Health education is a powerful tool of health promotion in the prevention and protection of a person against the influence of infectious diseases while interacting with an environment. In this study, a person is a pilgrim who attends and participates in Hajj and may be challenged by infectious diseases due to overcrowding conditions. Pilgrim integrity and self-worth needs to be preserved and protected during Hajj by improving on pilgrim's health awareness.

- **Environment**

Environment refers to all the internal and external contextual factors of the person that intertwine with one another and render the person unable to live in isolation (Arnold *et al.*, 2015). It includes the cultural, social, physical, biological, technological, political, psychological, legal and economic conditions that influence the perception and behaviour of a person. In this study, the environment refers to the annual mass gathering of Hajj at Mecca in Saudi Arabia. Hajj is associated with

importations and exportations of infectious diseases due to overcrowding and poor health behaviour. As such, nurses work by empowering pilgrims before, during and after Hajj with individualized and holistic health promotion strategies in order to protect them from contracting infectious diseases during Hajj.

- **Nursing**

According to the International Council of Nursing(International Council of 2006) Nursing is defined as a discipline "encompassing autonomous and collaborative care of individuals of all ages, families, groups and communities, sick or well and in all settings." Donaldson and Crowley (1978) explain that provision of holistic care to the needy requires understanding of the principles, theories and laws that govern the manner and process of care in order to achieve an optimum outcome. This is supported by the Royal College of Nursing (RCN) in June 2004 that states provision of nursing care requires the use of clinical judgement (Sinyiza, 2016). By implication to the current study, it implies that nurses require evidence based knowledge derived from the individual perspectives on the best required health information needs of pilgrims for the promotion of their health in order to protect them against infectious diseases.

- **Health**

The term health is a multidisciplinary concept comprising of physical, psychological, environmental, sociocultural, developmental, biological and spiritual factors that must be maintained at an equilibrium for maximum quality of life (Arnold *et al.*, 2015). Maintaining and preserving and protecting a maximum quality of life incorporate the need for an effective health promotion programs that are individualized and holistic. This goal is achieved with the help of a well-planned and individualised reflected health education program. In this study, promotion and safeguarding public health is advocated because it is based on health promotion involving disease prevention and control that link person, environment, nursing and health together.

1.8 OPERATIONAL TERMS

- **Hajj** is the annual Islamic pilgrimage to Saudi Arabia that is performed by Muslims all over the world (Parker, 2010)
- **Health literacy** is the extent of an individual's ability for obtaining, processing and understanding basic health information (World Health Organization, 2014).
- **Infectious diseases** are diseases caused by pathogenic organisms which can be transmitted from one person to another through direct or indirect means (WHO, 2001).
- **Protective measures** – refer to both personal or pharmacological protective measures taken by people to mitigate the risks or prevent themselves from contracting infectious diseases (European Centre for Diseases Prevention and Control. Accessed: www.europa.eu).

1.9 OVERVIEW OF RESEARCH METHODS

1.9.1 Research Design

A qualitative and explorative approach was used in this study.

1.9.1.1 Qualitative design

Brink, Van der Walt and Van Rensburg (2012:121) define qualitative research design as a "broad range of research designs and methods used to study phenomena of social action and of which we do not have an understanding." This definition implies that qualitative studies aimed at providing an in-depth understanding of the research participants' life experience and beliefs about an issue of interest will be better understood through the research findings (Brink *et al.*, 2012; Polit and Beck, 2004). In this study, the findings and recommendations will provide an in-depth understanding of health information needed by pilgrims and this will help in the protection of pilgrims against infectious diseases during Hajj by simplifying and improving pilgrims' compliance with protective measures. This effort will also help in reducing the spread of infectious diseases during Hajj.

1.9.1.2 Explorative design

Explorative design is used in research studies where phenomena under investigation are not known or little is known about it. It also provides baseline data regarding phenomena under investigations in order to enable in-depth understanding and stimulate further investigations of the phenomena. This study planned to explore pilgrims' health information needs for the protection against infectious diseases during Hajj, and this could be used to develop a practical intervention that can improve and simplify compliance with protective measures by pilgrims during Hajj and reduces spread of infections at the event.

1.9.2 Research Method

Population

Population is a group of all human or non-human elements that are included in the researcher's interest on which to conduct a study (2013). In this study, the population covers all Muslims both females and males who are staff, students or visitors of the University of the Witwatersrand, Johannesburg.

Sample and Sampling

Sample is defined as a fraction of a whole of the mother population of elements that is selected by the researcher as a true representation of the mother population to participate in a research study (Brink *et al.*, 2012). Sampling refers to a process through which a researcher selects and forms an easily accessible group of elements to represent the population under investigation regarding phenomena of interest during the research stages (Brink *et al.*, 2012; Polit and Beck 2012). In this study, purposive sampling was used to select participants for the research. The sampling method was adopted because it gives the researcher flexibility to select participants based on their knowledge and experiences about the phenomena that the study wishes to obtain. The sample for this study included four groups, two each for male and two for female participants of the Muslim population worshiping at the University of the Witwatersrand Mosques. The sampling strategy used was as follows:

• Group A consisted of eight purposively selected married couples who had not attended Hajj within the last 8years.

• Group B consisted of five t purposively selected females who had not attended Hajj within the last 8years.

• Group C consisted of four purposively selected married couples who had attended Hajj..

• Group D consisted of five purposively selected males who had attended Hajj

This process was repeatedly conducted until data saturation was reached.

Setting and Site

The study was carried out in the Muslim community within the University of the Witwatersrand. This community was selected as it possessed the characteristics required, in other words, a mix of Muslims some who have not yet been and some of the members whom have been to Hajj. The study site included the two Mosques, one on Main campus and one at the Faculty of Health Sciences campus of the University of Witwatersrand.

1.9.2.1 Data collection

Data collection is "a systematic gathering of information relevant to the research purpose or specific objectives of the study" (Burns and Grove, 2007:536 as cited by; Sinyiza, 2016). In this study, data was collected using semi-structured questions (Appendix 1) with focus groups. A series of four focus group discussions were conducted, each lasting 40-60minutes using open ended and probe questions and guided by a formulated interview guide until saturation was reached. Four focus groups consisting of Muslim males and females who were a minimum of 18 years of age formed the focus groups. They were purposively recruited during Friday prayer meetings after obtaining permission from the Imam. The participants were then informed about the study. Those who voluntarily accepted to participate were grouped as outlined above and each group was invited to a focus group discussion. Discussions were digitally recorded and then transcribed verbatim.

1.9.2.2 Data Analysis

Data analysis is a scientific and systematic way of organizing, categorizing, ordering, manipulating, interpreting, summarizing, reporting and describing collected data into a meaningful structural form for an easy discussion of the research data (Brink *et al.*, 2012). In this study, the collected and transcribed verbatim data were analysed using Braun and Clarke's (2013) thematic analysis guide in order to establish the objectives of the study. Emerging themes were grouped using a step by step approach. This analysis consists of the following steps:

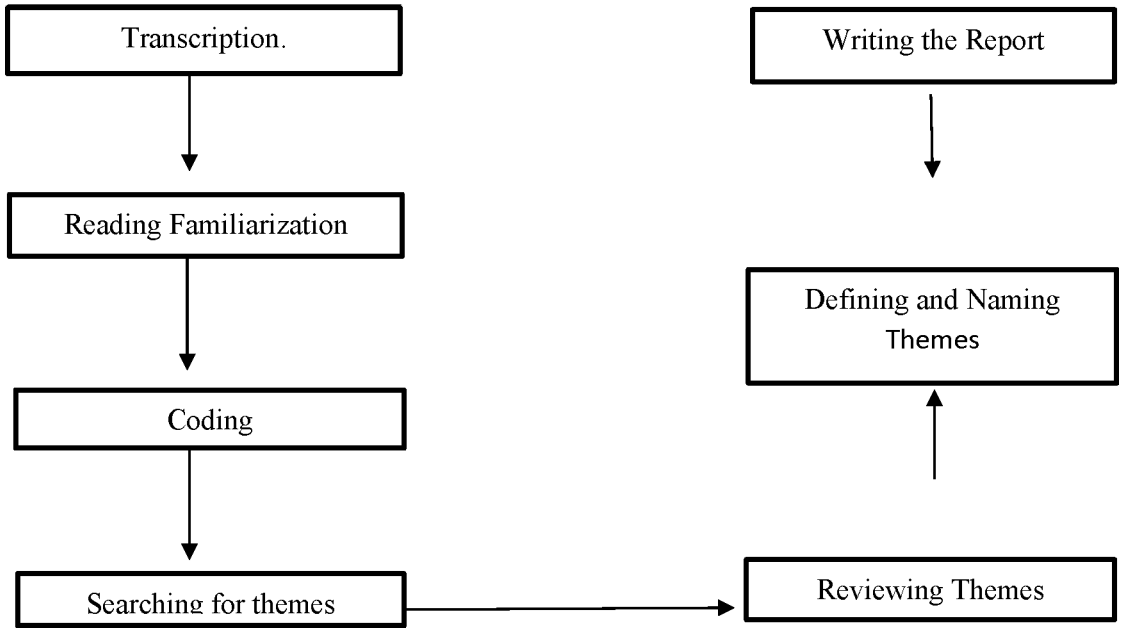

Figure 1.1 Braun and Clarke's (2013) steps of analysis

1.9.2.3 Discussion Guide

The study was guided by the method of data collection called focus group discussion. Data were collected using this method. During the discussions open ended questions and probes questions (see appendices 1) were put to the participants and their views, experiences, preferred health needs and perceptions were explored. This method was believed to be suited for this study because it allows for collective activity between the researcher and participants, an interaction that differentiated focus group discussion from a group interview method with the former being a group interaction (Krueger and Casey, 2002).

Open ended questions with probe questions were used in this study, and their use gave the participants ample opportunities to answer, qualify, clarify and raise important points in the details of the answers to questions presented to them by the researcher.

1.9.3 Ethical Considerations

Prior to commencing this study, approval to conduct the study was sought and obtained from the following committees.

- The research proposal was presented to the Department of Nursing Education for Peer review.
- Approval was obtained from Faculty Research University Postgraduate Studies Committee for permission to conduct the study.
- Ethical approval was obtained from the Human Research Ethics Committee (Medical) of the University of the Witwatersrand. Ethics clearance certificate **M160414**.
- Permission from the Deputy Registrar and Dean of Students Affairs of the University of the Witwatersrand to conduct the research was sought and obtained.
- Permission to carry out the research and use the data was obtained in writing from the participants (Appendix 6).
- Confidentiality would be difficult to ascertain in focus group interviews and thus, could not be guaranteed but anonymity was maintained by using codes to replace the participants' names at all times. Raw data was only known to the researcher and supervisor.
- Participants were told and reminded about their right to withdraw at any time during the research process.

1.9.4 Trustworthiness

It is a means of judging the soundness of qualitative research using the Lincoln and Guba's Model (1985) for guiding qualitative studies. Therefore, in this study, trustworthiness was established using four cardinal approaches to the model developed by Lincoln *et al.* (1985) and elaborated on by Shenton (2004). These approaches include credibility, confirmability, transferability and dependability and are vital in adding rigor and plausibility to the qualitative studies.

Credibility was ascertained using member checks which involved getting concordance between the recorded data and the transcribed data from the discussions of the research participants.

Confirmability was established by bracketing the researcher's assumptions if any, about the study's findings. Bracketing excludes bias emanating from the belief and attitude of the researcher (Shosha, 2012). In addition, an audit trail was also used to give a detailed description of the methodology such that the link from the data collection through the recommendations of the study could be traced by the study's readers.

Transferability was ensured using thick description which provided a detailed account of the field experiences of the participants. In addition, a peer review of the developed themes was conducted by the supervisor and senior researchers of the department.

Lastly, dependability might be difficult to ascertain because of the size and setting of this study although detailed expression of the processes within the study was reported so that future researchers would be able to conduct the research again using a similar sample (Loh, 2013; Shenton, 2004).

1.10 DIVISION OF CHAPTERS

The study comprises of five chapters categorized as follows:

- Chapter One - Overview of the study
- Chapter Two – Literature review
- Chapter Three – Study Methodology
- Chapter Four – Presentation of findings
- Chapter Five – Discussion of findings, Recommendations Limitations and Conclusion

1.11 SUMMARY

The chapter presented an in-depth overview of the study. This includes the background of the study, problem statement, purpose of the study, research question, research objectives and the significance of

the study. An overview of the research methodology, trustworthiness of the study and ethical considerations were presented. The assumptions and operational terms of the study were also defined. The next chapter will present a review of the literature.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

According to Cronin, Ryan and Coughlan (2008:43) "A literature review is central to the research process and can help refine a research question through determining inconsistencies in a body of knowledge, inspire new research innovations and ideas while creating greater understanding about a topic." The chapter provides the literature review and theoretical framework as regards to the study. In this chapter, detailed description of the mass gathering, hajj and protective measures were discussed.

2.2 SEARCH METHOD

The sources of literature reviewed included searching of various databases including Google scholar, Science direct, Elsevier, British medical journal, Scopus, Cinahl, Pubmed databases. Printed text books, e-books and electronic media reports were also searched. The searching was conducted using the search strings such as Hajj AND health education OR health risks behaviour of pilgrims OR Health problems associated with Hajj AND/OR Infectious diseases during Hajj among many strings. The searching was made open but most recent studies were selected. A few old studies which were not repealed or repeated recently were included. The majority of the literature accessed and analysed was internationally sourced and written by medical doctors with only a few from a nursing perspective.

2.3 OVERVIEW OF THE MASS GATHERINGS

An inclusive definition was given by the World Health Organization (WHO) as reported in studies that defined mass gatherings as a pre-planned or spontaneous public events attended by a sufficient number of people in a limited space for a specific period of time during which the planning and

response resources of a community, nation and state are strained (Lombardo, Sniegoski, Loschen *et al.*, 2008; Al-Tawfiq and Memish 2014).

It has been reported in a study conducted by Ahmed, Barbeschi and Memish (2009) that mass gatherings require a coordinated medical infrastructure and evidence based health education programme against infectious diseases that emanate from it. This is a necessity for all countries involved in any large events in order to collaborate with one another to prevent the spread of diseases. In this collaborative intervention, nurses should be at the centre because they provide holistic health promotion services that are derived from the individual and behavioural perspective (nurses' role) and health promotion is a nurse-based strategy of preventing and controlling diseases through empowering individuals with health information that could improve their awareness (Irven 2007).

Health promotion is vital in the prevention of importation and exportation of infectious diseases at mass gatherings. This problem which may occur at these events result from the congregation of people from various cultures, regions and nations (Memish and Alrabeeah, 2011; Memish, Zumla, Alhakeem *et al.*, 2014b).

During mass gatherings, the possibility of importation and exportation of infectious diseases is high and this poses great challenges for the organizers and participants as well as health care providers especially as the diseases and their effects vary with location and type of the gatherings (Memish *et al.*, 2014b). These diseases are aggravated by factors that could be reduced by effective health promotion on how to manage these factors such as extreme climatic conditions, crowd size, demographic profile of the participants, sensitivity of host environments and others (Gautret, Benkouiten, Sridhar *et al.*, 2015c; Lombardo *et al.*, 2008). Memish, Stephens, Steffen *et al.* (2012) argued that the impacts of these factors have a wide ranging effect from crowd management, security and emergency preparedness, trauma injuries to heat exhaustion, dehydration and infectious diseases, to name a few. For the purpose of this study, the concern was restricted to infectious diseases resulting from gastro-intestinal diseases, respiratory diseases and blood and body fluid infections. It has been demonstrated epidemiologically that the impacts of diseases vary with the type and location of mass

gatherings (Shibl, Senok and Memish, 2012; Yancey, Fuhri, Pillay *et al.*, 2008; Zuckerman, Bröker and Worth, 2010). For instance, sexually transmitted infections are very rare in religious gatherings but common in non-religious gatherings. During Islamic gatherings such as Hajj, intercourse is totally forbidden even among married couples. It is thought that this may have contributed to the cause of paucity of HIV prevalence in Saudi Arabia (Shibl *et al.*, 2012).

Preventing and reducing public health risks and maximizing people's safety at mass gatherings is a primary goal of public health professionals and organizers as well as global health authorities like World Health Organization (WHO). Achieving this goal requires an adequate planning and coordination of various strategies that are centred on health promotion because it requires a prompt outbreak investigation strategy, health education, community participation behavioural change and a triangular strategy for prevention and control of infectious disease (Al-Tawfiq and Memish, 2012; Al Turki, 2014; Povlsen and Borup, 2011). These strategies are essential in the prevention of infectious diseases such as respiratory tract infections. How the strategies are utilized during mass gatherings to achieve objectives depends on the type and location of the gatherings. Memish *et al.* (2012) speaks of gathering as large and small mass gatherings.

2.4 HISTORICAL OVERVIEW OF MASS MUSLIMS GATHERINGS

Mass Muslim gatherings are important events in the Islamic religion and tradition. Hajj is one of the most important gatherings.

Hajj is culturally, economically and geographically diverse. It is the oldest religious mass gatherings event known to mankind (Lombardo *et al.*, 2008; Memish *et al.*, 2014b; Shujaa and Alhamid, 2016). Participants from over 183 countries gather in one place.

This gathering gives exposes the participants to various conditions such as overcrowding, multi-ethnicity, diversity of health issues, extreme temperatures especially during summer months and many other conditions. A health concern to Saudi Arabia, potential pilgrims and international communities

is the possibility of disease outbreaks during Hajj. This is due to the number and diversity of people attending Hajj annually. Adequate planning against infectious diseases before, during and after Hajj should therefore be in place. The Hajj period increases the challenges due to the rituals of Hajj which necessitate pilgrims to be in close proximity with one another, with as many as 70-80 persons per tent and 5-7 persons per room. The large numbers put a strain on the available resources and make transmission of infectious diseases among pilgrims very easy. This is a great concern to the local and international public health organizations because it increases the ease with which infections occur.

Hajj raises fear and concern of the public health organizations due to the emergence of pathogenic and overcrowding related infections. Apart from the well-known respiratory and gastro-intestinal infections, outbreaks of viral haemorrhagic fevers and the newly emergent Zika virus raise additional concerns (Gatrad, Shafi, Memish *et al.*, 2006; Gautret, Benkouiten, Al-Tawfiq *et al.*, 2016). Therefore, adequate health promotional services based on the perspective of individuals need to be planned and implemented to curtail the possibilities of acquiring and spreading these pathogens.

2.4.1 Rituals of the Islamic pilgrimage (Hajj) which may increase possibility of infections

Hajj has rituals which bring masses close together thus increasing the possibility of cross infection during these rituals. For the reader who is unfamiliar with the rituals, the researcher has expanded on the process in order to give a better understanding of the risk of cross infection. The procession during this important Muslim gathering comprises of:

- Arrival – On arrival in Mecca, Saudi Arabia pilgrims start by performing lesser Hajj known as Umrah. This involves circumambulation of the building of Kaaba (Muslims' sacred house), Sa'I (Safa and Marwa) and the cutting of hair close to the scalp. Pilgrims then wait in Mecca until the Hajj period commences.

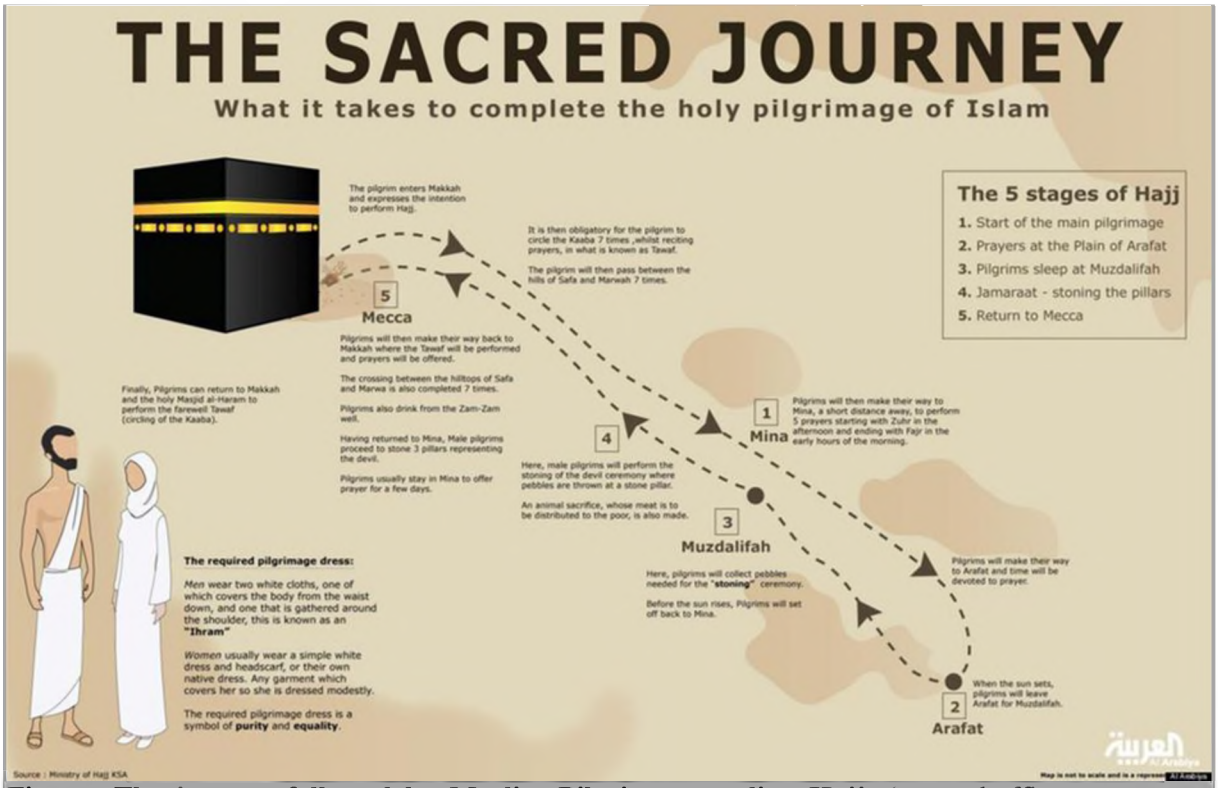

Figure: The journey followed by Muslim Pilgrims attending Hajj. (www.huffingtonpost.com 10/11/2013)

- Moving to Mena and Arafat - on the 8th of Dhulhijjah all pilgrims travel 5km to the plain of Mina by buses and camp in tents there overnight before moving to the plain of Arafat. At the Arafat, pilgrims supplicate and devote in an open space till sunset.
- Moving to Muzdalifah – Following sunset at the plain of Arafat, pilgrims move to Muzdalifah, a site between Mena and Arafat and stay there overnight in an open space. At Muzdalifah, pilgrims eat and drink from street vendors because they are the only available eateries. The next day, pilgrims walk to Mina from Musdalifah for pelting of the effigy of Satan.
- Once this ritual has been completed, they walk 5km to the Masjid-ul-Haram where pilgrims perform circumambulation and perform Sa'I. On completion of Sa'I, males go to the barbers and have their head shaven. Females only have to cut one lock of hair and often cut each other's hair. After shaving, both male and female pilgrims go to the abattoirs and offer sacrifice by slaughtering an animal, usually a sheep.
- On the 11th of Dhulhijjah, pilgrims go to the effigies of Satan and throw seven pebbles at the middle effigy of Satan, likewise on the 12th of Dhulhijjah pilgrims throw seven pebbles at the

small effigy of Satan. On the 13th of Dhulhijjah, pilgrims return to Mecca and wait for their return home (Farid, 1956; Parker, 2015).

During Hajj especially while performing the rituals, pilgrims come in close contact with one another and eat food prepared by street vendors. This raises concern for the public health security because many pilgrims know little about infectious diseases and may have pre-existing health conditions. For these reasons, nurses and other health care workers are brought in to provide health education, monitor compliance, provide emergency first aid and surveillance (Kemppainen, Tossavainen and Turunen, 2013). Whitehead (2001) however argues that health education is poorly presented and may not address health promotion and changes of poor health practices and behaviour. This is likely the reason for the poor outcomes of the strategy.

2.4.2 Profile of Hajj Pilgrims

Annually, more than three million pilgrims attend the Islamic pilgrimage with about 25% of them from Saudi Arabia and 75% from various other countries of the world. An anecdotal estimate of about 840,000 Asians, 700,000 Africans, 1,400,000 Arabians including Saudi Arabians and 240, 000 Europeans attend Hajj annually. An estimated 70% of pilgrims are found to be between 45-75years of age and 80% of them have pre-existing health conditions that could be exacerbated by extreme temperature and overcrowding (Memish, McNabb, Mahoney *et al.,* 2009). This group of people is prioritized locally and globally because of their vulnerability and liability to illness. For this reason, promoting their health is paramount in order to prevent and protect them from becoming objects of disease importation and exportation during and after Hajj (Al-Tawfiq and Memish, 2015; Memish *et al.*, 2014b).

The 20th century brought with it a lot of technological advancements but also the emergence of new diseases to communities. The advancements include invention of aeroplanes which makes travel to Hajj easier and increases the numbers of participants annually thus causing an increased pressure on resources such as ablution facilities (Parker, 2010; Shafi, Booy, Haworth *et al.*, 2008; Shujaa *et al.*,

2016). Memish *et al.* (2014b) observed a perpetual increase in the number of pilgrims attending Hajj from 58, 584 in 1920 to 3, 161,573 pilgrims in 2012. This is a concern because of the potential risks of disease spread due to overcrowding. Sometimes there is at least seven persons standing within a square meter (Memish, McNabb, Mahoney *et al.*, 2009). This exceeds the safe distance of 1.5meter as referred to by World Health Organization (WHO 2004).

2.5 IMPACTS OF MASS GATHERINGS ON HEALTH SYSTEMS

Mass gatherings generate a lot of positive and negative effects on host communities. These effects are grouped into classes which impact on economic, environmental, political and health issues (Kim, Gursoy and Lee, 2006).

Prior to the events, the host community engages in planning and preparation of the health systems. For instance, prior to the 2010 world cup, South Africa examined the preparedness of their health care system. Particular attention was placed on the emergency services and disaster preparedness (Desai and Vahed, 2010; Yancey *et al.*, 2008). The planning includes prior preparation of emergency services and hospitals in order to deal with mass admissions or outbreaks of communicable diseases in large numbers. Preparation relating to the prevention and control of infections are put in place, including employment and deployment of health care personnel to Mecca, Medina, Mina, Arafat and Muzdalifah which are the areas for the spiritual activities during Hajj. In addition, renovation of healthcare delivery centres and provision of drugs, necessary facilities and equipment are also arranged prior to Hajj.

The negative effects of preparation of Hajj also impact on economic and health issues. The traffic congestion results in the emission of halocarbons, carbon monoxide, volatile organic compounds into the atmosphere polluting the natural air and the environment. The increase in pollution in turn increases the participants' risk of contracting respiratory diseases, mainly contagious, as well as non-infectious conditions like cancer (Kim *et al.*, 2006; Noweir, Bafail and Jomoah, 2008; Simpson, Aburizaiza, Siddique *et al.*, 2014). Vehicular emitted pollutants intensify during mass gathering.

Halocarbons and volatile organic compounds result in the increased level of benzene and carbon monoxide and are associated with increased risks of leukaemia and heart failure respectively (Chamsi-Pasha, Ahmed and Al-Shaibi, 2014; Simpson *et al.*, 2014). This is confirmed by a study which reported WHO's assertion that more than one million people die prematurely because of the environmental air pollution that intensifies during mass gatherings (Simpson *et al.*, 2014).

Mass gatherings also affect the health and wellbeing of host communities. During the events, host communities are faced with the same pollution challenges as well as additional health challenges due to overcrowding and increased negative human attitudes among many (Simpson *et al.*, 2014). The overcrowding influences sexually transmitted infections and blood borne infections which become prevalent and spread locally and internationally. The massive influx of people has an impact on accommodation and ablution facilities. The latter become inadequate and poorly maintained. The overcrowding and poor sanitation creates a perfect environment for respiratory tract and gastrointestinal infections to spread easily among the participants as well as to local and eventually international communities (Alqahtani, BinDhim, Tashani *et al.*, 2015a; Benkouiten, Charrel, Belhouchat *et al.*, 2014b; Gautret, Botelho-Nevers, Brouqui *et al.*, 2012; Parker, 2010).

2.6 PROBLEMS ASSOCIATED WITH HAJJ AND CAUSES FOR PUBLIC HEALTH CONCERN

Hajj poses enormous challenges with regards to infectious diseases. Protection of the lives and health of pilgrims from the risks of contracting infectious diseases is paramount (Memish *et al.*, 2014b). Benkouiten, Charrel, Belhouchat *et al.* (2013a) argued that Hajj is associated with infectious diseases, an argument supported by Al-Tawfiq and Memish (2014) who state that Hajj is a good and favourable breeding site for overcrowding associated infectious diseases. There are many infections at Hajj, but the most commonly reported are respiratory, gastrointestinal and blood-borne infections. The respiratory tract infections are the most frequently reported, and include Tuberculosis, H1N1 Influenza, Middle East Coronavirus and many others (Memish *et al.*, 2014b). In addition, there is Meningitis which is contracted through droplet secretion and close contact with the carrier. Cross

infection of respiratory infections and meningitis are aggravated by close proximity of pilgrims with one another. This may result in importing and exporting of these infectious diseases to other areas and countries. For instance, in the 2000 and 2001 Hajj seasons thousands of people suffered Meningitis globally because of the epidemic outbreaks that started at the Hajj (Yezli, Assiri, Alhakeem et al., 2016). Acquiring and spreading of infectious diseases during Hajj is very easy because pilgrims stay in a confined area of a few kilometres (Yezli, Assiri, Alhakeem *et al.,* 2016). The likelihood of acquisition and transmission are high especially during overcrowded activities like circumambulation of the Kaaba, Sa'I and in the tents at Mina. Pilgrims return home frequently with infections (Parker, 2015). Generally, the most common infectious diseases associated with the Hajj are grouped into four classes as shown below. These infections are generally diseases preventable by vaccines and hygienic behaviour related infections (Alqahtani *et al.*, 2015a; Gautret *et al.*, 2012) . They are:

- Respiratory Tract Infections
- Gastrointestinal tract infections
- Blood Borne infections
- Diseases due to pre-existing health conditions

2.6.1 Upper and lower respiratory tract infections

Respiratory tract infections are those infections affecting the sinuses, throat, airways and lungs. Respiratory tract infections are the most frequently reported diseases by pilgrims, a situation linked to overcrowded conditions (Al-Ghamdi, Akbar, Qari *et al.*, 2003; Benkouiten, Gautret, Belhouchat *et al.*, 2013b; Parker, 2015). These infections are caused by a wide range of viral and bacterial pathogens. They are classified into two classes; the upper respiratory tract infections affecting nose, sinuses and throat and the lower respiratory tract infections affecting the airways and lungs. The infections are mostly viral, with Influenza virus as the most frequently reported cases related to upper respiratory tract, followed by Respiratory Syncytial Viruses, Rhinovirus and Adenoviruses (Benkouiten *et al.*, 2013b).

Lower respiratory tract infections are those that affect the lower airways and the lungs. They are mainly caused by bacteria, and include Streptococcus pneumoniae, Mycobacterium tubercle, Staphylococcus aureus and exacerbated pre-existing conditions such as Bronchial Asthma, Chronic Obstructive Pulmonary diseases (Al-Ghamdi *et al.*, 2003; Benkouiten *et al.*, 2013b).

Respiratory discomfort is the frequent complaint of pilgrims and laboratory investigations conducted reveal different kinds of bacterial and viral pathogens as the major causes of the discomfort The pathogens include Streptococcus pneumoniae, Staphylococcus aureus for bacterial infections while MERS-CoV and Non-MERS-CoV (Haemophilus Influenza, Influenza A H1NI, Coronaviruses (229E AND OC43), Rhinoviruses) for viral infections. The Non-MERS-CoV are isolated often during Hajj and examples include Rhinoviruses, influenza viruses and coronaviruses (Annan, Owusu, Marfo *et al.*, 2015; Gautret, Benkouiten, Al-Tawfiq *et al.*, 2015a; Memish, Assiri, Turkestani *et al.*, 2015).

Nasal carriage of the respiratory pathogens has been debated as the major contributing factor for the perpetual increase in respiratory cases at Hajj despite the measures put in place by the Saudi Arabian Government for pilgrims' protection against the infections (Benkouiten *et al.*, 2014b). In addition, some pilgrims harbour infections and act as asymptomatic reservoirs that shed the pathogens during Hajj. For this reason, local and international public health organizations are concerned and fear the possibility of epidemic outbreaks of the newly emerging deadly strains of respiratory infectious pathogens like Acute Severe Respiratory Syndromes, Middle East Respiratory Syndrome Coronavirus (Gautret *et al.*, 2016). This concern is necessary since importation and exportation of the infections are deadly, costly and can easily spread in an overcrowded environment such as mass gatherings like the Hajj. In addition to this, the nature of the rituals and age of the participants are also aggravating factors for spread of infections because the majority of pilgrims were older, poorly health literate, unhygienic and did not comply with the protective measures in place (Benkouiten *et al.*, 2014b).

Incidence and variety of respiratory infections

Contraction and dissemination of respiratory infectious diseases at Hajj are amplified by inevitable overcrowding resulting from the massive influx of people who are poorly utilizing the health promotion services put in place. In a study conducted on 1206 pilgrims comprising of 84.2% Africans and Asians and 15.6% Europeans and Americans during the 2013 Hajj, a significant increase in the prevalence of respiratory tract infections was seen between paired cohorts of the pre-Hajj and post-Hajj pilgrims (Memish *et al.*, 2015). A similar report by Parker (2015) indicates that respiratory tract infections' clinical signs and symptoms manifest in 1:3 pilgrims during and after Hajj. In a study conducted by Alzeer (2009), it was found that influenza is the most common upper respiratory infection and pneumonia is most common cause of hospitalization during Hajj. Studies conducted among Iranian Pilgrims have found an increase in the prevalence of influenza. Illness among returning Iranian pilgrims after Hajj showed a 50% increase in recorded cases of influenza like illnesses in 2005 when compared to the cases recorded in 2004 Hajj season (Moattari, Emami, Moghadami *et al.*, 2012; Parker, 2015).

In an effort to determine the risks of exporting infections from Hajj, a study conducted on Pakistan's pilgrims reported that the incidence of influenza in vaccinated versus unvaccinated pilgrims was 36% of vaccinated pilgrims and 62% of unvaccinated pilgrims complained of influenza like illness on their return from Hajj (Qureshi, Gessner, Leboulleux *et al.*, 2000). In another study, it has been reported that there are different kind of influenza Virus' strains documented over the years and this might be the reason behind contracting influenza in spite of being vaccinated as well as the cause for its uncertainty of efficacy (Alzeer, 2009). In the same study, it was reported that United Kingdom pilgrims have the highest prevalence rate of Rhinovirus whereas Saudi Arabian Pilgrims have a high incidence of influenza. In the year 2003, United Kingdom pilgrims presented an unusual prevalence rate of 30% and 40% influenza like illness cases by the vaccinated and unvaccinated pilgrims respectively (Alzeer, 2009; Parker, 2015; Rashid, Shafi, Haworth *et al.*, 2008).

Interestingly the highest incidence of rhinovirus was seen to be due the fact that United Kingdom pilgrims spend more time in the Holy Mosques, a place that is ventilated with air conditions (A.C). The unusually large number of cases of influenza recorded in 2003 were related to the variability and mismatching of vaccines to the influenza virus strain (Alzeer, 2009; Rashid *et al.*, 2008). It has been postulated that Saudi Arabia and countries such as Nigeria are at great risk of contracting influenza virus and creating an influenza epidemic (Alzeer, 2009; Parker, 2015; Rashid *et al.*, 2008). For this reason, Rashid *et al.* (2008) argued that an effectively planned health education program on the prevention of infectious diseases during Hajj could improve pilgrims' awareness about the infectious diseases and boost compliance with protective strategies.

In South Africa, cases of upper respiratory tract infections are the most frequently reported on returning home from Hajj. Parker (2015) found that pilgrims had an incidence rate of 52%, 40% and 9.4% of influenza upon returning home from 2008, 2010 and 2013 Hajj seasons respectively. The sharp decrease was thought to be due to the pre-travel vaccination with influenza vaccine. Use of influenza vaccine among South African and United Kingdom's pilgrims is highly applauded compared to the compliance of Saudi Arabian pilgrims in using the influenza vaccination (Gatrad *et al.*, 2006; Rashid *et al.*, 2008).

The rate of non-compliance to using influenza vaccine is very high among many countries and consequently heightens the rates of nasal carriage and infection in pilgrims upon returning to their various countries of origin. This is a problem that may lead to a global epidemic of influenza (Gatrad *et al.*, 2006). In the year 2009, H1N1 influenza was imported from Mexico through Jordan into Saudi Arabia. It resulted in a total of 26 secondary confirmed cases of A/H1N1Influenza among pilgrims attending lesser Hajj. For this reason, an influenza vaccination was introduced into the visa requirement for pilgrims by the Kingdom of Saudi Arabia in the same year (Kandeel, Deming, Elkreem *et al.*, 2011; Memish *et al.*, 2014b). The new policy was introduced for pilgrims from "high risks" countries and pilgrims with a chronic pre-existing condition. Many pilgrims from the developing countries of Africa, Asia and Saudi Arabia do not comply with the new recommendations.

They also refuse to use facemasks during Hajj because they believe it is prohibited, a response Islamic teachers have queried (Gatrad *et al.*, 2006; Gautret, Soula, Parola *et al.*, 2009b; Memish, 2002).

In 2009 during the Mexican H1N1 pandemic, 60% of French pilgrims hospitalised on return from Hajj were found to have acute respiratory infections such as Rhinovirus and Adenoviruse. Pilgrims were found to be poor literate about protective measures against Hajj related infectious diseases. They were not given pre-Hajj health education (Gautret *et al.*, 2009b). In another study, it was found that an average of 60% of French pilgrims report a regular "Hajj cough". A Hajj cough is related to the crowded conditions at Hajj and over use of antibiotics among most of the affected pilgrims (Gautret, Benkouiten, Griffiths *et al.*, 2015b). In a similar vein, Gautret, Benkouiten, Gaillard *et al.* (2013) argued that most of the infections are not due to lack of protective measures, rather poor compliance with the measures and unhygienic health habits that predominate pilgrims' behaviour.

Another cause for increasing concern was the emergence of MERS-CoV in 2012 in Jordan. The disease is believed to be hosted by Arabian Camels called Dromedary camels. How the virus spread to humans is still unknown? However, anecdotal studies asserted that drinking of the camels' unpasteurized milk is the source through which the virus has moved to humans. In support of this assertion, studies conducted on pilgrims showed that drinking of the camels' unpasteurized milk is a common practice of the pilgrims. (Gautret *et al.*, 2013; Shuman, 2013; Zumla, Hui and Perlman, 2015a). In addition laboratory studies conducted in Spain and Oman on the camels showed that many tested positive for MERS-CoV antibodies, an indication of an infection with the virus (Faure, Poissy, Goffard *et al.*, 2014). In 2013 and 2014, a total of 114 and 180 cases of MERS-CoV were documented by WHO but none was seen in pilgrims (Memish, Assiri, Almasri *et al.*, 2014a; Shuman, 2013; Zumla *et al.*, 2015a). Concern has been raised of an epidemic threat to global public health due to serious dangers associated with MERS-CoV and poor health information regarding prevention of infections in the majority of pilgrims. To date no Hajj-associated case has been reported (Zumla *et al.*, 2015a). For this reason, in the 2013 Hajj season, pre and post Hajj screening was conducted to determine the rate of nasal carriage of MERS-CoV among pilgrims from five continents including Asia, Africa, Europe. The result obtained was insignificant (Gautret *et al.*, 2015a; Memish *et al.*, 2014a). Cases of

the virus have been seen among non-Hajj travellers in United Kingdom, France, Middle East, Italy and Germany but no case has been reported from Sub-Saharan Africa in spite of close contact with camels both at home and during Hajj (Memish *et al.*, 2014a; Zumla, Rustomjee, Ntoumi *et al.*, 2015b). In Ghana, a study was conducted in 2013 and no case of MERS-CoV has been reported from the returning pilgrims despite an increase in the prevalence of viral respiratory infections among the returning pilgrims (Annan *et al.*, 2015). Thus no case of MERS-CoV associated with Hajj has been reported from Africa.

Pilgrims do not fully comply with protective measures put in place such as vaccination against diseases like influenza and pneumonia and difficulty associated with accessing the vaccines by pilgrims also contribute to the poor compliance. However, significant compliance was seen with regards to yellow fever, meningitis and polio vaccines because these vaccines are necessary for issuing of entry permits into the Saudi Arabian territory (Memish *et al.*, 2009). Alqahtani, Wiley, Tashani *et al.* (2016) found that Australian pilgrims do not make use of Pneumococcal vaccine, a vaccine that provides protection against the most common cause of hospitalization during Hajj. Benkouiten *et al.* (2014b) found that a pneumonia causing organism has high chances of being acquired and transmitted amongst pilgrims and this is the reason that pneumonia caused 50% of the Intensive Care Unit admissions annually during Hajj.

In a pre-Hajj and post-Hajj screening of 129 pilgrims in the year 2014 a marked variation was shown with pneumonia pathogens being prevalent in the post-hajj screening (Benkouiten *et al.*, 2014b). In the same study, it is argued that the discrepancy between the pre-Hajj and post-Hajj cases was due to poor usage of the pneumococcal vaccine, non-use of face masks and poor health hygiene among pilgrims. A similar study reports that pneumonia accounts for 30-40% of the total admission into tertiary hospitals in Saudi Arabia during Hajj annually because of the poor health literacy, advanced age of pilgrims, poor hygiene and unwillingness to make use of the protective measures in place (Gautret *et al.*, 2015b).

Although Meningitis is a disease of the central nervous system it is discussed under the respiratory system because it spreads via respiratory secretions and in the same manner as respiratory conditions. It spreads when pilgrims live in close proximity with infected individuals through droplet respiratory secretions. Caused by a bacterium there are four strains of meningitis, W135, Y, C and A (Memish *et al.*, 2014b).

Bacterial meningitis is an inflammation of the meninges caused by a bacterium called Neisseria meningitides. The organism is exclusively a human pathogen that is carried asymptomatically in the nasopharynx of about 10% of humans during non-epidemic periods (Yezli, Assiri, Alhakeem *et al.*, 2016). It spreads rapidly and easily in overcrowded conditions where people are in close contact with each other. Six of 13 strains are more pathogenic and cause disease globally (Yezli *et al.*, 2016). . Discovered around the middle 1700s, its first outbreak was in Geneva in 1805 while in Saudi Arabia, meningitis dated back to the 1987 Hajj season when an infected Asian pilgrim attended the Hajj and spread it to many pilgrims whom further disseminated the disease to their various countries of origin on returning home. As a result, a global outbreak occurred affecting returning pilgrims and people of their countries (Yezli *et al.*, 2016). Subsequent outbreaks occurred in the 1992 and 1994 Hajj seasons. Meningitis outbreaks were seen in Zambia and Central Africa over the years. This was transmitted to Mecca by pilgrims for Lesser Hajj (Umrah) in the same year (Yezli *et al.*, 2016). The worst of all the Mecca outbreaks were the 2000 and 2001 epidemics. In the year 2000 more than 400 cases were reported affecting Pilgrims and their close contacts in 16 countries. Laboratory investigations conducted showed that 99.5% of the cases were caused by W135 strains (Yezli *et al.*, 2016). After the 2001 outbreak, in its effort to eradicate and prevent the importation and exportation of this disease, Saudi Arabia enforced Meningococcal Vaccination as one of the requirements of entry to the Kingdom and since then, no case has been reported at Hajj.

2.6.2 Gastrointestinal tract diseases

In the past, gastrointestinal tract diseases were the leading causes of morbidity and mortality of pilgrims during Hajj. Today gastrointestinal diseases are third on the list of infectious diseases faced by pilgrims during Hajj. Prior to 1990, outbreaks of gastrointestinal diseases such as cholera, food poisoning and diarrhoea were frequent, affected large numbers and affected more female than male pilgrims. People from developed countries suffer more whilst those from developing countries suffer less (Swaminathan, Torresi, Schlagenhauf *et al.*, 2009). This could be related to the manner in which food is prepared in developing countries thus giving those from these countries natural immunity against this group of infections.

During Hajj, pilgrims face a lot of challenges due to poor handling of food by cafeterias and road side vendors. Poor environmental hygiene of the cafeterias, Pilgrims' dependency on eating from street vendors, consumption of leftover food and unpasteurized camel milk and the pilgrims' poor health information regarding infection prevention have been reported as common behaviour and the source of gastrointestinal tract infections (Gautret *et al.*, 2015c; Gautret, Soula, Delmont *et al.*, 2009a; Khan, Ishag, Ahmad *et al.*, 2006). The likelihood of cholera is poor with its last outbreak in 1968 Hajj season. This is possibly related to the improvement in the sanitary conditions of Saudi Arabia as a whole (Gautret *et al.*, 2015c).

In 1989, a total of 102 cases of Cholera were recorded during the 1989 cholera outbreaks at Hajj and since then, only few cases have been seen among groups of pilgrims with the recent cases in 2004 and 2011 diarrhoea outbreaks among Saudi Soldiers in Mina and Iranian Female pilgrims respectively (Gautret *et al.*, 2015c). Food poisoning, diarrhoea and gastroenteritis remain threatening infections for global health security during Hajj (Gautret *et al.*, 2015c).

Recent Literature shows that there is a marked difference between the Saudi Arabian sanitary conditions before 1989 and the present due to improvements (Gautret *et al.*, 2015c; Gautret *et al.*, 2009a; Parker, 2010). New vaccinations against Hepatitis A virus is highly recommended by the Saudi Arabia government. Parker (2010) argued that Hepatitis A is the most common vaccine

preventable disease faced by international travellers and reported that South Africa and Saudi Arabia are two countries in which the vaccine is regularly used. In the same study, it has been reported that the prevalence of Hepatitis A is high among South Africans of lower socioeconomic class. However, this has not been the case in the South African Muslims' community possibly because it is a small community comprising mainly Indians and Coloureds who are vaccinated prior to departure in spite the low prevalence rate of Hepatitis A among them. Sustaining this attitude is reliant on infection control nurses who are centred in health education and promotion, to educate and encourage continuation.

2.6.3 Blood-borne infections

These are infections caused by viruses that usually spread via contamination by blood and body fluids. Examples of these include HIV, hepatitis B, Viral haemorrhagic fevers such as Ebola, Dengue and Lassa, Yellow Fevers and others. Pilgrims are exposed to these infections when shaving their heads particularly when using unlicensed barbers who re-use blades (Al-Tawfiq *et al.*, 2012).

Shaving of hair is a ritual that marks an end to the religious rituals of Hajj. In observing this ritual, male pilgrims shave their heads while female pilgrims cut one inch off their hair length. Male pilgrims are faced with the possibility of contracting blood-borne viruses such as Hepatitis B and C viruses (Ahmed, Arabi and Memish, 2006; Shibl *et al.*, 2012). Though it has not been established that these infections are transmitted at Hajj, risks of acquiring them are increased, due to illegal operating of unlicensed barbers who re-use blades (Al-Tawfiq *et al.*, 2012; Shibl *et al.*, 2012). For this reason, the Kingdom of Saudi Arabia has introduced various policies and legislations that restrict unlicensed barbers from operating however some continue to operate in defiance of the Kingdom's rules (Al-Tawfiq *et al.*, 2012).

Saudi Arabia is known to harbour some vectors and is the origin of Alkhurma haemorrhagic fever Virus. The vectors which are mostly Mosquitoes such as Culex, Aedes aegypti and Anopheles transmit diseases like West Nile Virus, Arboviruses (Yellow fever, Dengue Fever, Zika Virus among

others) and Malaria (Al-Tawfiq *et al.*, 2012; Al-Tawfiq *et al.*, 2015; Memish *et al.*, 2014b; Shibl *et al.*, 2012). A study reported that outbreaks of Dengue fever occurred in Saudi Arabia in 1994, 2008 and 2010 with a total of 35000 confirmed infections and 212 cases of death due to Dengue haemorrhagic fever (Shibl *et al.*, 2012). In the same study, it was reported that Alkhurma haemorrhagic fever virus was discovered in 1995 in Saudi Arabia and it is not yet known if it can be transmitted via human to human because most of the cases were linked with ingestion of unpasteurized camel milk. In the years 2001 to 2003, a total of 20 confirmed laboratory recorded cases were identified and since then, the confirmation of the virus is strictly controlled (Shibl *et al.*, 2012). The risks of contracting other diseases such as Malaria and Yellow Fever virus are high. Malaria was first seen in Mecca in 625AD during the Hajj season. Subsequent cases have been reported and it was observed to be 50% imported cases annually (Parker, 2010; Shibl *et al.*, 2012).

2.6.4 Diseases due to pre-existing health conditions

The climate in Saudi Arabia is considered hot with an average temperature of 22-31 degree Celsius in winter and 28-44 degree Celsius in summer. When Hajj falls in summer, the extreme temperatures cause heat stress which makes pilgrims sweat profusely and dehydrate thus making them unable to perform Hajj. Pilgrims develop skin rashes and muscle cramp and sometimes cases of heat stroke were reported among the pilgrims (Noweir *et al.*, 2008). Generally, excessive heat exacerbates pre-existing health conditions, commonly cardiovascular diseases, renal diseases, dermatological diseases and endocrine disorders like diabetes mellitus. Cardiovascular diseases are the most reported causes of disorders secondary to heat stress. As such they are thus are the third most common cause of morbidity and mortality during Hajj with acute coronary heart diseases, stroke and hypertension most frequently seen (Chamsi-Pasha *et al.*, 2014; Khan *et al.*, 2006). Diabetes Mellitus is also exacerbated during Hajj due to effects of the excessive heat. Since the immune system is compromised in all of the above, the pilgrims are rendered susceptible to infections. It has been found that pilgrims with hypertension or diabetes mellitus have a high risk of being infected with respiratory infections during

Hajj (Gautret *et al.*, 2015b). Evidence to this is the high prevalence of a regular ''Hajj cough'' among pilgrims with diabetes mellitus and moderate to severe hypertension(Gautret *et al.*, 2015b) .

2.7 PREVENTIVE STRATEGIES

Promotion of pilgrims' health during Hajj is an integral objective of the Saudi Arabian Ministry of Health, pilgrims' countries of origin and Local and Global public health organizations, in order to maximize pilgrims' productivity during and after Hajj through ensuring that any public health risks are reduced to a minimal level. Promotion of Health is a nursing based strategy for reducing risks of importing and disseminating infectious diseases in communities and gatherings. In achieving that, highly skilful, multi-disciplinary, competence and clients-focused nurses are necessary because nurses' roles in infection prevention are essential. Such roles include:

- Assisting clients in making decisions about their health status.
- Providing health education on the importance and ways of promoting health.
- Using health surveillance strategy to protect and prevent individuals and communities against infectious diseases
- Supporting clients in engaging with health promotion activities
- Providing a holistic and client-oriented health promotional care services. (Kemppainen *et al.*, 2013).

In the prevention and control of diseases at Hajj through health promotion, the Kingdom of Saudi Arabia comes up with two major strategies: Pharmacological and Non-pharmacological strategies.

2.7.1 Pharmacological Strategy

This strategy comprises of vaccination requirements, administration of prophylaxes and a widespread vector control program (Memish *et al.*, 2014b).

- Vaccination

Vaccination against infectious diseases during Hajj yields a great result despite poor pilgrim compliance with some of the vaccines. The Kingdom enforces vaccines against yellow fever, meningitis and seasonal influenza as requirements for issuing an entry visa into Saudi Arabia for Hajj. It is recommended in the international health regulations of 2005 that all travellers departing disease belts or areas at risk of yellow fever, meningitis and/or influenza must present a valid vaccination certificate against such disease (World Health Organization, 2005). Based on these regulations, Saudi Arabia amended the entrance visas appropriately (World Health Alqahtani *et al.*, 2016; Organization, 2005; Parker, 2010). Significant compliance has been recorded on the four enforced vaccines however compliance with the remaining vaccines such as pneumococcus and hepatitis is lacking. Evidence of the significant compliance was reported by various studies (Al-Tawfiq, Gautret, Benkouiten *et al.*, 2016).

Therefore, exploring the needs of pilgrims regarding prevention of infectious diseases and improving compliance with protective measures during Hajj becomes an important aspect of the infection prevention nurse in any country. It was argued that health education and promotion are two roles of infection control nurses that could improve pilgrims' awareness, diseases prevention strategy and adherence to safe and protective practices as well as modifying pilgrims' belief (Bosch-Capblanch, Abba and Prictor)

- Administration of Prophylaxes

At the point of departure or entry into the Saudi Arabia, Ciprofloxacin tablets are given to pilgrims especially those from meningitis belts. This drug is given prophylactically in case of nasal carriage of meningitis among pilgrims in order to prevent cross transmission (Memish *et al.*, 2014b; Parker, 2010). The strategy greatly reduced carriage rates during the 2003 Hajj season and also has prevent any further outbreaks since 2001 (Parker, 2010).

- Widespread Vector Control program

It is an integral part of preventing infectious diseases through the use of insecticides to kill diseases vectors such as mosquitos. Prior to Hajj, the Saudi Arabian Government sprays housing units allocated for pilgrims from yellow fever and dengue fever endemic countries. In addition government departments and tents at the holy sites are sprayed and an aerial spray over Arafat, Mina and Muzdalifah is carried out (Memish *et al.*, 2014b).

2.7.2 Non-pharmacological Strategy

This strategy involves measures such as hand hygiene, appropriate use of facemasks, social distancing, surveillance, health education and awareness and lastly administrative advice and recommendations.

- Hand Hygiene

Hand hygiene is the central point of preventing infectious diseases and it includes appropriate use of hand washing and antiseptic hand rubbing (Wenzel, Brewer and Butzler, 2002). In a study conducted among Hajj medical mission personnel, it has been found that antiseptic hand rubbing is more effective for infection control than the other forms of hand hygiene (Al-Asmary, Al-Shehri, Abou-Zeid *et al.*, 2007). Recently, Benkouiten, Brouqui and Gautret (2014a) reported that alcohol based hand sanitizer was more effective than the traditional hand washing because it is fast and easy to carry out resulting in sustainable compliance. The use of alcohol hand sanitizer was initially rejected by pilgrims due to the poor understanding of the Islamic stand on alcohol but later accepted when the use of alcohol as a medicine has been condoned by the Islamic faith. Hand washing and alcohol hand rubbing are fully accepted as a form of hand hygiene during Hajj and compliance is good (Alqahtani *et al.*, 2016; Benkouiten *et al.*, 2014a). This finding was confirmed by Al-Tawfiq *et al.* (2016) since hand washing is one of the Muslims daily duties prior to each of the five daily prayers, a duty performed under ritual purification called Wudhu meaning ablution.

- Appropriate use of facemasks

The use of facemasks is an integral part to any prevention and control of infection strategy. It is a contact precaution strategy against respiratory tract infectious diseases. Literature reviewed reveals that from 1998 to 2013 there was a steady increase in compliance with the appropriate use of facemasks during Hajj. Most of the seasons where good compliance was seen, was due to prior explanations or health education given to the pilgrims which improved their willingness to wear the masks (Benkouiten *et al.*, 2014a). Benkouiten *et al.*, (2014a) found that appropriate use of facemasks has significantly reduced respiratory symptoms presented by pilgrims during Hajj. In other studies, it was found that despite difficulties attached to the promotion of compliance with the use of infection protective strategies such as facemasks, it has been proven that health education pre-travel and during Hajj have a great contribution in mitigating the challenges (Alqahtani *et al.*, 2016; Balaban, Stauffer, Hammad *et al.*, 2012). For this reason, this study has explored ways that would add clarity to protective measures and simplify compliance.

- Social distancing

Social distancing is a public health strategy usually used in an event of confirmed or suspected possibility of an outbreak of a contagious disease to reduce transmission among the population or pilgrims in the case of the Hajj. It includes staying away from sick persons and limiting the coming together of large groups of pilgrims (Benkouiten *et al.*, 2014a). Social distancing plays a vital role in the prevention of infectious diseases most particularly respiratory tract infections. The dense crowd in the Hajj is a challenge to social distancing because pilgrims are living and walking in overcrowded situations with 6-9 persons per square meter (Benkouiten *et al.*, 2014a). In an effort to ascertain its effectiveness, a study was conducted among 186 USA pilgrims in 2009, and behavioural intervention including social distancing was seen to be very effective in preventing spread of infectious diseases during Hajj (Balaban *et al.*, 2012).

- Administrative advice and recommendations

This is a means through which the Kingdom of Saudi Arabia exercises its constitutional rights. It does this by advising any country or countries faced with a disease challenge to stay away from Hajj during

the epidemic or endemic outbreak. This was a situation Benkouiten *et al.* (2014a) called "postponement of Hajj for at-risk populations". Such cases occurred in 2001 and 2014 Hajj seasons when Uganda and other countries affected with an Ebola epidemic were advised to postpone their pilgrimage and were banned from attending the Hajj (Memish, 2002). It also advises countries to restrict high risk groups such as pregnant women, persons of 65years and above, children and those with pre-existing chronic conditions from performing Hajj if there is an infectious disease challenge in the Saudi Arabia. For instance, in 2009 Hajj season, such advice was given against the Influenza A/H1NI pandemic and during the 2013 Hajj season, against MERS-CoV when Saudi Arabia was identified to be the epicentre of the outbreak (Benkouiten *et al.*, 2014a). The worrisome part of this strategy is the flexibility of the warning. Pilgrims do not understand the concept of options to attend. A common example was when Ugandans and high-risk groups were banned from 2001 and 2014 Hajj but people disobeyed (Benkouiten *et al.*, 2014a; Parker, 2015).

- Health education and awareness

Hajj is characterized by people with diverse cultures, ethnicity, language and health literacy differences who converge at the same place, mingling with one another. In such situation, a health education and awareness program is essential because it has the capacity to reduce the spread of infectious diseases among pilgrims. It has been recognized in the literature that health education is the most common intervention strategy used by nurses in the provision of effective, affordable, holistic and scientifically validated promotional health services. This strategy is applied to communities, individuals and gatherings (Kemppainen *et al.*, 2013; Robinson and Hill, 1998). Health promotion with health education as the commonest form is based on the prevention and control of infectious diseases, and nurses' health promotion provides and improves quality of life through an increase in health awareness and compliance with protective measures against infectious diseases (Alqahtani *et al.*, 2016). Consequently, a public health oriented health promotion is paramount for pilgrims attending Hajj, a health promotion that is aimed at preventing importing and exporting of diseases. For this reason, health educational materials which are printed in different countries with their own official language through their Hajj Commission and shared with pilgrims, should be based on the

individual's perspective. Alqahtani *et al.*, (2016) and Kemppainen *et al.*, (2013) assert that nurses reflect the multi-disciplinary nature of nursing in health promotion in order to enable provision of health education that is socio-culturally, behaviourally and scientifically inclusive and client-focused. This study aimed at improving compliance with protective strategies for pilgrims by exploring their health information needs.

2.8 ROLES OF INFECTION CONTROL NURSES DURING HAJJ

The roles of infection control nurses during hajj are similar to those performed in all health care settings. These roles include (Kemppainen *et al.*, 2013) :

- Surveillance
- Isolation of symptomatic pilgrims and identified asymptomatic pilgrims during Hajj.
- Ensuring, supervising and monitoring environmental cleanliness and hygiene.
- Prompt investigation, identification and management of outbreaks during hajj.
- Health educating pilgrims before, during and after Hajj.

SUMMARY

This chapter has presented a summary of literature on this topic. Previous research has been identified and the results and recommendations have been presented. The literature shows that there is a gap between what health education is given and what the pilgrims' needs are or what they understand from the education. This study will explore the health information needs of pilgrims against infectious diseases during mass Muslim gatherings. Concepts such as infection preventive strategies have been thoroughly explained. The next chapter explains the research design, the population and sample, the research setting and the data collection technique selected for this research.

CHAPTER THREE

METHODOLOGY

3.1 INTRODUCTION

The purpose of this chapter is to explain the research design, the population and sample, the research setting and the data collection method selected for this research. A description of the ethical consideration, data analysis, trustworthiness of the method used in data collection was included.

3.2 PURPOSE AND OBJECTIVES

The study is aimed at exploring the health information needs of the pilgrims attending Hajj in order to know what is required to reduce poor health practices and improve compliance with protective measures against infectious diseases before, during and after Hajj. This will help in minimizing the spread of infectious diseases in the Hajj.

The objectives, repeated for consistency are:

To explore the experiences of illness in pilgrims who have attended Hajj and their infection prevention practices.

To explore the sources of the health information of people attending Hajj.

To explore the health information needs of pilgrims attending Hajj.

3.3 RESEARCH DESIGN

An overview of the research design and methods used in the study will be discussed. A research design is a systematic, scientific and strategic researcher's plan that brings different parts of the study

together in a logical and coherent manner and addresses the research problem (Maree, 2012). In this study, a qualitative and explorative design was used to explore pilgrims' health information needs for the protection against infectious diseases during hajj.

3.3.1 Qualitative Research

Brink *et al.* (2012:121) define qualitative research design as a "broad range of research designs and methods used to study phenomena of social action and of which we do not have an understanding." This definition implies that qualitative studies are aimed at providing an in-depth understanding of research participants' life experiences and beliefs (Polit and Beck, 2012, Brink *et al.*, 2012). It involves an emergent design because of its flexibility, holistic and iterative nature (Polit and Beck, 2012). It is holistic because it centres on the process and is aimed at providing an in-depth study of an issue or event of interest. It is flexible and iterative due to its continuous and concurrent data collection and analysis that may evoke an adjustment (Polit and Beck, 2012). Moreover, qualitative findings provide better understanding to nurses on how to improve compliance with protective measures during Hajj through health promotion and disease prevention and control (Whitehead, 2003, Runciman, Watson, McIntosh *et al.*, 2006, Povlsen and Borup, 2011, Kemppainen *et al.*, 2013). This design was chosen for this study because it is the best method for exploring human experiences, beliefs and needs and providing in-depth description and understanding of the subjective experiences of those who have been to Hajj and understanding health information needs of those who have not been to Hajj. Keeler (2010) asserted that qualitative design is the best method of choice for research studies in which objectives are to provide meaningful description and understanding of participants' subjective experiences.

In the current study, findings and recommendations explored from participants' experiences and beliefs will assist in improving compliance with protective measures and reducing infectious diseases during Hajj.

3.3.2 Explorative Design

Polit and Beck (2012) argue that in situations where little or nothing is known about a phenomenon of interest, exploratory design can be used to gather preliminary data about the phenomenon. This design identifies the suitable method of data collection, participants and sampling technique. In the same vein, Quinn and Cochran (2002) state that an exploratory design provides a solid foundation for research studies in order to develop a concept, theory or practical intervention for a given phenomenon. Every effort has been made to improve preventative measures against infectious diseases at Hajj by researchers as well as professional bodies such as the World Health Organization. This has however had little effect (Alqahtani *et al.*, 2016) and may be due to the fact that there is a gap in the literature identifying what the needs of the pilgrims are. This study planned to explore the pilgrims' health information needs for protection against infectious diseases during Hajj. This could be used to develop a practical intervention to improve and simplify compliance with protective measures by pilgrims during Hajj and reduce the spread of infections at the event.

3.4 RESEARCH SETTING

The study was carried out in the Muslim community within the University of the Witwatersrand. The community comprises of staff, students and visitors who frequently visit the community's mosques (musalla) for prayers on Fridays. The community was selected as it possesses the characteristics required, in other words, a mix of Muslims who have not been to Hajj and some of the members who have been to Hajj. The setting also includes two mosques, one at main campus and one at the Faculty of Health Sciences campus of the same institution. These settings allowed for recruitment of participants from the larger community who visit the University for Friday prayer and this could be used to broaden the diversity of the population.

3.5 POPULATION

Population is a group of all human or non-human elements that possess the researcher's interest for purposes of the study (Burns and Grove, 2013). In this study, the population covers all Muslims both females and males who are staff, students and/or visitors of the attending the Mosques of the University of the Witwatersrand. The visitors included people from communities apart from the University who attend these Mosques for Friday prayer. This community was not only from the Health Sciences department but from the areas proximal and surrounding the site used in this study as there is no Mosque in the area. The Iman has agreed to offer Friday prays at the site. Inclusion of the visitors broaden the diversity of the study population and thus, contribute to the richness of data.

3.6 TARGET POPULATION

Target population refers to the total sets of human units which possess all the eligibility criteria for being selected to participate in the study (Burns and Grove, 2013). The study target population was all members of the Muslim community from 2007 who have been to Hajj and those are eligible for Hajj but have not been to Hajj so that the gap in knowledge between the groups with regards to the understanding of appropriate use of protective measures during mass gatherings could be explored and the needs identified. The year 2007 was selected because in 2007 information pamphlets were distributed to pilgrims who were preparing to attend hajj. Interviewing both groups has assisted in exploring the health information needs with regards to infection prevention knowledge and compliance by both groups. The participants whom had not been to Hajj were able to contribute to this research by enlightening the researcher of what they already know about infectious diseases that they could contract when going to Hajj and to find out what they would expect to be informed about with regards to the prevention of infections in preparation before going to Hajj for the first time.

3.6.1 Sample and Sampling

A sample is defined as a fraction of a whole of the mother population of elements that is selected by the researcher as a true representative of the mother population to participate in a research study

(Brink *et al.*, 2012). The elements within a sample are known as the subjects who can be human and non-human. In health sciences research studies, subjects are mostly human individuals (Brink *et al.*, 2012). In this study, the sample included four groups, two each of male and two of female participants of the Muslim population worshiping at the University of the Witwatersrand mosques. They have been purposively selected.

Sampling refers to a process through which the researcher selects and forms an easily accessible group of elements to represent the population under investigation regarding a phenomenon of interest during the research stages (Polit and Beck, 2012, Brink *et al.*, 2012). This study involved purposive sampling. This is a sampling method that gives the researcher flexibility because the researcher judges and selects participants based on their familiarity with the phenomenon in question (Brink *et al.*, 2012).

A purposive sampling was employed as a sampling method of the study. It is defined by Tongco (2007:147) as "the deliberate choice of an informant due to the qualities the informant possesses." It suggests that the researcher decides who should be part of the study based on the subjects' level of knowledge or experience (Lewis and Sheppard, 2006 as cited by, Tongco, 2007). For this reason, individuals whom the researcher believed to be conversant with the phenomenon under investigation were purposively selected and this provides more quality to the data being collected and access for researcher to the participants.

The Inclusion Criteria used in this study are as follows:

• All Muslims, age 18years and above **who have** attended Hajj within the last 8years (Mixed gender group) and attend prayer meetings at either of the two sites.

• All Muslims, age 18years and above **who have not** attended Hajj (Mixed gender group) and attend prayer meetings at either of the two sites.

Additional focus group discussions would have been conducted if data saturation was not reached on the first round of interviews. Data Saturation was achieved in the first rounds of interviews when the researcher observed that nothing new or no new themes were being verbalised from the participants of

the focus group in each and every group during the discussions. This is supported by Monette et al., (2005:242) who said saturation is achieved ''when no new data are emerging from focus group discussions''. This study focused on the in-depth experiences of those who had been to hajj and those who had not been to hajj.

3.7 DATA COLLECTION

Data collection is "a systematic gathering of information relevant to the research purpose or specific objectives of the study" (Burns and Grove, 2015:536 as cited by, Sinyiza, 2016). In this study data collection was conducted using focus group discussions.

3.7.1 Planning the focus groups

Focus group discussion or approach refers to an in-depth group discussion involving five to eight participants, conducted for one to two hours in a comfortable environment in order to explore predefined and specific issues of interest under an investigative phenomenon (Robinson 1994; Robinson, 1999). It is conducted with a facilitator who guides the discussion and participants on the phenomenon under investigation. Kitzinger (1994) and Robinson (1999) argued that this method was introduced into health science studies when the field's researchers realized the effectiveness of focus group discussions in providing detail and qualifying understanding of human conscious experiences, perceptions, needs and knowledge in studies of an exploratory nature. This study's data collection was carried out using a focus group discussion approach because it explores an individuals' experience, perceptions, knowledge and needs on the quality of healthcare and healthcare related issues through the eyes of the participant. In using this method, open ended and probe questions were used in the discussions (see Appendix 1). Four focus groups consisting of Muslim males and females who were a minimum of 18 years of age were purposely recruited to form the focus groups. Participants from both Mosques were included to increase the participant numbers and in an attempt to incorporate participants who came from different faculties. All participants that attended Friday meetings from both the Main Campus and the Health Sciences Faculty Mosques were recruited during

Friday prayer meetings. They were approached for an electronic contact address. An email was sent which invited all Muslims to participate. This e-mail also included information about the intended study. An attached letter explained that participation was voluntary. The participants who were interested were asked to respond to the email. The participants who voluntarily accepted to participate were grouped as outlined in the Table 3.1 below and each group was invited to a focus group discussion at a time agreed as convenient for a group. Since all the participants were comfortable with being The final arrangements were concluded via "WhatsApp" communication.

3.7.2 Conducting the focus groups

Four focus group discussions each lasting an hour were conducted and digitally recorded with a tape recorder. Recorded discussions were then transcribed verbatim. In an effort to recognize Islamic values, a separate female group was recruited by the researcher. This female group accepted to be interviewed by the researcher in the presence of an independent female who is a Muslim female, registered nurse and holds a Master's degree. This was done in order to allow complete freedom of conversation in the female groups because the researcher is male, and Islam does not allow isolation of non-blood related opposite genders. The married couples requested to be in mixed gender group together with their spouses and were interviewed by the researcher. When the participants were ready questions were asked.

Participants discussed probe questions such as

"Tell me about your experiences of Hajj"

"Describe your health status before you departed for Mecca"

"How do you think attending Hajj could influence the pilgrims' health"?

"When and where do you think would be appropriate to obtain this health information"?

Questions were put to both groups since those participants who had not yet attended Hajj may have had experiences of other family members who had been. The discussion was recorded and field notes were made. Finally, there was clarification of the contents of the focus groups.

Table 3.1 Sample Groups

	Focus group	Attended Hajj	Venue and Date
1	A1 Mixed gender group	NO	Main Campus 5/08/2016
2	B1 Females	NO	Medical School 29/08/2016
3	C1 Mixed gender group	YES	Main Campus 13/08/2016
4	D1 Males	YES	Medical School 19/08/2016

The study was guided by the method of data collection called focus group discussion. Data were collected using this method. During the discussions, participants were encouraged to interact and respond to open ended questions. Open ended probe questions were used if and when necessary (see appendices 1) and participants' views, experience, preferred health needs and perception were explored. This method was believed to be suited for this study because it allows for collective activity between the researcher and research participants, an interaction that differentiated this method from group interview method with the former being a group interaction (Krueger and Casey, 2002). This interaction allowed synergy between the researcher and participants and gave the researcher the ability to exercise the facilitator's role in exploring the participants preferred health information needs for the protection against infectious diseases during Hajj. During the discussion, field notes were recorded down and expanded immediately after discussions. These field notes are detailed narration of a researcher's observation of participants' verbal and non-verbal contributions during discussions. These notes serve as supplementary documentation and a back-up in case retrieving stored recordings becomes a problem. It also acts as evidence that discussions really took place.

Open ended questions with probe questions were used in this study, and their use gave the participants ample opportunities to answer, qualify, clarify and raise important points in questions presented to

them by the researcher. This was also observed in Sinyiza (2016). In addition to this, Polit and Beck (2012) explained that probing questions keep participants in discussion over the issue under investigation until the end of the discussion.

3.8 DATA ANALYSIS

Data analysis is a scientific and systematic way of organizing, categorizing, ordering, manipulating, interpreting, summarizing, reporting and describing collected data into a meaningful structural form for an easy discussion of the research data (Brink *et al.*, 2012). It varies with the form of the research data. In qualitative research it is important to be open and non-judgmental about the experience of the participants thus allowing an unbiased interpretation.

3.8.1 Method of data analysis and approach to analysis

In this study, data analysis was done concurrently with the data collection, and involved creative and conceptual identification, organizing, reporting and description of the themes brought about by the collected raw data. Opler (1945), Georgi (1985), Collaizzi (1978) and recently by Braun and Clarke (2013) developed methods of data analysis called thematic analysis (Polit and Beck, 2004). This study adopted the thematic analysis using Clarke and Braun (2013) in analysing the collected research data in order to establish the research's objectives. This method comprises a series of steps that are used to make the process of analysis easy for the researcher. These steps include:

Step 1. Transcription – This is an interpretative and direct technical task of converting audio recorded data into written form in order to enable easy identification of vital statements and expressions, facilitate in-depth reading and systematic coding and analysis (Bailey, 2008). In this study, audio data of each focus group discussions were played back separately and followed word by word in a quiet and conducive environment, before converting into written text. This was done by the researcher as the recording was playing. Each focus group discussion was transcribed separately and then all were combined for analysis.

Step 2. Reading Familiarization – It is referred to as "careful reading and re-reading of the transcribed data" (Rice and Ezzy, 1999 as cited by Fereday and Muir-Cochrane, 2006:4). This continues until the researcher is completely immersed in the data and a general meaning of the transcribed data is obtained (Clarke and Braun, 2013). In this study, the transcribed data was read many times and the meanings were felt, understood and organized. Statements and expressions related to the research questions and research objectives were extracted from the transcribed data for coding. In doing so, all preconceived ideas, thoughts, beliefs and feelings of the researcher were bracketed. The bracketing was done in line with Brink *et al.* (2012) and Shosha's (2012) recommendations.

3. Coding – It deals with application of codes to the selected statements and expressions related to the research question. In this study, statements and expressions identified from the transcribed data to be relevant to the research question were written down and subsequently coded according to the needs, concerns and feelings of participants. Codes are the basic elements or unit of the raw data which can be transformed into themes. In this study, three types of coding were used: Initial coding, horizontal coding and vertical coding. In the initial coding, codes were assigned to each focus group discussions and in vertical coding, category of codes or summaries of individual ideas was generated in each focus group discussions while in the case of horizontal coding, focused was put on similar codes and category of codes across the focus group discussions. These coding strategies helped in eliminating, combining, subdividing coding categories and looking for repeated ideas (themes).

4. Searching for themes – searching for themes is a process that encompasses collating and sorting codes into potential themes that are relevant and answerable to the research question. At this level, all the extracted coded data related to the research question were sorted into potential themes, and then relevant coded data in the formed themes were identified and collated using a mind-map and produced a pattern of relationship between different themes and codes.

5. Reviewing Themes – Themes need to be reviewed and refined in order to ascertain their application with the coded data and the entire data set. The clarity and distinction of themes must be determined because themes sometimes do not truly represent data. Reviewing and refining themes is a quality control measure and continues until discussion is done. At this stage, in an effort to ensure internal homogeneity and external heterogeneity of themes, two actions were conducted. Firstly, all collated data for each theme were read severally, checked for its coherent pattern and then moved to the next theme. Data that are problematic were reworked or re-assigned to another theme to form new theme. Some were discarded. Secondly, data within each theme were re-read several times for accuracy of representation in relation to the data set and research question, re-coding of data as well as coding of those missed during coding process. This process was conducted in a repeated manner until a thematic map was generated.

6. Defining and Naming Themes – This stage involves ongoing analysis to refine the distinctive features of each theme and the overall story each theme tells, generating clear definitions and names for each theme and defining the essence of each theme in relation to the research question and objectives. This is a stage of external heterogeneity or external divergence because each theme was defined, differentiated from one another and followed with a detailed description of analysis related to the research objectives.

7. Writing the Report – It is the final stage of analysis of the selected data extracts and beginning stage of write-up of the report. It encompasses selection of vivid, compelling and captivated data extracts and relating the selected data back to the research questions and literature.

3.9 TRUSTWORTHINESS

Trustworthiness is a means of judging the soundness of qualitative research using the Lincoln and Guba's Model (1985) for guiding qualitative studies. This model helps in providing more highlights

on formed research results and assessing the validity and reliability (Trustworthiness) of qualitative research, with an aim to support anything that would explore the soundness and attractiveness of qualitative research findings generated through thematic or content analysis for qualifying and quantifying qualitative data respectively (Elo, 2014). Therefore, this study possesses resonate and plausible characters through the application of rigor and establishment of trustworthiness using the four cardinal approaches developed by Lincoln and Guba (1985) and elaborated on by Shenton (2004). These approaches include credibility, transferability, confirmability and dependability and are vital in adding rigor to the qualitative studies.

3.9.1 Credibility

Credibility is similar to the concept of internal validity of quantitative research. It is defined by Morrow (2005) as the idea of internal consistency that establishes the congruency of the research results developed from thematic or content analysis, from the participants' perspectives. It has been recognized in the literature that achieving credibility is the number one responsibility of a qualitative researcher in ensuring trustworthiness because it promotes researcher's confidence in scrutinizing recorded data (Shenton, 2004). Credibility can be achieved by prolonged engagement with participants, member checking, peer validation, audience validation, persistent observation and many others. In this study, credibility has been ascertained using member checking and peer validation. Member checking involves getting concordance between the recorded data and the transcribed data from the research participants' perspectives while peer validation involves getting feedback from senior professional colleagues, senior academics of the department and peers' scrutiny of the data. Member check was conducted after transcription of the recorded data, on a separate visit to the two campuses where some of the participants were identified and given recorded and transcribed data to ascertain consistency and they confirmed that the text and audio data were similar. Member Checks were used because it forces research participants to identify the presence or absence of a researcher's biases in the analysed data and improve researcher's understanding of the data while peer validation allows senior professional colleagues, senior lecturers in the department to scrutinize the data (Loh,

2013). At this stage, data, analytic categories, interpretation and conclusion were given to the participants of each group who participated in the focus group discussion, and verified the consistency of the audio data and the transcribed data. In the case of peer validation, transcribed and recorded (audio) data were given to the research supervisor to scrutinize.

In addition to member checking triangulation was included as a means to enhance accuracy of the study. From personal experience and literature (was Kemppainen et al., 2013; Memish et al., 2009 and Whitehead, 2001) the researcher identified stages of the journey and specific rituals which placed the pilgrim at risk of infection.

3.9.2 Transferability

Transferability is the qualitative research's external validity. It refers to the degree to which the results of a qualitative research can be applied or transferred to other situations (Shenton, 2004). A lot of issues have been raised on the possibility of transferability: Positivists scholars and naturalistic scholars believe that it is impossible to generalise or apply qualitative research findings to other settings because the findings and conclusion are tight to specific settings and population (Shenton, 2004). However, Denscombe (1998) as cited in Shenton (2004) opined that it is possible in certain conditions that the research setting or situation of the described study is the same with the transferee study's setting. For this reason, Lincoln and Guba as quoted by Shenton (2004) state that transferability is possible if an adequate and fully detailed account of experiences about the fieldwork is given to research to enable them have a proper understanding of the phenomenon investigated. Since the context and venue of the hajj remains the same each year some transferability would be expected. Moreover, provision of a detailed description of the field experiences would help research consumers to make a knowledgeable comparison of the described research for transferability. Furthermore, in this study, transferability was ensured using thick description and a detailed account of the field experiences of the participants has been described and provided in an audio tape, in order to enable transferability. The field experiences were not transcribed because field experiences play the major role when transcribed data is lost (Morgan, 1998).

3.9.3 Dependability

It is similar to reliability of quantitative studies, and reliability is concerned with accurate "replicability and repeatability" of data as presented by research participants and recorded by the researcher (William, 2006). Enhancing dependability is associated with difficulties and uncertainty because in the opinion of positivists, they assert that for dependability to be enhanced, the same work, same setting, same method and same participants must to be used for the same results to be obtained (Shenton, 2004). Essentially, this assertion predicts that dependability may not be feasible because qualitative phenomena and settings for qualitative investigation possess a dynamic property and this renders it difficult to enhance dependability and less likely for a study to give similar results if repeated as asserted by positivists Marshall and Rossman (1999) cited in Shenton (2004). For this reason, Lincoln and Guba argue that in practice, dependability and credibility of a study are very much related thus, ensuring the later goes a long way in ensuring the former (Shenton, 2004). Therefore, in this study, dependability might be difficult to ascertain because of the size and setting of this study though detailed expression of the processes within the study has been reported and focus group questions scripts are kept, so that future researchers would be able to conduct the research again using a similar sample as recommended by Shenton, 2004 and Loh, 2013).

3.9.4 Confirmability

Confirmability is a comparable concept to objectivity, and it is the "congruency between two or more independent people about the data's accuracy" (Polit and Beck, 2012:585). It is also referring to as the extent to which research findings could be ascertained by others as the true reflection of the participants' experiences, perception and views (William, 2006). In an effort to achieve confirmability, strategies must be put in place to safeguard research findings from the researcher's preferences, biases, pre-conceived ideas and characteristics from the research findings and make the findings and emerging constructs more acceptable, and such strategies include Bracketing, audit trail

among many others (Shenton, 2004, Elo, 2014). Bracketing excludes biases, preferences and preconceived ideas emanating from the belief and attitude of the researcher (Shosha, 2012). The researcher is a Muslim who has attended hajj thus has detailed knowledge of what occurs during the rituals, however when last attending the hajj there was no interest in this topic as the researcher was not a student at that point. In addition emerging themes were discussed with senior staff in the department as well as the supervisor, none of whom are Muslim in an attempt to exclude any bias or deliberate connection between the themes and hajj or the Muslim faith. An audit trail gives a detailed description of the methodology such that the link from the data collection through the recommendations of the study can be traced by the study's readers. Furthermore, in audit trail a thorough and careful description of the methodology is necessary in order to enable readers to trace the processes through which the research passed to produce the findings and emerging constructs (Shenton, 2004). In this study, confirmability was established by bracketing the researcher's assumptions if any, about the study's findings. In addition, an audit trail has been used to give a detailed description of the methodology such that the link from the data collection through the recommendations of the study can be traced by the study's readers.

3.10 ETHICAL CONSIDERATIONS

According to Johnstone (2009) as cited in Marianna (2011:4)ethics refers to as "a system of principles which can critically change previous considerations about choices and actions." This definition shows that, in any research studies, ethical issues must be observed by the researcher from conceptualization to implementation stage (Brink *et al.*, 2012). Ethics is necessary in any research study because it protects participants' rights such as right to voluntary participation and withdrawal at any stage of the research process as well as from being harmed. In this study, the following moral principles were taken into consideration.

3.10.1 Permission to conduct the study

Permission was sought and approval was obtained from the department of Nursing, University of the Witwatersrand, the faculty research University Postgraduate Studies Committee (Appendix I), Office of the Deputy Registrar for permission to have access to the University and its' mailing system (Appendix J) and Human Research Ethics Committee of the University of the Witwatersrand (M160414 – Appendix H). Prior to obtaining the approval to conduct the study, the study protocol was written, submitted and presented to the department of Nursing for peer review, the School of therapeutics Sciences Assessors Group, then after summited to the Human Medical Research Ethics Committee of the University of the Witwatersrand and office of the Deputy Registrar of the University for permission to conduct the study and access the University's mailing system.

In addition to this, permission was also sought and obtained during the recruitment of the participants at the mosques from the Imam after Friday prayers.

3.10.2 Informed Consent

This is a form of consent that is pivotal in scientific researches. It is an essential ethical issues that focuses on the protection of participants' right of autonomy, personal liberty and veracity as well as improving researchers' integrity in scientific research studies (Marianna, 2011). It is a form of consent that is volitionally, consciously and intelligently given by research participants after an information sheet is administered to them (Marianna, 2011).

In this study, two separate information sheets (Appendix D and E) were compiled based on whether participants had performed Hajj or not, each with consent forms for participation and recording thereof. These sheets and forms were submitted to the department of Nursing, Assessors (Appendix I) and Human Ethics research committee (Appendix H) for peer review and approval. Following approval, the information sheets were sent to potential student and staff participants through the Deputy Registrar's office. Prior to the beginning of each focus group it was established that each participant was in possession of an information sheet and then consent forms were administered to the participants. A session for questions and answers was given to participants by the researcher for

clarification. The participants acknowledged their participation by signing the consent forms (Appendix F and G) after they had fully understood the concept written on the information sheet.

3.10.3 Confidentiality

According to Polit and Beck (2012) confidentiality refers to as "pledge that any information participants provide will not be publicly reported in a manner that identifies them and will not be accessible to others." This implies that a researcher has a duty to ensure that information given by research participants are not linked to the participants, divulged or made available to any other person. In the current study, ensuring confidentiality would be difficult to achieve because of the nature of the method of data collection. However, in order to minimise effects of disclosure, a trustful and mutual relationship was created among the research participants during focus group discussions and Raw data was available only to the researcher and supervisor. Data collected would be kept with the department of nursing, University of the Witwatersrand for a period of 5 years in compliance with University policy. It will remain password protected by the researcher and the supervisor.

3.10.4 Anonymity

In scientific research studies, anonymity is an ethical issue that deals with the processes of making participants' names hidden to other people. In this study, anonymity was ensured by using codes assigned to all participants at the beginning of each focus group discussion. Each participant was given a code for use during the group discussion. This has gone a long way to improve the confidentiality which was difficult to ensure in focus group discussions (Halai, 2006).

3.11 SUMMARY

In this chapter, the research methodology was described and the research design was chosen to appropriately address the purpose of the study and the research objectives. Method of data collection was also described. The next chapter will present the research findings.

CHAPTER FOUR

PRESENTATION OF FINDINGS

4.1 INTRODUCTION

This chapter presents the research findings. Description, explorative and interpretive methods were used to obtain these findings. Emergent themes and sub-themes from the group discussions are presented. The discussions were recorded with a tape recorder, transcribed and then analysed using Braun and Clarke (2013) thematic analysis described in chapter three. Discussion to substantiate the findings will be presented in chapter five.

The objectives of the study were

- To explore the experiences of illness in pilgrims who have attended Hajj and their infection prevention practices.
- To explore the sources of the health information of people attending Hajj.
- To explore the health information needs of pilgrims attending Hajj.

4.2 DESCRIPTION OF THE SAMPLE AND PARTICIPANTS

The sample of this study was formed through purposive recruitment of participants on a voluntary basis at the two Mosques at the University of the Witwatersrand and via emails sent to all Muslim students and staff of the University by the office of the Deputy Registrar of the University. The participants comprised of two categories, those who have been on Hajj any time from 2007 to date and those who have not yet been on Hajj. The year 2007 was selected for those who had been on Hajj because it was the first year Saudi Arabia began to notice a tremendous influx of people below the age of 50years from developing nations(Al-Tawfiq and Memish, 2014; Memish *et al.*, 2009). Thus the risk of spread of infectious diseases became greater. A total of four groups were formed instead of eight as proposed due to a poor participant response. Some participants were married couples and

wished to be interviewed together. The unmarried and single participants agreed to be interviewed in one group who had been to hajj and one group who had not yet been to hajj since their numbers were limited (Table 4.1). Fortunately saturation was achieved and thus the need to delay the study to increase the number of groups was not necessary. Monette, Sullivan and DeJong (2013) said that in qualitative research, data saturation is achieved when nothing new comes from the focus group discussions. Because of the academic pressure on the participants during data collection, only four focus groups could be conducted instead of the planned eight. The small numbers may have limited the information obtained as fewer experiences were examined. The four groups are described in the Table 4.1.

Table 4.1 Coding of Focus Groups

Serial Number	FOCUS GROUP	DESCRIPTION	NUMBERS
1	FGD001(Mixed group)	Comprised of males and females who have not been on Hajj (participants requested to be together on the grounds that they are closely blood related)	6(3 males and 3 females)
2	FGD002	Comprised of females who have not been on Hajj	3 females only
3	FGD003(Mixed group)	Comprised of females and males who have been on Hajj (Participants requested to be together on the grounds that only one male was not with his wife)	7(3 females and 4 males)
4	FGD004	Comprised of females only who have been on Hajj	4 females

The researcher and supervisor collaborated and identified emerging themes and sub-themes in the analysed data. The emerged themes and sub-themes are presented with excerpts from the participants'

contribution during the focus groups. Development of the themes is substantiated by participants' quotes. The excerpts are presented verbatim without language editing. The researcher would like to emphasise that English was not the home language of most of the participants.

4.3 EMERGING THEMES AND SUB-THEMES

This segment addresses the important issues that were identified from the transcriptions recorded during the focus group discussions. The emergent themes and sub-themes are presented as set out in the table below.

Table 4.2 Emergent themes and subthemes

EMERGENT THEMES	SUB-THEMES
4.3.1 Preparation before departure for Hajj	• Adequacy of preparation • Disbelief and unconcerned • Knowledge regarding prevention of infectious diseases • What is available • Importance of collaboration
4.3.2Unhygienic Living Conditions	• Cross infections. • Matters of hygiene • Environmental contribution • Safety of vendors' food
4.3.3 Stressors related to Hajj	• My body is tired • Physiological imbalances

Each of the themes identified will be detailed with supportive evidence from the participants' shared views as transcribed from the audio-recorded discussions. In presenting participants' shared views, anonymity is ensured by replacing their names with codes.

After becoming familiar with the transcripts meaningful and significant statements were considered and the meanings were put forward for consideration. Meanings were placed in categories where each statement reflected some aspect of the category. Categories were reviewed before determining and defining the theme. Once this was completed the statements were addressed under each emerging theme and sub theme.

4.3.1 Theme 1. Preparation before departure for Hajj

Mass gatherings such as Hajj create an opportunity for the spread and cross infection of infectious diseases (Al-Tawfiq and Memish, 2014). The Saudi Arabian health authorities have measures in place that must be adhered to by all persons entering Saudi Arabia. Participants receive preparation in their countries of origin before commencing their travels to attend the Hajj. This is also the case in South Africa. The preparation and the commitment to adhering to these measures is the starting point of keeping oneself safe during the hajj.

Sub-themes

4.3.1.1 Adequacy of preparation

Preparation for travelling to a foreign country is important. Each country may have endemic diseases against which the traveller is not protected. The need for vaccination is dealt with during the preparation. Also part of preparation is the adherence to basic hygiene principles. Both of these aspects are particularly important when attending mass gatherings since the close proximity of people at a mass gathering may place them less than a meter apart during the gathering. This increases their risk of infection.

When asked about the adequacy of the preparation, this is what the participants had to say.

"[We should] *"take the necessary precautions before and during Hajj". (ABC04)*

"I think prevention is very important". (ABC02)

A female participant who had not been on Hajj was of the view that participants of Hajj should be worried about their status prior to going rather than while in Saudi Arabia. In her view

"Check up with [on] *your health before you go to make sure you are ok". (ABC203)*

A participant who has been on the lesser Hajj expressed that:

"People should be intelligently health conscious". (ABC01)

Participants who have been on Hajj were of the view that Muslim health care workers in communities should form an integral part of health preparation and protecting oneself against infectious diseases during Hajj.

"Medical Doctors and Nurses in communities should be part of the Hajj program to educate people". (C04)

"Muslim health care personnel should be involved to give health talks to intending [potential] *pilgrims during Hajj classes". (FGD001)*

4.3.1.2 Disbelief and unconcerned

Despite evidence of emerging diseases and new strains of well-known diseases that are a potential danger to mass gatherings like Hajj, some people still attend Hajj without observing the minimum health requirements set down by Saudi Arabia.

A participant who had been on Hajj said

"We did not prepare for the Hajj in advance. We did not think of any protective measures in-terms of health. We just went" (A2)

A participant who had yet to attend Hajj agreed that the possibility of contracting a disease was not really a concern.

"I would not be afraid of catching [a disease] *or getting sick" (ABC03)*

Many participants who have not been on Hajj shared similar views and considered that diseases affect only those who are ill when they go to Hajj, the elderly and those who refuse to take necessary precautions before departure and while on Hajj.

One of those who shared their views said:

"I do not see there is [any] *a normal healthy person who go for Hajj and then come back sick" (ABC01)*

A participant who has been on Hajj some years ago highlighted the poor preparation and compliance with protective measures prior to departure to Saudi Arabia for Hajj. The participant pointed out that many of the pilgrims are going on Hajj for the first time. Their excitement stops them from considering the possibilities of contracting infections and this influences the preparation.

"At the time of going to Hajj because of your preparation and your intention, getting sick or thought of sickness would not cross your mind. You just do not know it until you experience it. I think, on [at] *the onset, when you are going to Hajj, there is nothing that crosses your mind but getting there" (ABC05)*

However, some of the participants in both groups had different views to those above with regards to the careless attitude. They expressed that possibilities of contracting diseases could be avoided, if necessary preparation and precautions before and during Hajj are taken.

A participant who had been on Hajj commented

"I did found [find] *a lot of pilgrims* [who] *when they came back,* [had] *come down with health issues" (B)* Another participant added: *"the risks of cross infection are very high" (E)* This same participant added *"I always get flu there" (E).*

A participant who had performed lesser Hajj expressed that

"there are possibilities of getting sick" (ABC04)

4.3.1.3 Knowledge regarding prevention of infectious diseases

Nursing approach to health and diseases has changed from a disease inclined approach to a health promoting approach that has health education as the most important tool of achieving a positive change of health behaviour and improve people's level of health awareness (Arnold and Gorin, 2006). Similarly, promoting health of a community, mass gatherings and nations requires three interwoven, interdependent and inter-related factors which are health education, infection prevention and control and health protection (Wilhelmsson and Lindberg, 2009). Therefore, simplifying and improving people's compliance with protective measures requires adequate knowledge and understanding of the

infection prevention and control. This is very necessary in mass gatherings like Hajj which raises the fear and concern of global public health security.

Participants voiced concern, desire and need for health promotion and diseases prevention through health education. When asked what they thought would be important to know for the protection against infectious diseases during Hajj there were a variety of responses

One participant who has been on Hajj believed

"They [pilgrims] *need to be part of the community diseases preparation" (A)*

Another participant in the same group added that pilgrims

"Should be informed about all vaccinations before they get their visa" (A3)

One participant who had been on Hajj, argued that the authorities concerned are not giving adequate attention to preventive health, they emphasize curative health aspects.

"focus to[on] *the health aspect like providing the preventive stuffs*[precautions] *before people reach Saudi Arabia instead of waiting when [until] they become ill and/or experience illness" (A2)* The same participant added that pilgrims

"... should have hygiene education and vaccines. It is important prior to departure" (A2)

Similarly, those who had not been on Hajj shared their views on what they thought would be beneficial to pilgrims during Hajj.

They believe that health education before departure is important.

"Pilgrims get [should be] *trained on what is expected of them spiritually,* [as well as] *health and security prior to their departure" (ABC02)*

"Health education is important and a priority prior to departure" (ABC01)

"there is need for health education sessions or classes like the ones in Indonesia prior to departure" (ABC05)

When participants were asked for their opinion on how such knowledge should be distributed, a response requesting written information in the form of pamphlets was suggested. There were also strong opinions on who was responsible for this task.

A participant suggested

"There is need for health educational pamphlets or mini health education books. Develop and give [these] *to travel agents to distribute to people prior to departure" (ABC05).* This participant also suggested possible sources of health information.

"Basic health education must be obtained from Visa office website and travel agents office." (ABC05)

Another participant who had not been on Hajj agreed with this view and added:

"Saudi Arabian embassy needs to put information on its website" (ABC203)

However, some participants expressed contrary views on the health educational pamphlets and health education books. These participants felt in this modern age, perhaps information should be shared electronically.

"The problem of having pamphlets is that most people do not even read it... like teach them on the plane or in a place where you can demonstrate what they need to do rather than having gone and read" (A2)

"Pamphlets are really... ... [redundant] *people do not use any more. It is unnecessary cost" (A4)*

Other views expressed by participants suggest a total move from reading to visual and other means of health promotion.

"Some sort of educational video they show on the plane before you get there or some sort of quick five minutes' demonstration when you get to the Hajj terminal" (A1)

"I think if you use like technology to access people it is much faster, quicker and much more accessible" (A4)

4.3.1.4 What is Available?

In this sub-theme, health promotion is said to have an approach called health protection approach. This approach requires formulation of policies and laws that would make people to comply with infection prevention and control measures (Wilhelmsson and Lindberg, 2009). It is most common in international travels and participation in mass gathering events like Hajj. During Hajj, Saudi Arabia stipulated certain vaccines that are necessary before issuing a visa, and these available vaccines include Yellow fever, influenza and meningococcal vaccines.

Participants in this study commented on the protective measures at pilgrims' disposal for use prior to departure from their country of origin. One of the participants who had recently been on Hajj said:

"From a health perspective and prevention of infectious diseases probably taking all the recommended inoculations that are required [is important]*" (A)*

Saudi Arabia is very strict on some requirements such as Vaccinations and less concerned with others such as use of facemasks. A participant who has been on Hajj and has performed lesser Hajj recently had this to say from her experience

"They [Saudi Arabians] *are strict on Yellow Fever vaccination and Meningococcal Vaccination" (ABC05)*

Another participant who has been on Hajj said:

"Vaccination also very important" (G)

Some of the participants shared their experiences on what they had seen pilgrims doing to protect themselves from infectious diseases during Hajj.

"A lot of people walk with face masks" (E)

The same participant added that if a face mask were to be enforced, it may contribute to a large reduction in the transmission of respiratory diseases.

"I think it [Face Masks] *would be beneficial if enforced" (E)*

Some of the participants were keen to share what they did to protect themselves. They advised:

"To take the basic personal hygiene prevention" (A)

"A facemask to prevent airborne diseases……. make sure you wash your hands before and after using the bathroom" (G)

Another participant said:

"Screening for diseases prior to leaving is a good idea" (A4)

In addition to that, this participant was concerned about vaccines.

"Measles vaccine if you have not had measles vaccine and hepatitis A and B vaccines, H1N1 Influenza vaccine. Also, the flu vaccine for that year" (A1)

Those who had not been on Hajj also expressed what they thought pilgrims should use prior to departure and while in Saudi Arabia. One of the participants said:

"There are stuffs [things] *like vaccines and stuffs like that to prevent those infections" (ABC02)*

"Carry a lot of medicines" (ABC03)

"Take medicines even though we know is easy to get medicine there" (ABC203)

Participants were asked to specify the medicines. They suggested that pilgrims should

"Carry antibiotics" (ABC203 and ABC01)

"Something for diarrhoea, sore-throat and mild analgesics" (ABC05)

"General pain killers" (ABC203)

The participants also commended the South African Hajj and Umrah Commission (SAHUC) (the body that handles all Hajj and Umrah [lesser Hajj] administrative issues in South Africa) for its efforts in providing pamphlets for pilgrims prior to departure. The participant said:

"SAHUC gives out medical facts to every pilgrim going for Hajj" (A1)

Another participant commended the SAHUC for their strictness on Medical Clearance and had this to say:

"Medical clearance, we had to go to a travel doctor and got the appropriate injections and get checked up" (A1)

4.3.1.5 Importance of Collaboration

Preparing for Hajj is a shared responsibility between the Saudi Arabia and countries whose citizens participate annually in Hajj. This collaboration does not stop at the political and ministerial level but also involves pilgrims who have been on Hajj and those who intend going. Collaboration between pilgrims while on the Hajj may also give support. This is important because it will give pilgrims the ability to learn from one another. For-instance, countries like Nigeria, Indonesia and Pakistan do have annual health educational programs for people going to Hajj.

"There is a Hajj body in many countries that do everything. Such countries include India, Pakistan, Indonesia and many [others]. *They have Hajj bodies like India Hajj Ministry" (ABC04).*

Both participants who have been on Hajj as well as those who have not been expressed the need for stronger local and international partnership of countries involved for Hajj in order to exchange experiences. They believed that they could discuss meaningful ways of promoting health amongst pilgrims and protecting them against infectious diseases such as respiratory tract infections.

A participant who has been on Hajj, commented on the local partnership and said that:

"If SAHUC can team up with the Islamic Medical Association of South Africa, they could do things like the screening" (A4)

Another participant from the group who performed Hajj said

"People should be consulted because they have first-hand experience and evidence based knowledge" (ABC05)

When asked about the importance of local partnership the participants said in chorus that:

"Muslim health care personnel should be involved to give health talks to intending [potential] *pilgrims during Hajj classes" (FGD001)*

The international partnership between Saudi Arabia and other countries also plays a role. Participants shared their views on its importance. A participant said that:

"Hajj Ministry, they should be communicating with the Hajj authorities all over the world like here in South Africa, we have SAHUC" (B)

"SAHUC should have been liaising with the Hajj ministry of Saudi Arabia and probably engage them more pro-actively and prompt them rather than waiting for them to give us something" (A)

Another participant concurred with above and added that it:

"Is their [SAHUC] *responsibility to do that" (B*)

4.3.1.6 Summary of Theme One

Both the participants who had been on Hajj and those who had not have identified the importance of preparation against infectious diseases prior to departure for Hajj. Preparation is identified as a shared responsibility between Saudi Arabia and countries whose citizens participate in Hajj in order to provide pilgrims with required health education regarding protective measures against infectious diseases. This would increase pilgrims' health awareness and compliance with protective measures such as vaccinations, use of facemasks and prophylactics. The Participants also recognised health education as a central point in health promotion and prevention and control of infectious diseases at the Hajj. They therefore suggested that Saudi Arabian embassies, their websites and travel agents should be the sources of health education. Similarly, they viewed health educational pamphlets as less relevant when compared to teaching, demonstration and health educational videos about enlightening pilgrims and increasing their health awareness prior to and during Hajj. However, lack of concern and disbelief in protective measures and existence of diseases are found to be serious problems. The

emergence of deadly diseases that could spread easily and fast in an overcrowded environment is also a concern. This is because some pilgrims still go to Hajj without the necessary required vaccinations such as yellow fever vaccines.

4.3.2 Theme 2: Unhygienic Living Conditions

Managing crowds in Mass gathering events is a daunting task because large numbers at gatherings such as Hajj render available facilities such as the ablution facilities inadequate. This encourages participants to engage in poor hygienic practices and results in poor sanitation. For this reason, communicable diseases become a concern during Hajj. Cross infection between pilgrims is facilitated by environmental conditions such as dust that carries airborne diseases. Extreme heat and cold increase the incidence of communicable diseases such as influenza particularly as the large tents have no structural divisions and occupants are in close contact with each other during the period that they are in the tents.

Sub-themes

4.3.2.1 Cross infection

Mass gatherings such as Hajj put participants at risk of contracting and spreading infectious diseases because of overcrowding and the close proximity of people. This, in turn facilitates the spreading of infections during Hajj. Participants who had been on Hajj asserted to this and said:

"a tent with about 50 other women and you do not know their health status and you do not know whether they got some sort of infections" (A1)

"Because of the mixture of people, the risks of cross infection are very high" (E)

"Cross infection with the other pilgrims is simple. A lot of ladies in one room" (B)

Similarly, participants who had not been on Hajj shared their understanding of the importance of Hajj in facilitating the spread of infectious diseases among the participants. Participants were particularly concerned about upper respiratory conditions. They commented that:

"Performing of Hajj could cause cough" (ABC02)

"Postnasal drip is the most common thing... ...mixing and living in close proximity with people from different part of the world make the possibilities of picking it [postnasal drip] *up very wide" (ABCO3)*

"Sharing things like water bottles and ablution facilities is easier for disease to spread" (ABC202)

It is a common belief that pilgrims return home from Hajj with some kind of illness. When questions related to participants' experiences of illness was asked to those who had been on Hajj, participants emphasized on respiratory tract infections as their major health challenge.

"I took medications with me because I had a strong feeling that I was going to get flu" (E).

"I experienced cough and a lot of respiratory problems after returning home" (B)

"a lot of pilgrims when they do come back, they do suffer from flu, cough and cold" (B)

"I just had quite a bad respiratory infection" (A)

"I also had respiratory infections" (B)

In this study, some participants perceived the prevalence of respiratory diseases to be due to abstaining from drinking of "Zamzam" water, dust and extreme temperatures in Saudi Arabia. Participants who shared their views and said:

"I know people who have been to Hajj and [a] *few said they went to Hajj and got sick because they did not drink Zamzam water and they got flu, headache and cough" (ABC03)*

"I went to lesser Hajj, I did not drink cold Zamzam and I got postnasal drip" (ABC04)

On the other hand, some participants who had been on Hajj did not agree that Zamzam water causes respiratory infections.

"I do not agree that Zamzam cold or not causes flu, cough or postnasal drip". (ABC05)

"The underlying factors are the dusty air, mixing and living in close proximity". (ABC03).

A participant who had been on Hajj, thought it might be related to the air conditioners and change of temperature. In the participant's words:

"I do not know if it is attributed to the air conditioner and the change of temperature" (B)

4.3.2.2 Matters of Hygiene

Ablution facilities such as toilets and bathrooms are inadequate for the number of pilgrims attending Hajj. For this reason, maintenance of environmental sanitation and hygienic practices during Hajj by

both the organizers and participants become a challenging task and thus result in unhygienic practices by participants. This gives room for cross-infection of conditions such as diarrhoea and cholera during Hajj. In this study, participants expressed concern on the state of the ablution facilities during Hajj. Those who had been on Hajj said:

"The toilets are very dirty. You go to the toilet and you do not want to use it because it is dirty." (C)

"Major problem there is the bathrooms" (A2)

"Sanitation in the bathroom is one thing that needs to be sorted out" (A4)

Participants also shared their experiences on how they managed the poor and inadequate ablution facilities. One of the participants who had been on Hajj, said she had noticed that in the early morning hours the toilets and bathrooms are clean and good for use. She however advised that in the middle of the morning the bathrooms should be avoided if possible.

"We were early enough in the bathrooms but later on, in the day you could not use" (A)

Another participant who had been on Hajj added that

"I was not comfortable with using toilets" (E)

Some participants changed their behaviour, as the condition of the toilets was so unacceptable. It was common to reduce the quantity of food consumed or the amount of fluid taken in in order to reduce the need for using the toilets.

A female participant who had been on Hajj commented that:

"many ladies [women] *do not want to drink and eat because they are scared to use public facilities" You do not find people continue cleaning and it is a problem of hygiene" (A)*

Participants were also concerned about the level of environmental sanitation that they described as below average. Participants during Hajj are contributing to the poor environmental sanitation. Those participants who had been on Hajj expressed that:

"The sanitation was bad" (A2)

"The problem was hygiene in the environment, everywhere and everyone throws everything on the floor" (A2)

"There are [is] *a lot of stagnant water" (A)*

"A lot of ladies in one room [and using] *the same* [single] *bathroom" (B)*

Participants raised fear that the poor hygienic practices and poor environmental sanitation may give rise to bacterial growth which could lead to increased infection such as typhoid fever amidst overcrowding because the poor hygienic practices and sanitation will cause flies to thrive well contaminate water sources and food. The fact that the pilgrims are from different parts of the world may lead to diseases exportation.

A participant who had been on Hajj commented that:

"Waste disposal within the bathrooms, like sanitary pads, which is actually quite disturbing. Just general waste disposal in that micro-organisms like bacteria strive [thrive]" *(A4)*

Another participant was concerned and added that:

"I think in some of those areas [toilets and bathrooms] *is terrible that you will think that bacterial infections are all around" (A2)*

4.3.2.3 Environmental Contributions

The environment plays a role in the emergence and spread of diseases. It may impact on the existing health challenges of individuals. Variation in climatic conditions such changes of temperature contribute to the spread of infection. Saudi Arabia has a hot climate with temperatures that range from 22-37 degrees Celsius in winter and 27-45 degrees Celsius in summer. This temperature is unusual for many participants of Hajj especially those from the Northern Hemisphere where air conditioners are uncommonly used. In addition to this, the use of air conditioners may not be unrelated to prevalence of respiratory infections because it harbours and spreads Legionnaires disease that can affect the pilgrims' respiratory tract. In this study, the participants expressed concerns and even fear about Saudi Arabia's climate during their experiences.

When considering temperature, a participant who had been on Hajj said that:

"I had experienced an extreme temperature It was extreme heat" (A)

The same participant added that one could not avoid exposure to the extreme temperature in Saudi Arabia.

"You will be exposed to extreme heat" (A)

Another participant who had been on Hajj, said the weather was strange.

"I never experience such strange whether in my life. The nights were very cold and the days were very hot. We get like 45°C during the day time and in the evening we got like 40°C to 50°C" (A2).

Many participants advised that people who are planning to go for Hajj should have a thorough medical check-up and if they are found to be unhealthy or sick, they should postpone the trip until they are well. The environmental change of temperature could cause or exacerbate underlying health infectious and non-infectious conditions like Herpes Simplex virus infection and Diabetes, Asthma and Congestive Cardiac Failure (Balkhy, Memish, Bafaqeer *et al.*, 2004, Chamsi-Pasha *et al.*, 2014). The non-infectious diseases if exacerbated could tamper with a pilgrim's immunity and thus, make the pilgrim susceptible to infectious diseases and malaria because Saudi Arabia has both Anopheles mosquitoes and Aedes aegypti mosquitoes which cause malaria and yellow fever respectively. Those who shared their experiences had this to say:

"That is one thing [Malaria], *we did not realise that Saudi Arabian mosquitoes were so rampant……We had a lot of malaria……many people were quite infected with mosquitoes* [malaria]." *(A)*

"[My] *family members did get a bit sick due to the climate change because you coming up* [travelling] *from a very cold environment to the very hot" (F)*

"It [flu, cough and cold] *is attributed to the air conditioning and the change of temperature" (B)*

A participant who had not been on Hajj shared an opinion on the possible causes of respiratory infections beyond just a pathological cause and had this to say:

"I am of the opinion that there are other factors such as change of weather, season variation, dust" (ABC04)

Participants advised that anyone wishing to take part in the Hajj should postpone their trip if found sick on medical screening because of the high temperature that they believe could increase the spread of diseases.

A participant said that:

"You are planning on going to Hajj but you found out that you have something infectious, then first get treated and then perhaps go the following the year. So that, you do not spread it to someone else" (G)

Another participant shared views that were based on Islamic perspectives regarding Mass gatherings and Movement of Muslims when they are not well or planning to travel to an area where there are health challenges. The participant said:

"I am just going back and think of a hadith [saying] *of the prophet Muhammad where he instructed certain people who were fallen sick in a specific city not leave their city" (E)*

4.3.2.4 Safety of Food

Food safety is one of the areas Saudi Arabia pays more attention to during Hajj in order to maximise effort of safeguarding pilgrims against food borne diseases such as food poisoning, salmonella and gastroenteritis. Previously, food borne diseases were the greatest threat to pilgrims and Saudi Arabia during Hajj but because of the emphasis laid on food safety, the prevalence rate for these diseases has reduced slightly (Gautret *et al.*, 2015c). Similarly, the concerns regarding food safety is poor understanding of the factors contributing to contamination of food substances. For this reason, Saudi Arabia does not allow the importation of raw food substances by pilgrims into the Kingdom.

Despite Saudi Arabian efforts to minimise risks of food borne diseases, pilgrims fail to change their practice and continue to bring raw foodstuff into the country. This may be the reason for the continuing failure of the Saudi Arabia to eradicate food contamination and food borne diseases during Hajj.

Anecdotal studies have shown that African and Asian pilgrims patronise street vendors of their country and eat their type of food. Preparation of food in many of the street vendors' areas is substandard as many street vendors have poor hygiene practices, resulting in contaminated food (Dablool and Al-Ghamdi, 2011). However, pilgrims continue to eat and drink in spite of the poor hygiene. They develop food borne diseases because of lack of information and economic issues. In

this study, participants shared various reasons for eating from street vendors and taking food substances into Saudi Arabia during Hajj.

Participants who had not been on Hajj but performed lesser Hajj agreed that people eat from street vendors and take food to Hajj despite issues of food contamination and food borne disease because of economic reasons as food is expensive in Saudi Arabia.

"People buy from them for conveniences and to save money" (ABC201)

"Carry some food during lesser Hajj because food is quite expensive there" (ABC205)

"We also ate from street vendors because we look for the most economical food" (ABC205)

A participant who had been on Hajj felt that cultural and economic reasons might be the reason why the pilgrims consume food prepared by the street vendors.

"I think people want the cultural experience and also that cut for a lot people [this attitude is noticed in people from third world countries] *from the third world countries. They cannot afford the restaurants' charges. So, they gonna* [going to] *go for the local option" (A4).*

Participants denied the notion that street vendors' food caused health challenges. One participant said she had never seen or experienced food related challenges and did not believe that food from street vendors causes food poisoning.

"I do not know because I have never come across that. For me, it is very difficult to believe that it was the cause of food poisoning. I have never found something hazardous with it" (ABC05).

Other participants who had performed lesser Hajj but not Hajj said:

"I think the food is ok" (ABC202)

"I think, when we travel, because your body is not used to food in that place [you get ill] *this is not specific to Saudi Arabia. It is common with all travel" (ABC201)*

Some of those who had been to Hajj felt the food were good. A participant said:

"Street vendors [food is] *really delicious like the Turkish vendors. The streets are sometimes a lot better than a restaurant" (A1)*

4.3.2.5 Summary of Theme Two

The participants expressed that infectious diseases are a major threat to pilgrims and organisers of Hajj. Respiratory tract infections were the commonest issues affecting pilgrims during Hajj. This is similar to the findings of Gautret *et al.* (2009a). Those who had been on Hajj had commented on the various kinds of respiratory tract syndromes they had experienced during Hajj. Zamzam water, air conditioners, dusty environment, hot climate and overcrowding were amongst the common issues experienced by the participants who performed Hajj. Similarly, other infectious sources were linked to the unhygienic living conditions such as living in a room with 20 persons, a tent with more than 50 persons and unhygienic and dirty toilets. Participants added that they tried to compensate by reducing the amount of water and food they ate during their stay in order to avoid the need for use of bathrooms and toilets because they are dirty with used toiletries left on the floor. Combination of these issues could make cross infection of respiratory tract infections and blood borne infections so easily among pilgrims.

Participants confirmed that there were improved hygienic practices by food handlers during Hajj as presented in a study by Gautret *et al.* (2015c). This follows various comments made on the safety of street vendors' food that participants said they had eaten with no detrimental results.

4.2.3 Theme Three. Stressors related to Hajj

Hajj involves a series of spiritual activities that pilgrims carry out in a sequential Islamic order. While carrying out the activities, pilgrims walk from one place to another in over-crowded and hot conditions in order to fulfil the activities as required by Islam. This increases the physical demand on pilgrims and they perspire profusely and may become dehydrated. This may result in electrolyte imbalances and increase the risk and vulnerability for contamination by opportunistic organisms. By identifying and acknowledging the stressors and the potential risk that they impose on the pilgrims, measures can be taken to warn pilgrims to take precautions and have

Sub-themes

4.2.3.1 My body is tired

Hajj is a spiritual event that includes strenuous physical activity that could result in weight loss, profuse perspiration due to heat exposure and dehydration. In this study, participants expressed their views and experiences regarding the pilgrims' bodily responses to physical exertion which could result in mental and physical health problems.

Participants who had not been on Hajj expressed their views that Hajj is a spiritual duty that is much better performed during one's youth because it is associated with a lot of physical and mental health challenges that could make oneself susceptible to infectious diseases at Hajj. They said:

"It is also a very strenuous activity so that it also impacts to [on] *health" (ABC201)*

"It could be associated with fatigue" (ABC02)

"We all know that it can be problematic to all persons" (ABC01)

A participant who had been on Hajj agreed and expressed that Hajj activities cause someone's body to manifest various responses which may cause pilgrims to lose weight and in turn, predisposes pilgrims to infectious diseases. The participant expressed that:

"We suffered tiredness" (A2)

In addition to the above view on the body's reactions due to the Hajj activities, participants also agreed that the combination of extreme temperature, lack of sleep and strenuous activities could harm the pilgrims' ability to fight infections during Hajj and this may give room for disease transmission among pilgrims in close proximity.

A participant who had not been on Hajj was of the view that pilgrims do not sleep well during Hajj and this makes them prone to infections.

"*Lack of sleep as well, I will imagine may impact* [on] *someone health, make your body weaker and less able to respond to infections" (ABC02)*

Also, participants who had been on Hajj expressed that:

"In addition to a very strenuous trip, your immune system is suppressed and it takes long to fight infectious. My asthma flared up" (A)

"My brother fainted and he had heat stroke" (A1)

4.2.3.2 Physiological Imbalance

During Hajj, pilgrims usually become susceptible to infectious diseases because of the imbalances of body electrolytes and fluid content. The combination of extreme temperature, overcrowding and excessive sweating makes pilgrims to lose a lot of water and in turn, distort the electrolytes resulting in weight lost and as a result, pilgrims become susceptible to infectious diseases. Participants who had been on Hajj expressed how this combination of factors affected them and their relatives.

"At one stage I was dehydrated" (B)

"My mom fainted because of dehydration" (A4)

"It was extreme heat, dehydration" (A)

Other participants who had been on Hajj and experienced dehydration advised potential pilgrims to take enough water wherever they go during Hajj to avoid dehydration.

"Be well hydrated" (A3)

"Drinking plenty of fluid and need to be in air conditioned facility" (B)

4.3.3.4 Summary of Theme Three

Hajj is a physically demanding Islamic ritual that involves walking in hot and overcrowding conditions from dawn to sunset for a longer distance with stopovers at some places for prayer. The participants in this study had expressed concern regarding stressors associated with the Hajj that make pilgrims tired and disrupt their body fluids and electrolytes resulting in weight loss which in turn predisposes pilgrims to be prone to infectious diseases during Hajj. Participants identified dehydration, extreme temperature, and walking in close proximity with one another for a week as contributing factors to the susceptibility of pilgrims to infectious diseases during Hajj. The participants also advised that adequate fluid intake and staying in air-conditioned environment could minimise chances of pilgrims becoming susceptible due to weight loss secondary to dehydration.

4.4 SUMMARY

This chapter presented the findings of this study under three themes and eleven sub-themes that emerged from the use of an approach developed by Braun and Clarke (2013), called thematic analysis. The approach was used on the focus group discussions conducted and three themes and eleven sub-themes emerged.

The first theme that addressed the sources of health information as well as health information needs of potential pilgrims prior to departure and a part of the study's first objectives. It had five sub-themes that collectively explained the theme.

The second theme answered a part of the study's first objectives as shown in the next chapter on the discussion of findings section. The theme has four sub-themes that gave the detailed description of the theme.

The third and final theme had two sub-themes that described the theme's meaning as supported by the participants' quotes. This brought forth issues of health information or health advice for pilgrims during Hajj regarding factors that could make pilgrims susceptible to infectious diseases during Hajj resulting from a secondary weight loss

CHAPTER FIVE

DISCUSSION, SUMMARY, RECOMMENDATIONS, LIMITATIONS AND CONCLUSIONS

5.1 INTRODUCTION

This is the final chapter of the research report and connects chapter two and the findings presented in chapter four. It discusses the findings, limitations of the study and recommendations for future nursing research. A conclusion is reached from the findings.

In addition, this chapter reflects on the lessons learned and identifies the gaps. Literature was used to compare and support the interpretation of the participants' comments.

5.2 SUMMARY OF MAIN FINDINGS

The purpose of the study was to explore and describe the health information needs of the pilgrims attending Hajj, a mass gathering, in order to understand what is required to improve health practices and compliance with protective measures against infectious diseases before, during and after the event. This will help in minimising the spread of infectious diseases at the event. Hajj is the largest known mass gathering and occurs annually. Added to this the participants come from all over the world. Any outbreak of infectious diseases during this meeting creates a potential risk for global spread, a horrific thought when one recalls the international response to the Ebola outbreak in West Africa during 2014-2016.

The objectives of the study were:

To explore the experiences of illness in pilgrims who have attended Hajj and their infection prevention practices.

To explore the sources of the health information of people attending Hajj.

To explore the health information needs of pilgrims attending Hajj.

5.3 DISCUSSION OF FINDINGS

In the previous section the themes extracted were identified and excerpts to support the themes were included. Three themes were identified from the findings with eleven sub themes.

Mass gatherings such as Hajj predispose participants and organisers to the risks of contracting infectious diseases. Saudi Arabia implements various protective measures for effective utilisation by pilgrims during Hajj in order to reduce the risks of contracting and transmitting of diseases among pilgrims. Health education is believed to be the central point in health promotion as well as infection prevention and control (Wilhelmsson and Lindberg, 2009). These measures include health educational pamphlets, personal protective equipment such as face masks and visa linked vaccinations (Ahmed, Barbeschi and Memish, 2009). However, infectious diseases continue to be a threat in spite of the measures taken.

This study looked at the health information needs of pilgrims for protection against infectious diseases during Hajj. The participants consisted of two groups, those who had been on Hajj and those who had not. Males and females were included in each group and both groups of participants of this study expressed the need for health education awareness programs that deviate from the present way of providing health educational pamphlets to pilgrims before and during Hajj.

Themes identified have been discussed and excerpts given to illustrate the content. The findings were grouped into three themes. Eleven sub themes were extracted and grouped from the main themes. The researcher has identified the main concepts that emerged from each of the three themes in this section, and provided a thick description of these concepts which underpin the themes discussed. The description is supported by references to relevant literature.

Theme one: Preparation before departure

Mass gathering events like Hajj offer the ideal opportunity for the spread of infectious diseases. Preventing the spread of these diseases is important and the first step lies with the preparation of the pilgrims. Preparation for these events require both organisational and individual participant involvement in order to minimise the risks of importing, contracting and spreading infectious diseases within and outside of the hosting cities. This can be achieved through adequate planning, coordination and collaboration between participants, the hosting country and the countries from where the participants originate. (Leonard, 1996).

In this study most of the participants expressed that health preparation is a duty that individuals should actively embrace before leaving home for Saudi Arabia. Based on the participants' opinions, pilgrims should be screened for diseases before departure. They must make sure they do not go to Hajj with an infectious disease or a disease that could be exacerbated by the excessive physical demands of the Hajj. Compliance with the protective measures recommended by Saudi Arabia must be ensured by the Saudi Arabia embassies before issuing visas to individuals. Protective measures requested by Saudi Arabia include vaccinations against certain diseases before granting entry, health education awareness programs, and use of face masks. This is to increase pilgrims' health awareness level, change pilgrims' behaviour and improve pilgrims' hygiene practices. Improving compliance with measures such as face masks in turn would lead to a decrease in the chances of contracting infectious diseases during Hajj.

A few of the participants believed that such preparation is not necessary. They reported not having any vaccines before leaving for Hajj and they did not contract any infections. They added that they were not afraid of contracting infections during Hajj and did not know of anyone who had contracted any infection or illness either at the Hajj or on their return. Their report of not having had any vaccinations is questionable since it is a visa requirement and should also have been checked at the border entry into Saudi Arabia. It is also against the Islamic teachings to disobey rules. If true it is a serious matter that that requires addressing by Islamic teachers and Muslim health care workers.

Gautret, Soula, Parola *et al.* (2009b) recommended collaboration of stakeholders in a study they conducted on the knowledge of pilgrims regarding acute respiratory infections. In this study pilgrims refused to use face masks during Hajj because of their misunderstood perception that wearing anything apart from the garment called Ihram during Hajj is prohibited. Because of this, a participant suggested for its enforcement.

"I think it [Face Masks] *would be beneficial if enforced" (E)*

It was also found that elderly pilgrims were fatalistic about risks of contracting infections as they believed that they are under the protection of God. Death was not negatively considered. According to some authors, some pilgrims would even like to die during or immediately after Hajj so that they go straight to heaven (Alqahtani, Sheikh, Wiley *et al.*, 2015c).

"I would not be afraid of catching [a disease] *or getting sick" (ABC03)*

During the focus groups the topic of non-compliance to preventative precautions was discussed. One participant felt strongly that the Islamic teachings gave guidance.

"Three things must be taking into account. Number one- public predicament, number two- Alhifdhul-hayat [protection of lives] *and number three- we have to look at the dharuurat* [Needs]*....Based on at-least those three principles which I set out before you, if it is considered that those* [are] *appropriate measures to take then I would say I am for it to be used in that instance" (E)*

Based on this Islamic point of view, it can be said that surveillance of infections, prevention and control is the duty of everyone either as an organiser or a participant. Al-Tawfiq and Memish, (2014) said that although infectious diseases vary with the type of mass gathering events and the location of the events, adequate preparation is a necessity by the organisers and participants in order to minimise risks of causing epidemic and pandemic outbreaks such as the cholera outbreaks in the Hajj season of 1986 and the Meningococcal outbreaks of the 2000 and 2001 Hajj seasons.

Similarly, preparation is a central responsibility of the organisers and participants in any mass gathering events. It encompasses provision of public health information and health promotion,

coordination and collaboration, environmental health and food safety, health care role in vaccination, risk assessment and others (Al-Tawfiq and Memish, 2014; Leonard, 1996.). Therefore, it could be argued that public health information and health promotion is the primary preparatory stage against infectious diseases because of its vital and central role in health promotion and infection control and prevention (Wilhelmsson and Lindberg, 2009).

Participants who had not performed Hajj expressed willingness to seek knowledge and understanding regarding health promotion and diseases prevention before departure for Hajj. This is important because health education modifies individuals' poor health behaviour to a more positive one (Richard, Gendron, Beaudet *et al.*, 2010). Moreover, this finding concurs with Ahmed *et al.* (2009) who identified the need for health guidelines for pilgrims for the protection against infectious diseases during the event. However, according the findings of Alqahtani, Wiley, Tashani *et al.* (2016), pilgrims did not recognise any importance of seeking pre-travel health information because they preferred the information from family members and friends who had been on Hajj to the health professional information source.

Participants in this study identified that Saudi Arabian embassies all over the world together with travel agents are in the best position to provide health educational information to increase pilgrims' level of awareness concerning Hajj, health hazards associated with Hajj and protective measures available for such hazards. This comment was supported by the findings of a study by Al-Zahrani, Chaudhry and Alhamdan (2007) which showed the Ministry of Health in Saudi Arabia to be the central source of health information. This department is best suited to professionally collaborate with countries through the embassies worldwide and provide health information to pilgrims.

"Hajj Ministry [of Saudi Arabia], *they should be communicating with the Hajj authorities all over the world like here in South Africa, we have SAHUC" (B)*

"Basic health education must be obtained from Visa office website and travel agents office." (ABC05)

"Saudi Arabian embassy needs to put information on its website" (ABC203)

Both groups of participants in this study suggested the need for involving Muslim health care workers, especially Nurses and Doctors, to give health talks on infection prevention and control as well as importance of the use of available protective measures such as vaccination within a community before departure for Hajj. They also commented on visiting General Practitioners (GPs) for pre-travel health advice. These views are in agreement with the findings of Al-Zahrani *et al.* (2007) and Alqahtani *et al.*(2015b) which revealed that Middle East and Asian pilgrims seek pre-travel advice from General Practitioners, specialist travel clinics as well as health educational classes.

Previous anecdotal studies recommended the provision of health educational pamphlets to increase the level of awareness with regards to health and infection prevention and control. Unlike those studies participants in this study especially those who had been on Hajj, disagreed with and rejected the idea of pamphlets as a waste of resources. They maintain that people are not interested in reading and suggested a number of other options. Demonstrations, classes, availability of videos on the plane and use of technology for surveillance were deemed important. Some participants commented on the using modern technology in the preparation process. Detecting pilgrims in need of health assistance during Hajj and screening for diseases during accreditation processes before departure for mass gatherings was seen as an important part of prevention. This more modern approach could significantly facilitate an increase in the compliance with the protective measures against infectious diseases especially when cell phone software application is used.

This is supported by the findings of a pilot study on the use of a novel smartphone application to track travellers' health behaviour with regards to infectious diseases during mass gatherings. Hajj was used as an example and the study revealed that use of smartphone application in changing poor health belief and behaviour is feasible and showed an increase in the compliance with the non-pharmaceutical infection prevention and control measures (Alqahtani, BinDhim, Tashani *et al.*, 2015a). Similarly, Ibrahim (2016) in an integrative literature review supported the use of video conferences and social media such as Podcasts, Instagram, Twitter, YouTube, WhatsApp, and Facebook to spread health education information for the protection against infectious diseases

particularly during Mass gatherings and this era of emerging deadly infectious diseases such as Zika Virus, MERS-CoV and influenza viral strains among others.

Preparation for a mass gathering is not limited to seeking health information, it also covers vaccinations, the use of personal protective equipment and collaboration because preparation is a shared responsibility that brings all stake holders together during mass gatherings in order to safeguard global public health security through minimising the risks of importing and exporting infectious diseases from a host community. Annually, when Hajj approaches, Saudi Arabia reminds countries of the importance of vaccination. Vaccination in Saudi Arabia is a requirement for a visa but is limited to influenza, meningitis and yellow fever vaccines. These diseases are endemic in Saudi Arabia and there is global concern about the spread of these diseases.

The Saudi Arabian endemic diseases are however not the only concerns. Since this is a global gathering perhaps there should be some consideration of infectious diseases that are endemic to areas from which the pilgrims come. Vaccinations are available against Hepatitis B, Hepatitis C and Tuberculosis.

In addition, there is a growing concern about diseases for which there are no vaccines such as MER-CoV, Zika virus, Ebola virus, Swine and Avian Influenza. The participants in the study only knew of the vaccines which are compulsory for visa requirements for travelling to Hajj. Surprisingly, a few participants said they went to Hajj without vaccination while others from the two groups of the participants complained about the price as too expensive and debated on government involvement to subsidize the vaccines. This was rejected by overwhelming majority of the participants on the ground that there are many racial and religious groups, and these groups do also have their pilgrimage and require vaccinations before departure. Vaccines' price might be another reason for variable uptake of the compulsory vaccines among pilgrims. This is in addition to reasons identified by previous studies such as Barasheed, Rashid, Heron *et al.* (2014), Alqahtani *et al.* (2015b) that lack of knowledge, poor health preparation, misconception about vaccinations and others affect uptake of vaccines by pilgrims. The studies also shown that provision of health education prior to departure and pilgrims'

collaboration have the capacity to change pilgrims' behaviour and improve compliance or uptake of vaccines by pilgrims.

''we obviously know that immunizations are very expensive'' (ABC06)

''we are not the only racial or religious group [who have pilgrimage]*.....[If] government started funding vaccines, they cannot* [might not be able to] *fund basic things'' (ABC06)*

Moreover, another protective measure is appropriate use of face masks during mass gatherings for the prevention of spread of respiratory tract infections. A group of participants who had been on Hajj asserted that pilgrims wear face masks during Hajj especially on the day of Arafat (9th day of the month of Hajj). They also suggested the enforcement of the use of face masks during Hajj because of the increased prevalence of respiratory infections and its beneficial effect in reducing the spread of respiratory tract infections in overcrowded places. Gautret *et al.* (2009b) reported that pilgrims use face masks because it is freely supplied during Hajj by Saudi Arabia to promote its usage. In concordance of this finding, Alqahtani *et al.* (2015a) reports tremendous improvement in compliance with face masks during 2014 Hajj season. In addition to this, a study reveals that the reason for this improved compliance with face masks is not for protection against respiratory tract infections but air pollution (Alqahtani *et al.*, 2016). Similarly, in a study on air quality during Hajj, it was found that the air pollution was high and above the United Nation acceptable range. This is due to that fact that Saudi Arabia is a desert and dusty (Simpson, Aburizaiza, Siddique *et al.*, 2014).

The two groups of participants cited screening for diseases and taking a supply of medications to Hajj as preparatory approaches. Screening for diseases is important because it will lead to prompt identification and management of infectious disease such as Tuberculosis, Herpes simplex virus, Influenza, non-infectious such as Asthma and others. The participants advised that potential pilgrims should defer travelling to a time when they are completely healthy if diagnosed with an infection in the course of screening. This is consistent with the findings of a study that showed the banning of people from Sierra-Leone, Liberia and Guinea from 2014 Hajj Season because of the 2014 Ebola outbreaks in West Africa in order to prevent importation of the Ebola virus into Saudi Arabia (Al

Turki, 2015). It was an informed decision that was taken to safeguard the whole world because Hajj has the capacity to spread the disease to all parts of the world and could have caused a pandemic outbreak. During the 2012 Hajj season, Saudi Arabia deported many Iranian pilgrims back to Iran because of infectious diseases that were identified during the Hajj. The purpose was to prevent exportation of the diseases to other countries (Mortazavi, Torkan, Tabatabaei *et al.*, 2015).

Participants had exhibited a sign of lack of understanding and knowledge about the causes of food related infections such as cholera and food poisoning by denying the notion that food bought from street vendors may cause health challenges. This is a clear indicator of the urgent need for the provision of health information to potential pilgrims regarding the importance of personal hygiene, sanitation and hygienic preparation of food sold during mass gatherings such as Hajj. This is vital because proper sanitation and good hygienic practices and behaviours are the building block for infection free mass events.

The participants mentioned taking medication with them when going to Saudi Arabia for Hajj. The drugs included Antibiotics, Anti-Diarrhoea, Analgesics and Vitamins. Participants might have taken these medications with them to Hajj because of the ciprofloxacin given by Saudi Arabia at the point of entry into the Kingdom as a prophylaxis for meningitis. Memish, Zumla, Alhakeem *et al.* (2014), Alomi and Zahran (2015), Yezli, Saeed, Assiri *et al.* (2015) reported pilgrims receiving medications for prophylactic reasons including Antibiotics and Analgesics. Intake of medications without proper prescription is an act of abuse of medications and such action is a threat to infection prevention and control and may contribute to resistance of these organisms. For this reason, it might be useful to Saudi Arabia to involve infection prevention and control Nurses to monitor and ensure appropriate prescription and use of antibiotics during Hajj. This could help in partly preventing the antimicrobial resistance experienced by Saudi Arabia in the last ten years. Contributing factors may be people who go to Hajj from countries where antibiotics are obtained without prescription as well as the increased prevalence of respiratory tract infections during Hajj (Al-Tawfiq and Memish, 2014, Zowawi, 2016). Whatever the reason, adequate infection prevention and control measures need to be taken to reduce

the poor attitude and optimise the use of medications during Hajj and so reduce the prevalence of respiratory tract infections during Hajj.

Summary of theme one

Theme one has cut across all the three objectives of the research. It explores and describes in detail the sources of health information. These sources vary but could be expanded and modernised using digital technology for those pilgrims who are "techno-savvy". The information given during preparation for Hajj might be more plausible if it was done by nurses or doctors who speak with authority. These nurses should come from the same community as the pilgrims. They would then have a better knowledge of available resources and pilgrim support would improve. The countries of origin need to inform Saudi Arabia of any outbreaks of infectious diseases so that on arrival in Saudi Arabia, the pilgrims could be monitored for symptoms. They could also be isolated and hospitalised or even sent home if necessary.

Theme two: Unhygienic living conditions

Crowds are synonymous with mass gathering events such as Hajj and Hajj is a particularly large gathering sometimes consisting of as many as 3.5 million pilgrims. During Hajj facilities such as bathrooms and ablution facilities are inadequate. This results in participants engaging in poor hygienic practices. It results in poor sanitation, growth and spread of pathogens and spread of infectious diseases causing diseases among pilgrims. In spite of the large number of toilets and bathrooms in Mecca the participants in this study who had attended Hajj believed that the facilities are inadequate considering the numbers of pilgrims at Hajj. The participants who had performed Hajj commented on the level of hygiene of the toilets, bathrooms and the general environment. At the focus groups, they were clearly dismayed at the standard of hygiene of the facilities and felt that the toilets were only clean and safe to use early in the morning. They pointed out that the toilets and bathrooms are very dirty and poorly maintained. This resulted in pilgrims resolving to either reduce the intake of food and water or go to the toilets and bathrooms early in the morning when the toilets are clean. The toilets

are only cleaned once in a day and this was usually around midnight. Health education should include the adequate intake of water in spite of the reluctance to the use toilets in order to reduce the effect of dehydration and extreme heat.

The female toilets were a particular concern as no attention was placed on the specific needs of the female pilgrims. No bins for disposal of soiled toiletries were supplied and thus the female toilets were considered to be dirty. The state of ablution facilities together with the overcrowding of these facilities put the pilgrims at risk of contracting infectious diseases from blood and fluid borne sources. Pilgrims are exposed to overcrowding both on the streets as well as in the places of accommodation. The participants who had been to Hajj confirmed that there were more than 50 persons in one tent. Some had made use of rented rooms and also found that these rooms were crowded and had inadequate toilet facilities. The results of this study are similar to other studies. In one of the studies Johansson, Batty, Hayashi *et al.* (2012) reported that pilgrims are at risk of contracting and spreading infectious diseases during Hajj because of the overcrowding. Yamin (2015) concurred with Johansson *et al.* (2012) and argued that risks of cross infection during Hajj is inevitable because the overcrowding at Hajj is uncontrollable and a daunting task to manage. Yamin (2015) states that this is exacerbated by the illegal entry into Saudi Arabia by pilgrims who worsen the already overcrowded situation and increase the possibility of cross infection.

In this study the participants expressed fears of the possibility of cross infection. The participants who had been on Hajj shared their experiences of respiratory tract infections. This was said to be the most common infection that the pilgrims suffered. Many said that they had experienced cough, postnasal drip, flu, cold and undiagnosed respiratory infections either during or on return from Hajj.

These comments are consistent with findings of a study that reported a high prevalence of coughs among pilgrims across the seven continents during the 2009 Hajj season (Gautret, Benkouiten, Griffiths *et al.*, 2015b). The same study also stated that respiratory tract infections are the greatest threat and concern for both the organisers and pilgrims during Hajj. They are the main reason for hospitalisation due to resulting septic shock.

A systematic review conducted by Gautret, Benkouiten, Al-Tawfiq *et al.* (2015a) revealed that there is a risk of cross infection during Hajj that increases with pilgrims' poor hygienic practices. The same study identified respiratory tract infections and syndromes as the most common illnesses at Hajj. They stated that most of the pathogens are viral and spread easily between pilgrims in close proximity especially in the area of Mina where an average of 80 persons lives in a tent. The authors, Gautret, Soula, Delmont *et al.* (2009a) in a quantitative research study showed that the increased prevalence and frequent complaints of respiratory syndromes and infections were due to proximity in overcrowding which is believed to contribute to the spread of bacterial and viral pathogens causing respiratory and gastrointestinal infections during Hajj.

In this study in addition to the respiratory conditions, participants considered other factors such as the use of "Zamzam" water, dusty air, air conditioners and the very high temperatures in Saudi Arabia in the spread of infections.

Some studies have shown how factors such as air pollution, temperature and air conditioners cause respiratory tract infections. Gautret *et al.* (2015b) argued that air pollution affects Mecca. Since Saudi Arabia is a desert, the air contains a high dust load with pathogens. This air is inhaled by the pilgrims resulting in respiratory infections. Some of the participants who had performed Hajj believed that they had experienced respiratory illnesses because of time spent in the Haram (Holy Mosque) which has many air-conditioners. Researchers in the United Kingdom found that pilgrims from that country suffer upper respiratory tract infections because they spend a longer period in the Haram during Hajj (Rashid, Shafi, Haworth *et al.*, 2008). This would support the observations made by the participants in this study.

In addition to air conditioners, environmental factors also contribute to the spread of diseases during Hajj. Mecca, Saudi Arabia has a climate that is hot with a temperature of 37°C to 45°C during the day. In the group of participants who had been to Hajj, many expressed that the excessive heat had caused some of them to faint or become dehydrated. Some had experienced heat stroke. Through the participants' experiences in this study it was noted that extreme temperatures may predispose

participants to ill health. These conditions include exacerbation of existing infectious diseases or a relapse of a previous condition.

Extreme climatic temperatures when combined with poor sanitary conditions and practices such as throwing litter in the streets, failing to dispose of waste or allowing stagnant water to accumulate could lead to the breeding and growth of bacterial and viral pathogens as well as vectors such as Anopheles and Aedes aegypti mosquitoes. These pathogens spread and cause infections such as Typhoid fever when food substances are contaminated while the vectors spread Malaria and Yellow fever. Mimesh, Al-Khenaizan and Memish (2008) presented a similar finding in a triangular relationship between overcrowding conditions, high atmospheric temperature and poor hygienic practices. They argued that a combination of these conditions result in the breeding, growth and spreading or exacerbation of infectious diseases such as Herpes simplex virus, Yellow fever, Chickenpox, folliculitis and others. In the same study, it was reported that the high temperature in Mecca could create health hazards for pilgrims from the Northern hemisphere where lower temperatures are dominant and the pilgrims are not exposed routinely to infectious diseases common to the higher temperatures. Provision of evidence based and client directed health education prior to departure becomes important.

Dablool and Al-Ghamdi (2011) found that improper sanitation, poor hygienic practices by pilgrims and poor hand hygiene amongst food handlers, contaminate food substances resulting in food poisoning such as infection of Salmonellosis and Shigellosis. Abubakar, Gautret, Brunette *et al.*, (2012), Gautret, Benkouiten, Gaillard *et al.*,(2013) and Ahmed and Dablool, (2015) all describe the consumption of unpasteurised milk, lack of hand hygiene and the practise of spitting as poor hygienic practices which add to the risk of spreading infectious diseases.

Dablool and Al-Ghamdi (2011) identified lack of knowledge and denial as the reason for continuing consumption of food from street vendors during Hajj. In this study, it was observed that most of the participants did not believe that street vendors' food might be contaminated and unhygienic. Those who had eaten it did not experience any negative reactions. They commented that it was delicious.

They ate it for economic and cultural reasons. They were not used to the Arabian food and it was an affordable option. This finding was supported by the results of a study by Gautret, Benkouiten, Sridhar *et al.* (2015c) which found that gastrointestinal infections such as food poisoning, diarrhoea, gastroenteritis and cholera are no longer significant threats to the pilgrims.

The same study identified the improvement in sanitary conditions in Mecca as a reason for the lower prevalence of gastrointestinal infections during Hajj. However, there continues to be a lack of knowledge and understanding of the causes of gastrointestinal infections among international travellers (Swaminathan, Torresi, Schlagenhauf *et al.*, 2009, Gautret *et al.*, 2015c). This is confirmed in this study by various comments made by the participants that showed lack of concern about the consequences of patronising street vendors during Hajj. It is imperative for the organisers of mass gathering events such as Hajj to give special considerations to health education prior to the event in order to increase the health awareness of potential pilgrims and empower them to protect themselves against infectious diseases such as respiratory and gastrointestinal infections.

Theme three: Stressors related to Hajj

This theme does not deal directly with infectious diseases but rather a change in the state of the human body during mental and physical exhaustion both of which may result in rendering the body at risk of infection. Periods of exercise in extreme conditions and mental stress which includes spiritual pressure, are part of the activities required during Hajj. The participants in both groups of this study believed that the activities had some effect on the body and could result in placing the pilgrims at risk of illness.

The activities of Hajj are physically demanding and involve walking long distances in a crowd. The temperature is commonly greater than what many of the pilgrims are used to. As a result, pilgrims perspire and may lose excessive amounts of body fluid. Added to this the physical exertion of the long walks result in an increase in the metabolic rate and with it, the generation of body heat. This adds to the internal core temperature of the pilgrims increasing. As a result, heat fatigue and heat stroke may

occur. This may alter the immune response of the person since the physiological response of blood cells are altered during hyperthermia. The pilgrims are thus more at risk of contracting infectious diseases.

When pilgrims are physically tired and dehydrated, underlying illnesses may re-emerge. In this study participants expressed that body tiredness, lack of sleep and fatigue, emergence of underlying Asthma and imbalance of serum water and electrolyte levels are all associated with Hajj. The activities at Hajj which are carried out in hot climatic conditions and over crowdedness are more physically demanding for the elderly who make up a large proportion of the pilgrims. The combination of these factors cause pilgrims to sweat profusely becoming dehydrated which results in weight loss and delayed immune responses which increases the risk of becoming infected with infectious diseases. This result correlates with a study conducted by Al-Tawfiq, Gautret, Benkouiten *et al.* (2016) who explain that respiratory tract infections spread easily during Hajj because of the activities involved together with hot atmospheric temperature that result in loss of weight due to dehydration. Pilgrims become prone to any infections This also concurs with Parker (2010) who described Hajj as a very good place for contracting infectious diseases because of the combination of hot climatic conditions in Mecca coupled with overcrowding, poor sanitary conditions and Hajj associated physically demanding activities.

The concern with increased body temperature was also highlighted by a study conducted on heat exposure during Hajj (Noweir, Bafail and Jomoah, 2008). These authors however stated that lack of proper education and awareness about the effects of heat exposure is the main problem and not the extreme heat. To address this Saudi Arabia has installed water sprays and air conditioners at some of the most crowded areas of Hajj to reduce the effect of heat on pilgrims.

Provision of health education to improve the health awareness level of pilgrims with regards to heat exposure is vital and will assist in reducing effects of extreme heat thus promoting pilgrims' health during Hajj.

Summary of Theme Three

Saudi Arabian hot climatic conditions are a real concern to pilgrims who comprise mainly elderly persons above 50 years of age. Hot climatic temperature serves as a predisposing factor when combined with walking for hours in overcrowded conditions and causes dehydration and loss of body fluid resulting in increased susceptibility to infectious diseases. These may include respiratory tract infections and gastrointestinal infections when combined with poor sanitary and personal hygiene. Fatigue, dehydration and exacerbation of illnesses are all experiences of discomfort that participants expressed when they performed Hajj. This theme therefore added to the answers of the first objective which addresses the experiences of illnesses by the participants during Hajj.

Summary of the Discussion

To the best of the researcher's knowledge, this study is the first of its kind to be conducted from a nursing perspective. It addresses the notion that present health education for pilgrims attending Hajj encounters minimum significance in modifying individuals' health related behaviour. The participants in this study rejected health educational pamphlets which are the traditional health educational tools used when preparing for changing people's health related behaviour, hygienic practices, promoting people's health and improving compliance with protective measures prior to attending Hajj. The participants suggested the use of visual and demonstrative forms of health educational programs that are based on health experiences and information needs of pilgrims who have previously been to Hajj. This confirms the reports of Whitehead (2001) who viewed the role of nursing as promoting of health through disease prevention and control. It is important then that nurses understand the uniqueness of disease control and management during large gatherings of people such as Hajj and that the education approach is relevant to the needs of the attendees.

Health education is the central tool for promoting people's health and preventing ill-health through simplifying and improving compliance with the protective and preventive measures during events like Hajj. This was also the belief of Wilhelmsson and Lindberg (2009) who see the triage of health

promotion, health education as well as prevention and control of infectious diseases as largely the nurses' role regardless of the events, situation or settings.

Participants in this study who had attended Hajj as well as those who had not, expressed fears and concerns particularly about environmental factors such as high temperatures in Mecca, poor sanitary conditions and poor hygienic practices. The high cost of vaccines and other protective measures were also a concern. Both groups recommended more collaboration on a National level as well as between individuals who had experienced Hajj and those who were yet to make the pilgrimage. Collaboration between Saudi Arabia and those countries that have pilgrims attending Hajj may also impact positively on the control of infectious diseases for both parties. Health promotion is a holistic approach with nurses leading the education on preventing and controlling infections through education. Povlsen and Borup (2011) confirm an assertion that health promotion is a social and political nursing approach for giving people control of the determinants of health with the help of health education.

This study found that for health education to achieve the goal of infection prevention and control, environmental factors, personal hygiene practices, collaboration and prices of some of the protective measures must be considered.

The environmental factors are atmospheric temperature and environmental sanitation. In this study, it was found that high atmospheric temperature is a real problem during Hajj because it affects pilgrims particularly those from Northern hemisphere, by causing them to sweat profusely resulting in water and electrolyte imbalances. Pilgrims thus lose weight and become prone to infectious diseases such as respiratory tract infections. Therefore, it is vital for nurses to provide health education to pilgrims prior to departure for Hajj with emphasis on the use of air conditioners as well as water sprays to reduce the effect of the hot climate during Hajj.

In addition to this the poor sanitary practices give rise to the spread of Hepatitis A infection among pilgrims. Evidence based health education on Hepatitis and its protective measures need to be taught to pilgrims.

This study found that price of vaccines is a hindering factor for vaccine utilization by pilgrims during Hajj. The participants debated on the price of vaccines as some believed that the affordability is too high for many. This finding has not been previously described to the best of the researcher's knowledge and for this reason, more research need to be conducted to ascertain how prices of vaccines affect their utilization prior to Hajj. Participants suggested a collaboration or involvement of wealthy Muslim individuals and non-government organisations in subsidising vaccines to help with affordability for pilgrims prior to departure to Mecca for Hajj. They also recommended that it is important to bring in health professionals such as nurses and medical doctors who are based in communities to educate potential pilgrims on how to protect themselves against infectious diseases before and during Hajj.

This study also found the sources of health information for pilgrims to be Saudi Arabian Embassies all over the globe. Participants suggested that Saudi Arabia should collaborate with health organisations like World Health Organisation to produce and provide health information to all potential pilgrims before they leave their country.

In conclusion, the participants expressed the need for health information that is sourced from Saudi Arabia and should address their health and diseases experiences but not in the current format of pamphlet. They also felt that the health information should address all the factors that predispose pilgrims to infectious diseases during Hajj. These factors include the environmental and personal factors which include the hot climatic temperature, overcrowding, poor environmental sanitation and pilgrims' poor hygienic practices.

5.4 RECOMMENDATIONS

Recommendations are based on the findings of the study. This research examined the health information needs of pilgrims for the protection against infectious diseases during mass Muslim gatherings (Hajj). The study identifies the importance of infection prevention.

The recommendations have been grouped into three sections, those that will influence direct nursing care, those that require decisions and assistance from managers or require insertion into a training programme and lastly those that beg more research.

5.4.1 Recommendations for Nursing Practice

During any mass gathering Nursing plays an important role through members of the profession who prepare participants against infectious diseases and who are the first contact is in the event of emergencies. Nurses seldom provide health education to participants of mass gathering events such as Hajj. Therefore, it is recommended that the risks of mass gatherings should be incorporated into the curriculum of Nursing programs in order to effectively train and equip nurses with better preparation measures particularly against infectious diseases during mass gatherings. This incorporation gives nurses opportunities to promote people's health through positive changing of health and health related behaviours during mass gathering events, and also improve adherence to quality health practices and protective measures (Kemppainen, Tossavainen and Turunen, 2012)

5.4.2 Recommendations for Nursing Management of Mass Gathering events like Hajj

In this study, it was found that health information would be more acceptable and better utilised by participants of mass gatherings if digital technology was included. Therefore, it is important for the organisers to create keep up with modern trends and create an electronic link which could be used to send health information to participants and promptly identify and manage individuals who develop illness during mass gathering events

5.4.3 Recommendations for Nursing Research

Further research is required by Infection Prevention and Control nurses to obtain a more widespread opinion. If this type of study was carried out at Hajj, a larger sample could be obtained and opinions from the seven continents would be available on which to base the format and content of the health information required by pilgrims who wish to attend the largest mass gathering in the world.

5.4.4 What this study adds

The purpose of this study was to explore the health information needs of the pilgrims attending Hajj in order obtain information that may be of help in reducing the poor health practices and lack of compliance with the use of protective measures against infectious diseases before, during and after Hajj. This would help in minimising the spread of infectious diseases during the Hajj. In chapter two, literature related to the topic and research question was searched and reviewed while in chapter three, the research design and methods used in this research were described in detail. Similarly, in the previous chapter results were presented after being analysed using approach of Braun and Clarke thematic analysis. The participants both who had been on hajj and who had not been on hajj expressed views and opinions on the health information they thought pilgrims would need when going to Saudi Arabia for Hajj. Similarly, participants expressed various means of health educational program for the improvement of pilgrims' health awareness that deviate from the old way of providing health educational pamphlets to pilgrims before and during Hajj.

5.5 LIMITATIONS OF THE STUDY

The study was a small sample carried out in a university setting. The participants who attended the prayer meetings at the university were most likely educated and informed members of the greater population. Their opinions therefore might not represent the greater Johannesburg Muslim Community and thus cannot be generalised.

Because of the academic pressure on the participants during data collection, only four focus groups could be conducted instead of the planned eight. Saturation was achieved by that time and so data collection was completed.

The researcher accepts that there may be different interpretations and thus different themes extracted from the narratives in other contextual settings. This is possible because the method used in the analysis of the data is subjective.

5.6 CONCLUSIONS

In order to fulfil the purpose of this study three objectives were set and achieved. The study's purpose was to explore the health information needs of pilgrims in order to simplify and improve compliance with protective measures during Mass Muslim gatherings (Hajj). The findings of the study showed that pilgrims need a holistic health educational program that addresses their experiences of illnesses and chosen format as educational pamphlets are no longer effective. The findings also revealed that collaboration is useful as it helps in spreading messages of health and diseases simply and yields effective results.

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Appendix A

EXPLORING THE HEALTH INFORMATION OF PILGRIMS AGAINSTINFECTIOUS DISEASES DURING MASS MUSLIM GATHERING (HAJJ

Samples of questions to be used in interview

GROUP 1(Participants who have performed Hajj) :

1. What year did you perform Hajj?
2. Describe your health status before you departed for Mecca.
3. What hygiene protection considerations if any, did you take before leaving to protect you against infectious diseases?
4. Tell me about your hygiene experiences and how you tried to remain healthy during the Hajj.
5. What was your state of health on returning home?
6. What do you consider is important for participants of Hajj to know in order to protect themselves against infectious diseases during the Hajj?

GROUP 2 (Participants who have not performed Hajj):

1. Firstly, how do you think Hajj will influence the pilgrims' health?
2. How would you prepare yourself in terms of your health, prior to departure for Saudi Arabia for Hajj?
3. What would you like to know before performing Hajj in order to protect yourself against contracting infectious diseases during the Hajj?

Appendix B

Department of Nursing Education
School of Therapeutics
Faculty of Health Sciences
University of the Witwatersrand
Johannesburg.
3rd February, 2016

The Deputy Registrar
University of Witwatersrand
Johannesburg.

Dear Madam,

APPLICATION FOR PERMISSION TO CONDUCT A STUDY

I am Dalhat Mohammed Nasir, a postgraduate student in the Department of Nursing Education. I wish to apply for permission to conduct research in order to carry out a study at the medical school and main campus Muslim Musallas (Mosques). This is for the purpose of meeting the requirement for the Master's degree in Nursing Science. The study is aimed at developing an educational pamphlet for pilgrims to use to protect themselves against contracting infectious diseases during Hajj.

The study is qualitative research and data will be collected from Muslim participants using a focus group discussion. Participation in the study is voluntary and anonymous. Information given will be recorded, transcribed verbatim and kept confidential and anonymous according to the requirements of the Ethics Committee (Medical) of the University.

The discussion will be centred on the need for the development of an educational pamphlet for the prevention of infectious diseases during the mass Muslim gathering (Hajj). The participants will comprise of males and females over the age of 18 and 16 years of age respectively, who have performed Hajj and who are yet to undertake this pilgrimage.

For more information or any queries, please contact me on +27732750130.

Yours Sincerely,

DALHAT MOHAMMED NASIR

Appendix C

Department of Nursing Education
School of Therapeutics
Faculty of Health Sciences
University of the Witwatersrand
Johannesburg.

3rd February, 2016

Muslim Student Association
University of Witwatersrand
Johannesburg.

Dear Madam,

APPLICATION FOR PERMISSION TO CONDUCT A STUDY

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For more information or any queries, please contact me on +27732750130.

Yours Sincerely,

DALHAT MOHAMMED NASIR

Appendix D

INFORMATION FOR THE PARTICIPANT WHO HAS BEEN TO HAJJ

EXPLORING THE HEALTH INFORMATION NEEDS OF PILGRIMS FOR THE PROTECTION AGAINST INFECTIOUS DISEASES DURING MASS MUSLIM GATHERINGS (HAJJ)

Assalamu Alaika/Alaiki.

I am DALHAT MOHAMMED NASIR, a student in the Faculty of Health Science, University of the Witwatersrand. I am currently studying for my Masters' degree. My research study is aimed at exploring the health information needs of the pilgrims attending Hajj in order to know what is required to reduce poor health practices and improve compliance with protective measures against infectious diseases before, during and after Hajj. I would like to invite you to participate as one of a focus group that will discuss information that you think will be useful to pilgrims travelling to Hajj.

Since you have performed Hajj, your participation is important and this information would be useful to Muslim pilgrims to improve their health knowledge. In sharing your own opinion of what you believe is important to remain healthy you will be assisting me in knowing what is required to reduce poor health practices and simplify and improve compliance with protective measures against infectious diseases before, during and after Hajj. I request to you to meet with me as part of a focus group for a voice recorded discussion with other participants who have performed Hajj. This discussion will last for approximately an hour and recordings will be kept in the department mentioned below for 2years after the work has been published and 6years if it has not been published.

All information provided by you or any other participant will be kept confidential and anonymous. Your name will not be linked to either recordings or transcribed data and will only be accessible to the research team even after reporting or publishing the research. However, confidentiality during discussions cannot be guaranteed because Focus Group Discussion entails bringing in people of similar background and/or experiences together with a sole aim to discuss an issue of interest under the guidance of a facilitator or researcher in the case of a study.

As a participant, you have a right to withdraw your involvement at any stage in the course of the study without repercussion or penalty. Your participation is purely voluntary.

Permission to conduct this study was sought and obtained from the Human Research Ethics and postgraduate research studies committees of the Faculty of Health Sciences, University of the Witwatersrand, Deputy Registrar and Dean of Student Affairs of the same University.

The Study is being supervised by the Department of Nursing Education at the University of the Witwatersrand. If you have any inquiries, complaints or queries about the study you are welcome to contact either of the following:

1. Dalhat Mohammed NASIR 07032750130
mdnasir2031@gmail.com, 884579@students.wits.ac.za,
2. Mrs. Andrea Hayward +27114884271
andrea.hayward2@wits.ac.za,

Appendix E

INFORMATION FOR THE PARTICIPANT WHO HAS NOT BEEN TO HAJJ

EXPLORING THE HEALTH INFORMATION NEEDS OF PILGRIMS FOR THE PROTECTION AGAINST INFECTIOUS DISEASES DURING MASS MUSLIM GATHERINGS (HAJJ)

Assalamu Alaika/Alaiki

I am DALHAT MOHAMMED NASIR, a student in the Faculty of Health Sciences, University of the Witwatersrand. I am currently studying for my Masters' degree. My research study is aimed at exploring the health information needs of the pilgrims attending Hajj in order to know what is required to reduce poor health practices and simplify and improve compliance with protective measures against infectious diseases before, during and after Hajj. I would like to invite you to participate as one of a focus group that will discuss information that you think will be useful to pilgrims travelling to Hajj.

Although you have not performed Hajj, your participation is important. We would like to know about your existing understanding of how to retain your health status and your health concerns during this period of performing Hajj. This information would be useful in knowing what is required to reduce poor health practices and simplify and improve compliance with protective measures against infectious diseases before, during and after Hajj. In doing so the researcher hopes to reduce the chances of the Pilgrims contracting contagious diseases whilst in Mecca.

I request to you to meet with me as part of a focus group for a recorded discussion with other participants. This discussion will last for approximately an hour and recordings will be kept in the department mentioned below for 2years after the work has been published and 6years if it has not been published.

Open ended questions will be posed to get your input on what you believe to be crucial for potential pilgrims to know in order to protect themselves against infectious disease. All information provided by you or any other participant will be kept confidential and anonymous. However, confidentiality during discussions cannot be guaranteed because Focus Group Discussion entails bringing in people of similar background and/or experiences together with a sole aim to discuss an issue of interest under the guidance of a facilitator or researcher in the case of a study.

Your name will not be linked to either recordings or transcribed data, and data will only be accessible to the research team even after reporting or publishing the research.

As a participant, you have a right to withdraw your involvement at any stage in the course of the study without repercussion or penalty. Your participation is purely voluntary (right to self-determination).

Permission to conduct this study was sought and obtained from the Human Research Ethics and postgraduate research studies committees of the Faculty of Health Sciences, University of the Witwatersrand, Deputy Registrar and Dean of Student Affairs.

The Study is being supervised by the Department of Nursing Education at the University of the Witwatersrand. If you have If you have any inquiries, complaints or queries about the study you are welcome to contact any of the following:

1. Dalhat Mohammed NASIR +277032750130
mdnasir2031@gmail.com, 884579@students.wits.ac.za,
2. Mrs. Andrea Hayward +27114884271 andrea.hayward2@wits.ac.za,

Appendix F

Permission from the participant.

EXPLORING THE HEALTH INFORMATION OF PILGRIMS AGAINSTINFECTIOUS DISEASES DURING MASS MUSLIM GATHERING (HAJJ).

I agree to participate in this study. I have read the proposed method of data collection and understand that I will be able to make alterations during the process, should I not agree with the interpretation. I also understand that the researcher will maintain my privacy.

I know that the Human Research, Ethics and Publications Committee of the Faculty of Health Sciences, University of Witwatersrand has approved the study and I am aware that the results will be used for scientific purposes and will be published.

I hereby agree to participate in the study.

……

Name of participant

…… ……

Signature Date

Appendix G

Permission from the participant.

EXPLORING THE HEALTH INFORMATION OF PILGRIMS AGAINSTINFECTIOUS DISEASES DURING MASS MUSLIM GATHERING (HAJJ).

CONSENT FORM FOR RECORDING A CONVERSATIONAL INTERVIEW

I have been given the information about this study. I have read the proposed method of data collection and understand that this will include a tape recording of the conversations.

I will be able to make alterations during the process, should I not agree with the interpretation.

I consent to the researcher recording the interview and understand that my name will not appear in any documentation.

……

Name of participant

…… ……

Signature Date

APPENDIX H: ETHICS APPROVAL

APPENDIX I: ASSESSORS APPROVAL

APPENDIX J: APPROVAL OF DEPUTY REGISTRAR TO CONDUCT THE STUDY

SAMPLE OF TRANSCRIPT (TRANSCRIPTS OF GROUP THREE)

TRANSCRIPTS 003 THOSE WHO HAVE BEEN TO HAJJ

QUESTION 1: TELL ME ABOUT YOUR EXPERIENCES OF HAJJ?

A… A very uplifting experience and very humble experience, these are my experience.

PROBE: Could you expatiate more on illness? Please

A…..Probably the holy cities and the historical sites were [are] very special and working in the footsteps of where Islam was born and how things evolved and going to the sites of the battles help us to connect with what we learned with the physical locations. I think also in terms of everyone feeling heightened in waiting this experience. So, everyone was quite attuned to and opened to the exposure that we were getting. So, we created a bond with people in our group, that was quite special and it continues later.

B…..I think for me, Masjid Nabawi [PROPHET'S MOSQUE IN MEDINA] absolutely wholesome. The first sighting of it was very special and also the first sighting of the Ka'aba [BUILDING OF THE KA'ABA] is still printed on my mind.

PROBE: Anything like flu during the hajj?

A….Alhamdulillah [I THANK GOD], I was very lucky, I only got FLU on my return not during Hajj.

B… All I can say is that it was a humble and spiritual experience. For me as well, I did not get anything like illness while I was there Alhamdulillah. What I did experience actually was dehydration. At one stage I was dehydrated and went to see a doctor who gave me advice as what to do such as drinking plenty of fluid and need to be in air conditioned facility and that, actually helped much with heat exposure and dehydration.

PROBE: Was dehydration the only experience?

B…. Dehydration and Fatigue

A… For us what we found was because the bathroom facilities are always far from hotels and if you were in the mosque and you are walking around from the hotel not the mosque, you will be exposed to extreme heat and in order to not miss one salat [PRAYER] after another when you sat in the haram, you then managed your intake of fluids and it actually then hindered you after that. So, that was the way out that we always had to make.

A… I think there [we were] is normally scared to drink and eat because the facilities are not good at all. So many people using one facility. [redacted]. You do not find people continue cleaning and it is a problem of hygiene and women do not really want to. That is, there are problems like infections, dehydration, constipation and stuff like that.