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**Barriers to and facilitators of research utilisation
among nurses in Saudi Arabia**

A thesis submitted in fulfilment of the requirements for the degree of
Doctor of Philosophy

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Declaration

I certify that except where due acknowledgement has been made, the work is that of the author alone; the work has not been submitted previously, in whole or in part, to qualify for any other academic award; the content of the thesis is the result of work which has been carried out since the official commencement date of the approved research program; any editorial work carried out by a third party is acknowledged; and, ethics procedures and guidelines have been followed.

Mohammed Saleh Almalki

Signed: _____ Date: 28/09/2017

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List of Abbreviations

ACLS	Advanced Cardiovascular Life Support
ANOVA	Analysis of variance
BLS	Basic life support
BSN	Bachelor of Science in Nursing
CHEAN	College Human Ethics Advisory Network
CPR	Cardiopulmonary resuscitation
EBP	Evidence-based practice
ICU	Intensive Care Unit
IRB	Institutional Review Board
JCI	Joint Commission International
KSA	Kingdom of Saudi Arabia
MOH	Ministry of Health
ORA	Office of Research Affairs
PLS	Plain language statement
PUSH	Promoting the utilisation of science in healthcare
REAP	Research endeavours among paediatric nurse practitioners
RMIT	Royal Melbourne Institute of Technology
SNB	Saudi Nursing Board
SPSS	Statistical Package for the Social Sciences
UK	United Kingdom
USA	United States of America
WHO	World Health Organisation

Abstract

Background: Research utilisation can be defined as the synthesis and application of research evidence to the clinical nursing care settings. Research utilisation results in Evidence-Based Practice (EBP) which is considered an important factor in improving the quality of health care as well as providing a comprehensive database of EBP for all health fields including nursing. The successful utilisation and application of research findings depend on nurses' knowledge and understanding of EBP concepts and its application within the organisational context. Knowledgeable nurses who practise EBP not only gain patients trust but also play a role in many treatments or medical decisions which result in higher quality care. However, for decades it was perceived that research utilisation may or may not be translated into a clinical setting through material such as clinical protocol or clinical guidelines. Regardless of the importance of and nurses' acceptance of utilising research findings in nursing practice, there exist barriers and facilitators to research utilisation and the application of EBP among nurses.

Aim: The aim of this study was to examine the perceived barriers to, and facilitators of, research utilisation among nurses in five hospitals in the Riyadh region of Saudi Arabia.

Method: This study adopted a cross-sectional descriptive research design to investigate the barriers to, and the facilitators of research utilisation, among nurses in Saudi Arabia. It was undertaken at five hospitals within a variety of health care sectors in Saudi Arabia, including governmental and educational hospitals in Riyadh

The Barrier Scale and the Facilitator Scale were both used to obtain data from participants in the study and in addition participants also completed a demographic survey. The Barrier Scale consisted of 35 items, 29 of which required nurses' perceptions on statements based on barriers to research on a five point Likert scale.

Likewise the Facilitator Scale, another five point Likert scale, was comprised of eight items which asked nurses to rate the extent to which they agreed or disagreed whether each of the items posed as a facilitator to research.

Prior to the data collection, ethics approval was obtained from the College of Human Ethics Advisory Network (CHEAN) of the Royal Melbourne Institute of Technology University (BSEHAPP 38-14 JONES-ALMALKI).

A convenience sample of nurses from the five selected hospitals was invited to participate in the study. The sample included clinical nurses, nurse educators, and nurse managers who had a minimum experience of two years in nursing.

Results: A sample size of 1824 from a possible total of 2650 (86%) nurses participated in the study. The results indicated that the majority of the participants were females, with an average age of 20 to 40 years, with a Bachelor qualification, 6 to 10 years of experience, overwhelmingly expatriate, mainly from the Philippines, and were clinical nurses. Demographic data differed across the five hospitals. The major barriers ascertained through this study were insufficient time to implement new ideas, lack of authority, unclear practice implications and not having time to read the nursing research literature. Nurses who had Masters qualification and who were nurse educators were more likely to have a higher Barrier Score. The most common facilitators identified were advanced education, providing colleague support, conducting more clinically relevant research and employing nurses with research skills. Nurses with a Masters qualification, were nurse educators, who had more experience and who were Western educated tended to have the highest Facilitator Scores. An exploratory factor analysis of the Barrier Scale identified five factors. These were conceptualised as: lack of incentives in applying research, drawbacks in applying research, drawbacks in consuming research, inadequacies of current research and implementing research.

There were also differences in what constituted facilitators to research utilisation between the five different hospitals. Nurses, who believed that there was a research culture in their hospitals, were more likely to subscribe to journals and read research articles. Hospitals differed in their strategies to apply EBP with no standardised guidelines to streamline nursing practice in hospitals in Saudi Arabia.

Discussion: Much of the literature concurs with the demographics of the survey participants. The thesis results however, extend much of the literature in correlating the demographics with the barriers of and facilitators to research utilisation. There is also little in the literature in terms of a detailed analysis of the facilitators which this study with its large data set attempts to achieve.

Conclusion: This study provides an evidence base for nursing education in Saudi Arabia. It identifies barriers and facilitators that impede conducting and applying research findings to nursing practice as well as the need to improve research and reading skills to facilitate interpreting research. This could be achieved through a number of strategies such as regular in-service sessions that specifically apply research evidence to practice through case studies. For nursing education, this study provides the foundation for research education that specifically develops nurses' abilities and skills to read, understand, and interpret research. The study results also enable universities and other institutions that educate nurses to ensure that this research education is in their curricula. For further research, a more in-depth study is recommended in order to further explore nurses' perceptions of the barriers to research utilisation and strategies they believe will assist.

Keywords

Barriers, facilitators, Saudi Arabia research utilisation, evidence-based practice.

Chapter 1: Introduction

1.1. Introduction

This chapter provides an overview of the research study undertaken for this thesis including, its aims and specific objectives. Further, it also presents the study rationale with the significance of its findings to nursing practice, to nursing education as well as to management. Finally, this chapter also presents an overview of the individual chapters in the thesis.

1.2. Background of the study

This study examines nursing education, nursing roles and the organisation of care that may facilitate or limit research utilisation. The motivation for this study arose from the Saudi researcher's clinical experience and observations whilst working across different nursing specialities and managing day-to-day staff nurses' activities across various health care settings in Saudi Arabia. This study will contribute to nursing knowledge as it explores nurses' perspectives of the barriers to and facilitators of the utilisation of research findings in their practices within the nursing culture of Saudi Arabia.

Research utilisation has been defined as an application of a specific kind of knowledge as well as the use of knowledge based on studies in clinical settings (Fineout-Overholt, Melnyk & Schultz, 2005). However, for decades it was perceived that research utilisation may or may not be translated into clinical practice via clinical protocols or clinical guidelines (Estabrooks, 1999). The latter author indicates that the term research utilisation is used in conjunction with the term Evidence-Based Practice (EBP). However, evidence-based practice is more general and might form the umbrella under which is encompassed research utilisation (Estabrooks, 1999). Evidence-based

practice is not only applying research findings but it might also include knowledge gained from practical experience or expert opinions and is the output of a complex process of which one aspect is research utilisation. Thus, this is achieved by the synthesis and application of research evidence and combines them with the proficiency and value of the health care providers (Melnyk & Fineout-Overholt, 2015). Evidence-based practice was first defined by Sackett and colleagues (1998) as:

> the integration of our clinical expertise with the best available external evidence and patients' values by translating our need for information into an answerable question and then tracking down the best information with which to answer the question (p. 1336).

Evidence-Based Practice (EBP) has been considered an important factor in improving the quality of health care (Cummings, Estabrooks, Midodzi, Wallin & Hayduk, 2007). The practice of EBP is influenced by the sources of evidence (level), the practitioner's experience (providers), and the desires and expectation of those being served and cared for (patients) (Melnyk & Fineout-Overholt, 2015). Research utilisation and application are essential in promoting and providing a comprehensive database of EBP for all health fields including nursing (Department of Health, 2013). However, in the latter, as EBP continues to develop it does demand more responsibility from health care practitioners including nurses in inclusion of the practice in their working life. Furthermore, the successful utilisation and application of research findings depend on an understanding of all concepts related to EBP and its application within the organisation context (Brown et al., 2010).

Understanding the effect of research utilisation and EBP in a variety of organisational and cultural contexts is crucial in providing high quality care in health care institutions. There are many benefits that are obtained from using EBP in health care settings.

Evidence-Based Practice has the potential to impact on the quality of care provided to patients and their families in various health care settings (Melnyk & Fineout-Overholt, 2015). Indeed patients assume that health care providers know what works best in treating their health care condition(s) and that health care practitioner's practise accordingly (Courtney & McCutcheon, 2010). Furthermore, it was not surprising that knowledgeable nurses who practise EBP not only gain patients' trust but also have a role in many treatments or medical decisions which achieve higher quality care (Hogue, Palin & Arrowsmith, 2006). Hogue, Palin and Arrowsmith (2006) reviewed evidence-based recommendations for investigations in cardiac surgical patients to evaluate the impact of current cardiopulmonary bypass management strategies for neurologic complications in an effort to optimise patients' care and outcomes. The review highlighted deficiencies in the current knowledge and traditional practice that doctors depend on to guide patients' care during cardiopulmonary bypass and suggested multicentre research was needed to alleviate neurologic complications and improve the evidence-based practice. More recently, a meta-analysis highlighted various nurses' roles and demonstrated that nurse practitioners who were applying evidence-based practice and who provided more health promotion scored higher on quality of care measures than physicians (Tricco et al., 2012). Similarly, a panel of 10 experts in the field of spinal cord trauma endorsed recommendations based on the evidence and critical review of the literature and meta- analysis (Furlan, Noonan, Cadotte & Fehlings, 2011). This was regarding the pre-clinical and clinical evidence on the potential impact of timing of surgical decompression of the spinal cord on outcomes after traumatic spinal cord injury. The meta-analysis part of the reviewed studies examined the effectiveness of non-pharmacological interventions in the management of pain and indicated that non-pharmacological nursing interventions can be effective in specific cases or as an adjunct in others (Furlan et al., 2011). This indeed showed that

even nursing interventions change over time on the assessed needs of patients (evidence-based practice). Some and selected traditional nursing interventions were part of the evidence-based procedures and were still applied and effective for managing pain in patients with spinal cord surgeries (Furlan et al., 2011).

For nurses, research utilisation and EBP improve nurses' performance according to the latest research findings in the literature (Cline, Burger, Amankwah, Goldenberg & Ghazarian, 2017; Department of Health, 2013; Heaslip, Hewitt-Taylor & Rowe, 2012). It has been well established that EBP advances nurses' decision making ability and improves their ability to prepare more focused care plans that end up with efficient care (Polit & Beck, 2004). In addition, nurses who practise EBP have been found to be empowered and can practise with high self-confidence and in a professional manner because they provide care supported by facts rather than routine (Courtney & McCutcheon, 2010). In other words, nurses who practise EBP can practise by the evidence of effectiveness rather than from traditional practise. Moreover, nurses and other health care providers using EBP can initiate or adopt practice guidelines and improve their judgments and abilities to reduce human errors and advance their communication skills (Oxman, 2004). This indeed, might give nurses the opportunity to be involved in setting rules and regulations for health care practice.

Furthermore, reduction of human errors though EBP may decrease organisational burden and costs and consequently decrease the admission and readmission rate (Courtney & McCutcheon, 2010). Research utilisation and EBP can be incorporated within the institutional policy and reflected in guidelines and management plans to improve staff commitment (Sutherland, Pullin, Dolman & Knight, 2004). However, the constant challenge is for all organisations to evaluate research utilisation regularly, and to disseminate and prioritise research results for application in practice (Funk, Tornquist & Champagne, 1995). While it is difficult to estimate the cost of

change accurately, it is recommended to weigh the expected health benefits in conjunction with the harms if present, in utilising research findings which can be validated by the health care outcomes (Oxman, 2004).

For some time, it was perceived that research utilisation may or may not be transferred to clinical practice, such as through clinical protocols or guidelines. Regardless of the importance of and nurses' acceptance of utilising research findings in nursing practice, there are still barriers to research utilisation and application of EBP among nurses. There is a paucity of research undertaken in Saudi Arabia that has explored this in detail.

1.3. Aim of the study

The overall aim of this study was to examine the perceived barriers to and facilitators of research utilisation among nurses working in hospitals in the Riyadh region of Saudi Arabia.

1.4. Objectives of the study

The overall objectives of this research study are:

1. Explore nurses' perceptions of the barriers to utilisation of research findings in nursing practice in the Saudi Arabia hospitals included in the study.

2. Explore nurses' perceptions on factors that facilitate utilisation of research findings in nursing practice in Saudi Arabia hospitals included in the study.

3. Describe nurses' perceptions on the impact of culture (personal, organisational and environmental) on the utilisation of research finding in nursing practice in the Saudi Arabia hospitals included in the study.

4. Explore how barriers and facilitators of research utilisation may differ with selected nurses' characteristics and demographics.

5. Use exploratory factor analysis to identify key factors underlying each of the items of the Barrier Scale.

1.5. Significance of the study

Nursing research has developed significantly throughout recent years, remarkably increasing nurses' knowledge and improving nursing practice. There is high demand for the utilisation of research findings and newly developed theories in nursing practice. According to Polit, Beck and Hungler (2001) research allows nurses to describe characteristics of a particular nursing situation which may be under researched, clarify phenomena that might be considered in planning nursing care, expect the probable outcomes of certain nursing decisions, control the occurrence of undesired outcomes, and initiate activities to promote desired patient behaviour. Nurses are increasingly expected to use EBP to improve the quality of health care. Regardless of nurses' acceptance of utilising research findings in nursing practice, there are still barriers to research utilisation among nurses.

For some time, there was high demand on building the nursing practice on rigorous research evidence which highlights clients' needs and consequently focus on professional nursing care and through advanced practice nurses (Gerrish et al., 2011). More recently, there was an important role for advanced practice nurses in promoting best practice among clinical nurses (Hamric, Hanson, Tracy & O'Grady, 2013). The authors determined that knowledge management and promoting and updating knowledge were key components of what they called 'knowledge brokering'. In the latter, the process of involving and managing knowledge generate evidence in different nursing fields, accumulating this evidence to work as a foundation for providing care in clinical areas and synthesising different types of evidence to create the body of evidence- based practice. This results in advanced practice nurses who promote the uptake of evidence through the development of knowledge and skills of clinical nurses through role modelling, education, clinical skills in problem-solving and facilitating the process of changing nursing practice according to research findings.

In tandem with other countries in the world, the nursing profession in Saudi Arabia needs to utilise research findings in clinical practice to achieve optimum levels of EBP. However, this requirement has been accompanied with a scarcity of research of the barriers to and facilitators of research utilisation in hospitals in Saudi Arabia. A study by Omer (2012) has been the only study to date which has explored barriers to and facilitators of research finding utilisation in nursing practice in Saudi Arabia. The study recruited and surveyed nurses who worked in Saudi National Guard hospitals only which were located in the cities of Riyadh, Jeddah, and Al-Ahsa. The response rate of this study was less than 50% and they recommended that a large study was needed in Saudi Arabia. Further discussion on this study will be presented in Chapter 3.

Despite the findings from the Omer (2012) study there was a large gap in the literature regarding nursing research utilisation in Saudi Arabia because of its narrow focus on national Guard Hospitals. The findings provided policymakers and administrators with baseline information about issues that affect nurses' application of research evidence in clinical practice. With the restricting of the Omer (2012) study to a selected area in Saudi Arabia and the valuable information it provided to policy makers, this indeed provides encouragement that such research would be crucial to build supportive policies and organisational structures to facilitate using research in nursing practice throughout the country and in hospitals other than those of the National Guard.

An incentive for pursuing this study was investigating the critical understanding of the barriers that may hinder nurses in other sectors and specialist healthcare institutions in Saudi Arabia to utilise research in the future. Further, this study will also provide pertinent information regarding the facilitators of utilising research by nurses in the healthcare institutions in Saudi Arabia. Moreover, it is expected that the results of this study will promote nurses' and other healthcare professionals' awareness regarding the importance of overcoming barriers to research utilisation in clinical practice and to

consider which of the investigated facilitators could be recommended in improving evidence-based practice. The results of this study may be used to improve the quality of care for patients in Saudi Arabian hospitals and indeed, world-wide. This may be achieved through education and preparing of nurses and other sectors of the healthcare system such as decision-makers, to maximise efforts for facilitation of EBP to ensure the best possible quality of patient care.

1.6. Problem statement

The dawn of the 21st Century has ushered in an era of public expectation that scientific evidence is the foundation for the delivery of research based health care services. Research utilisation and evidence-based practice have become a professional mandate that place high demands on quality while simultaneously emphasising cost containment which ends with efficiency of health care services. Incorporating research evidence into everyday practice are numerous and may improve standards of nursing care, increase quality, and personal and professional growth for nurses (Ashley, 2005). Clinically substantial research has the potential to achieve patients' satisfaction and improve health care professionals' practice which consequently improves the health care sector (Donaldson, Rutledge & Ashley, 2004). Although research findings indicate that nurses globally have positive attitudes toward conducting research and are certain of the need that their practice should be based on research results, the majority of nurses still do not integrate research findings into clinical practice (Boström, Kajermo, Nordström & Wallin, 2008; Fink, Thompson & Bonnes, 2005; Olade, 2003).

Consequently, many studies have been conducted worldwide to study the barriers that may restrict nurses' utilisation of research findings (Boström, Kajermo, Nordström & Wallin, 2008, 2009; Brown et al., 2010; Carlson & Plonczynski, 2008; Chau, Lopez & Thompson, 2008; Fink, Thompson & Bonnes, 2005; Olade, 2003). In particular, Chau, Lopez and Thompson (2008) conducted a survey in Hong Kong to

examine the barriers and facilitators of research utilisation as perceived by nurses. This study identified barriers related to inadequate facilities, lack of authority to change practice, lack of time, and lack of cooperation from physicians as the highest ranked barrier.

Studies have also been conducted assessing facilitators that promote utilisation of research findings by nurses (Chau, Lopez & Thompson, 2008; Mehrdad, Salsali & Kazemnejad, 2008; Moreno-Casbas, Fuentelsaz-Gallego, de Miguel, González-María & Clarke, 2011). Mehrdad et al. (2008) revealed the facilitators of research utilisation for nurses in Iran. These facilitators included support from educated nursing colleagues and nursing faculty, allowing nurses to attend conferences, the availability of an expert committee for evidence evaluation, and training and guidance for research utilisation.

For nurses in Saudi Arabia, research about barriers to and facilitators of research utilisation is still limited. To date there has been limited published studies in the literature that assessed the obstacles to nursing research utilisation in Saudi Arabia. Therefore, it is a crucial and an unavoidable requirement to explore these barriers to and facilitators of research utilisation from the perspective of nurses working at different institutions within the context of Saudi Arabia. Hence, this would contribute to creating a solid ground for developing evidence-based practice and moving toward high quality nursing care.

1.7. Overview of the thesis

There are seven chapters which follow this introductory chapter and information on each of these chapters is listed as per the following:

Chapter 2 provides the context of Saudi Arabia in order to present the background where the study was situated. This includes an overview of the country, the health care system in Saudi Arabia and nursing.

Chapter 3 presents a critical review of the related literature; the utilisation of research among nurses in the health care institution, mainly through identifying the facilitators and the barriers. The literature review focuses on relevant studies; studies are summarised and critical appraisals of the findings are reported. In addition, the gap in the literature is identified and the theoretical framework underpinning the study is discussed.

In Chapter 4 the methodology of the study is discussed and presented in detail. This includes the study's overall aim and objectives and the research questions. Chapter 4 presents the study design, setting, sample and sampling techniques and instrumentation, in addition to ethical considerations, analysis techniques and theoretical framework used in this study.

Chapter 5 presents the results of the study and includes participants' characteristics and answers to the research questions. These results include an overview of the demographics, the barriers, facilitators and the correlation between barriers, facilitators and demographics.

Chapter 6 discusses the factor analysis of the Barriers Scale responses

In the discussion chapter (Chapter 7), a critical feature of the findings is comparing the evidence linking the results to the evidence retrieved from the reviewed studies which facilitated the interpretation of the results in drawing conclusions and making recommendations (Chapter 8).

The final chapter in this study (Chapter 8) focuses on summarising the main ideas of the study including a brief description of each of the chapters of the study. The study limitations are then addressed. Additionally, this chapter provides valuable recommendations for nursing education, health and hospital policy and ongoing services provision in Saudi Arabia. Finally, recommendations for future research are outlined.

1.8. Summary

The aim of this study was to examine the barriers to and facilitators of research utilisation among nurses in the Riyadh region of Saudi Arabia. This chapter presented the organisation of the thesis and subsequent research study topic.

It is expected that this study will generate an evidence base which will inform the development of nursing education and practice through utilisation of the research findings and applying evidence-based practice across health care organisations in Saudi Arabia. Indeed, the topic has been studied in other countries but limited research has been conducted in Saudi Arabia. Given this, the results of this study are important in highlighting nurses' perceptions of the barriers to and facilitators of utilisation of research findings in nursing clinical practice. The next chapter will provide an overview of the context of Saudi Arabia where this research study was situated.

Chapter 2: Contextual Background

2.1. Introduction

This chapter highlights the distinctive Saudi Arabia context by describing the health care system and the unique situation that the nursing profession is in. The chapter begins by providing an overview of the country of Saudi Arabia. In addition, the current system of health services, hospitals, and nursing education, nursing regulations, and the health care providers of Saudi Arabia are explained. A description of the organisation of the nursing profession and the wider nursing experience in Saudi Arabia will also be presented. This contextual foundation will create groundwork upon which study results can be interpreted and presented.

2.2. The Kingdom of Saudi Arabia

This part of the chapter provides an overview of Saudi Arabia. The State of the Kingdom of Saudi Arabia (KSA) was established in 1932 (World Fact Book, 2015). Abdulaziz Al Saud was the core founder of the Arab state. It is ruled and governed by the Saudi Royal family and the heads of the main administrative functions are usually members of the Royal family. The Kingdom sits within the Middle-East Diaspora of Arabic countries including Egypt, Syria, United Arab Emirates, Oman and Yemen. Recent moves to greater democratic participation reflect careful balancing of tradition and modernity (see Figure 2.1).

Figure 2.1. Map of Saudi Arabia (Google Maps)

The Kingdom of Saudi Arabia is one of the largest countries in the Middle East, with a population of approximately 31.5 million people within an area of approximately 2.24 million square kilometres. The population includes 17.8 million males and 13.9 females (MOH Annual Statistical Report, 2015). The population of Saudi Arabia has experienced high growth rates over the past few years, with an expected population growth to reach 47 million by 2020. This expansion in population has triggered the Saudi government to consider the quality of health care services for its people (Almalki, Fitzgerald & Clark, 2011a). Table 2.1 includes details of population demographics in Saudi Arabia. Of specific interest is the number of expatriates within this population.

Table 2.1. Demographic characteristics of the Saudi population

Gender	Saudi citizens	Expatriates	Total *
Male	10,614,813	7,076815	17,691,628
Female	10,515,147	3,314,643	13829840
Total **	21130010	10391458	31,521,468

(Ministry of Health, 2015).

The median age of the population in Saudi Arabia is 27.2 years; the annual population growth rate is 2.7% (World Fact Book, 2015). Life expectancy in KSA has increased from 52 years in 1970 to 73 and 75.3 years in 2015, respectively due to improvements in both health and social services (MOH Annual Statistical Report, 2015). These two factors alone have contributed to the increased demand on healthcare services in Saudi Arabia. This is because children and the elderly are more likely to require healthcare (Almalki et al., 2011a). Table 2.2 includes details of the age distribution of the population in Saudi Arabia.

Table 2.2. Age distribution of Saudi Arabia population in 2015

Age category	Percentage
Under 5 years	10.1%
6-14 years	29.12%
15-64 years	67.95%
65+ years	2.93%

(Ministry of Health, 2015).

2.3. Healthcare services in Saudi Arabia

Healthcare services in Saudi Arabia have increased and improved significantly in recent times, currently ranked 26 out of 190 countries (Almalki, Fitzgerald & Clark, 2011b). This has been the result of the Saudi Arabian government committing a large amount of resurces to improve healthcare services (Aldossary, While & Barriball, 2008). The Saudi Arabian government prioritised the development of healthcare

services which are mainly managed by the Ministry of Health (MOH) (MOH, 2014). This advancement of healthcare services has contributed to significant improvements in health indicators, as discussed earlier. Three other ministries also hold some responsibility for providing health care services: the Ministry of Defence and Aviation, the Ministry of the Interior (security forces hospitals) and the Ministry of the National Guard (National Guard Health Affairs) (MOH, 2014). The healthcare systems managed by these ministries are coordinated by the Council of Health Services headed by the Minister of MOH. This multiplicity of healthcare providers creates issues as there is no coordination or clear lines of communication between these providers. The result is a tendency to a waste of resources and duplication of services as well as missed opportunities for advancement (Almalki et al., 2011b). Due to the limited resources and health personnel, the government relies on imported medicine, imported medical equipment and expatriate medical practitioners and nurses. This will be discussed in more detail later in this chapter.

The MOH is responsible for governance of all sectors of the health care system in Saudi Arabia. The MOH has appointed various regional directors of health affairs who monitor the healthcare facilities including nursing education (MOH, 2015). The first Saudi Arabian nursing educational program opened in 1958 in Riyadh following the tireless efforts of the World Health Organisation (WHO) and the MOH (Tumulty, 2001). In 1976 the Ministry of Education launched the Bachelor of Nursing Program at King Saud University and have since opened other nursing educational institutions (Tumulty, 2001). Currently many of these institutions offer certificates, diplomas, degrees, masters and PhD programs in nursing. The nursing labour force in Saudi Arabia embraces many nationalities and ethnicities. In 2015 approximately 38% of nurses were Saudi, with the remaining 62% representing over 20 nationalities (MOH, 2015).

2.3.1. Hospitals in Saudi Arabia

In Saudi Arabia, the hospital system is classified based on the type of health service and is managed by the Ministry of Health which manages most hospitals through health directories distributed over the 20 regions of Saudi Arabia (MOH Annual Statistical Report, 2015). According to the MOH Annual Statistical Report 2015, 69,394 beds were distributed over 462 hospitals in different regions and sectors in Saudi Arabia. Table 2.3 includes details of the number of hospitals and beds provided by the different health care sectors in Saudi Arabia. The MOH manages the main government hospitals which provide health services for Saudi citizens offering comprehensive insurance for Saudi governmental employees (MOH KSA, 2014). The MOH is known to be the principal health care provider taking the role of planning, managing and regulating the health care sectors. The other two governmental health sectors are the Ministry of Defence and Aviation sector governing the armed forces hospitals in the country (Armed Forces Hospital in Riyadh), and the Ministry of Interior and the Saudi Arabian National Guard sector. These three sectors represent 13% of total hospitals and 21% of hospital beds. The private health sector makes up 26% of hospitals and 16% of beds. The private hospitals are for-profit health organisations and are managed and run independently, often by groups of experts and international cooperatives such as the Saudi German Hospital and the Saudi British Hospital. The private hospitals follow the rules and regulations set by the MOH (MOH Annual Statistical Report, 2015).

Table 2.3. Number of hospitals and beds provided by health care sectors in Saudi Arabia

Health care sector	No of Hospitals	No of Beds
Ministry of Health	274	41297
Other governmental health sectors	43	11449
Private	145	16648
Total **	462	69394

(MOH, 2015).

2.4. Nursing in Saudi Arabia

Until the year 2015, the Ministry of Health stated that the total number of nurses increased from 134,632 in 2010 to 172,483 in 2015. Of these, 95,379 nurses were working at Ministry of Health hospitals, 35,119 at other governmental institutions, and 41,985 at private hospitals. In addition, the Saudi nurse workforce represented 38.3% of the total nursing workforce (MOH Annual Statistical Report, 2015). Table 2.4 lists the number of nurses working in Saudi Arabia as of 2015. The number of female nurses in Saudi Arabia was 136,855 or 79.4%% of the total nursing workforce population and of these 70,907 (73.4%) in MOH hospitals, 29,849 (85%) in other governmental hospitals, and 36,099 (86%) in the private sector hospitals.

Table 2.4. The nursing workforce in Saudi Arabia in 2015

Health sector	Number	Saudi Nurses (%)
Ministry of Health	95379	55.3%
Other governmental health sectors	35119	20.3%
Private Hospitals	41985	24.4%
Total **	172483	100%

(MOH, 2015)

The non-Saudi nurse workforce makes a considerable contribution to the health care system in Saudi Arabia. However, there are difficulties associated with such a high

dependence on the expatriate workforce, the most significant being the very high rate of attrition (Baumann, 2010). There are two forms of nurse exodus: internal and external (Al-Hosis, 2010). The internal turnover rate is whereby the nurses leave the nursing department and commence working in another department or division in the same hospital, organisation or institution. The external turnover rate is the rate at which the nurses leave working for the hospital to work in other institutions or organisations. In addition, external turnover is the rate at which expatriate nurses leave Saudi Arabian healthcare facilities after obtaining experience and marketable skills then move to developed countries, such as Canada and Australia (Almalki et al., 2011a). This loss of nursing staff has been attributed to a variety of factors that can be categorised under work-related attitudes, personal characteristics or external environmental factors (Tumulty, 2001). There are a number of consequences of this high turnover which have been identified by Al-Almadi (2002) and include:

> The high turnover of expatriate staff and low recruitment of Saudi nationals has led to serious staff shortage in the professions, particularly of well-qualified and experienced nurses which may be one of the reasons for lack of research in clinical nursing practice. The shortage has lasted more than ten years and that has been due to the inability of the nursing profession to attract Saudi male and female nurses to work due to difficulties arising from salaries, shift schedule, management decisions, and social perception of nurses (Al-Ahmadi, 2002, p.645).

Low recruitment of Saudi nationals to undertake nursing education programs has also contributed to the nursing shortage. There are a number of factors that have contributed to this, including 'the poor image' of nursing, lack of awareness about nursing opportunities among high school students, the nature of nursing work that conflicts with the family and personal life (for instance, high workload, long working

duties, night shifts and working over public holidays and weekends), low payment compared to other jobs, lack of professional growth and lack of support for working mothers (Almalki et al., 2011b).

Accordingly, nursing leaders need to work to improve the image of nurses and facilitate the recruitment of nursing experts into the nursing profession (Kelly, 2011). For example, reduced working hours and part-time contracts with increased salaries and benefits could attract nurses to the profession, as might the provision of facilities such as private transportation and on-site care (Mrayyan, 2006). Furthermore, establishing a national association for nursing research and practice would advance the nursing profession toward research-based practice (Youngblut & Brooten, 2001).

2.4.1. Nursing education in Saudi Arabia

Since 1992, a variety of colleges controlled by the MOH were established in Saudi Arabia to meet the demand for nursing and other health professionals. At present in Saudi Arabia there are 24 health institutes and 19 junior health colleges which award diplomas in different fields, one of which is nursing. A range of specialist nursing fields are available in Saudi Arabia including midwifery, medical, surgical, paediatric and psychiatry in addition to opportunities to practise in other areas and subspecialties such as ophthalmic, orthopedic and critical care. However, postgraduate courses are offered only in clinical courses such as midwifery which might be due to the lack of supervising staff in the other fields (Almalki et al., 2011a).

The Bachelor of Science in Nursing (BSN) program was established in Saudi Arabia in 1976 to increase the number of degree qualifications in the nursing profession (MOH KSA, 2014; Tumulty, 2001). This program is under the supervision of the Ministry of Higher Education. Technical Nurses and Technical Specialists have a Diploma but they are obtained from different institutions which are graded at college or

institute level. Nurse specialists have a degree awarded by a university (Aldossary et al., 2008).

Since 2005 the MOH has formally increased the entry requirement to a Bachelor of Science in Nursing as a minimum level qualification to join the profession. The objective was to equalise Saudi entry standards with international standards with an aim to improve the quality of nursing care and expertise whilst supporting evidence-based practice for nurses (MOH KSA, 2014). These standards were approved in 1999 by the International Council of Nurses and agreed that research-based practice is a hallmark for professional nursing and that nursing research, both qualitative and quantitative, is critical for quality cost-effective health-care (International Council of Nurses, 1999, p. 1). Based on this initiative, it would suggest that the nursing workforce in Saudi Arabia would be expected to provide more professional care and be able to incorporate EBP principles into their practice.

In 1987, the Master of Science in Nursing was commenced. Graduates from this program are referred to as Senior Specialists or Nurse Consultants (Aldossary et al., 2008). Doctoral scholarship programs were established in 1996. This program was to facilitate nurse leaders being able to obtain a doctorate in an overseas university (Aldossary et al., 2008; Miller-Rosser, Chapman & Francis, 2006).

2.4.2. Nursing regulation

The official regulation of the nursing profession in Saudi Arabia is a recent initiative and came from a desire of the Ministry of Health to improve the quality of health care and thereby improve outcomes for patients (MOH KSA, 2014). This regulation is undertaken by the Scientific Nursing Board which was established in 2002 (Miller-Rosser et al., 2006). Prior to the Scientific Nursing Board, nurses were not required to register and training programs were not standardised or required. There are private institutions either colleges or hospitals that provide training for nurses which are

well funded (MOH KSA, 2014). These institutions provide the training either during the course of study or after students' graduation from their schools and they are accredited by a Vocational Technical Organisation but their standards are still dissimilar to those of the MOH (Almalki et al., 2011a).

The Scientific Nursing Board has similar functions to regulatory bodies in other countries such as the Nursing and Midwifery Council in the United Kingdom, the Nursing and Midwifery Board of Australia, or those in the surrounding Arabic countries. The Board has a role to develop standards and approve courses including post-qualification programs. It is currently run by the Saudi Committee for Health Specialists which has general oversight of all health related professions. It has been suggested that an independent Board should be created for nurses as the current one which is supposed to support nurses, is mainly focused on the medical profession (Almalki et al., 2011a).

In 2003 the Saudi Nursing Society was founded (Almalki et al., 2011a). This society aimed to enhance clinical and theoretical competency of nurses and provide scientific advice to its members. In addition, the society aimed to improve the working conditions of nurses (Almalki et al., 2011a).

2.4.3. Nursing research activities

Currently all nurses registered with the SNB are required to attend a series of continuing education programs in order to be eligible to renew their registration (Tumulty, 2001). The availability of such programs, however, is not widespread, especially in the rural and remote areas of Saudi Arabia. This requirement therefore can be difficult to achieve.

One of the main goals of the SNB is conducting and supporting nursing research (Almalki et al., 2011a). There is a lack of resources in Saudi Arabia, however, to support and encourage this. Staff are also too busy dealing with the challenges that are

faced by every nurse, to be discussed shortly. Advanced education has been slow to develop until fairly recently. There is also not always the library resource to support this (Tumulty, 2001).

2.4.4. Nursing challenges

One of the major challenges for nursing in Saudi Arabia is a result of their dependence on expatriate nurses to staff their hospitals. This is for a number of reasons. Expatriate nurses are usually recruited through contract management with few systems or controls in place to ensure personnel standards are followed (Tumulty, 2001). Contracts for recruitment are awarded for three years which is followed by a new bidding process for a new contract. This can result in a lack of continuity in contract providers. Some contracts are priced at such low levels that maintaining high quality personnel is difficult. Few Western nurses are recruited as a consequence (Tumulty, 2001). The majority of expatriate nurses are recruited by agencies based in countries such as India and Philippines. Teams of Saudi staff consisting of doctors and administrators go regularly to the targeted countries to recruit new nurses. Nurses are not included in this recruitment team which may impact on the effectiveness of screening for potential recruits. Hence, many of the recruits often lack the necessary experience and may be poorly matched with the positions they are recruited for. This contributes further to the high turnover discussed earlier (Tumulty, 2001).

Although the hospitals in Saudi Arabia are generally well equipped with the most up to date facilities, their efficient usage is potentially limited due to the shortage of nurses, especially experienced and specialised nurses (Alshammari, 2014). This lack of nursing experience creates major challenges to the advancement of nursing practice in Saudi Arabian healthcare system (Almalki et al., 2011a). Furthermore, these inexperienced nurses create an additional workload for the experienced nurses who are required to supervise and teach these nurses in addition to performing their own duties.

In addition, is the added difficulty of language. The majority of the patients and their families are Saudis who speak Arabic. Most healthcare providers are from non-English speaking backgrounds and, therefore, have English as their second language and not competent in speaking Arabic (Aldossary et al., 2008). The problem that this creates adds further to the workload for the Saudi nurses as they are often asked to interpret for the expatriate nurses who are not able to effectively communicate with their Saudi patients (Bander & Jones, 2017).

One of the other challenges faced by nurses in Saudi Arabia that contributes to their high workload is the fact that they have to engage in non-nursing duties. This is because there are inadequate levels of ancillary and management personnel in most healthcare facilities to undertake these non-nursing tasks (Almalki et al., 2011a; Tumulty, 2001). The consequence is that nurses are compelled to undertake these duties on top of their nursing duties.

Dependence on an expatriate workforce to staff hospitals can be potentially problematic for another reason. If for some reason there was a large scale withdrawal of expatriate nurses similar to that occurring during the Gulf War in 1990, it would put the healthcare system under serious risk (Al-Hosis, Plummer & O'Connor, 2012). This creates a further impetus for not relying on an expatriate workforce.

2.4.5. Saudisation

In order to overcome many of the issues with having a predominatly expatriate nursing workforce identified above, Saudisation was introduced some 20 years ago. The rationale of this initiative was to increase the number of Saudi nationals in the workforce, not only an issue identified in healthcare and nursing. The initiative was also aimed at addressing the high unemployment rate in Saudi Arabia. The aim of this program was to force the private sector to employ more Saudi nationals and reduce the number of expatriates in the workforce generally (Torofdar, 2011). This was seen more

as an ideology rather than a policy. There was a tendency to prioritise professions differently, with for example such professions as engineering given a higher priority to nursing (Alshammari, 2014). Reasons for this included the paucity of fully accredited nurse education programs and the influence of gender attracting Saudi nationals to nursing. Engineering is a male dominated profession whereas nursing is a female dominated profession. Females are not necessarily attracted to nursing for a number of issues, identified earlier. Engineering was therefore a more achievable profession for success with Saudisation.

As recently as 1995, the Saudi government issued a royal decree to promote Saudisation for the nursing workforce in order to replace the mostly expatriate workforce (Mufti, 2000). This has resulted in a steady increase in Saudi nationals and a decrease in the dependence of expatriate nurses in the workforce (Miller-Rosser et al., 2006). The success of the Saudisation program is dependent on the ability to generate Saudi nurses rapidly with an intensive education program and to maintain quality and standards.

2.5. Summary of the chapter

This chapter highlighted the distinctive Saudi Arabia context by describing the health care system and the unique situation that the nursing profession is in. The chapter began by providing an overview of the country of Saudi Arabia. In addition, the current system of health services, hospitals, and nursing education, nursing regulations, and the health care providers of Saudi Arabia are explained. A description of the organisation of the nursing profession and the wider nursing experience in Saudi Arabia was also presented. This contextual foundation creates groundwork upon which the study results can be interpreted and presented.

Prior to approaching nurses in Saudi Arabia, it was crucial to be aware or what was already known and what needs to be known about this problem through a comprehensive literature review. This will be discussed in the next chapter.

Chapter 3: Literature Review

3.1. Introduction

This chapter presents a critical review of international and local literature related to the utilisation of evidence-based research in health care institutions in Saudi Arabia. The focus of this study is to examine the barriers to and facilitators of nursing utilisation of research in different clinical settings. A comprehensive systematic literature review is performed to inform and direct the emerging study aims, identify and clarify concepts, and provide an overview of the available evidence to demonstrate the need for further research. Evidence is critiqued to highlight and examine the external organisational and internal personal influences of the nurse that could limit or enhance using research findings in nursing practice; and to understand what and how such barriers to, or facilitators of, using these findings.

The review encompassed a search for evidence worldwide to facilitate the comparative analysis of nurses' adoption of evidence-based practice across different countries and within different cultures. Although a number of quality papers were identified, the search failed to uncover many original publications on such a topic within Saudi Arabia adding to the justification that such a study was necessary. This chapter begins with a description of the search strategy, followed by a description of the concept of research utilisation. Studies that investigated barriers to and facilitators of research utilisation will be presented in separate sections. The final section provides an explanation of the theoretical framework underpinning this study.

3.2. Search strategy

A systematic search strategy was developed and employed, using a wide range of databases and search engines. The main electronic databases: CINAHL, EMBASE and Ovid MEDLINE formed the chief sources of literature. The databases were

searched for studies published in English language and from January 1997 to April 2017 (20 years). In addition, the RMIT University catalogue for related books, theses, and publications only available in printed materials were also reviewed and obtained directly from the library when available. Google Scholar and Bing search engines were used when required. The keywords searched were 'percept'*, 'nurs'*, 'barrier'*, 'utilis'* and 'research', facilitators, evidence-based practice, and Barriers Scale. An appropriate thesaurus associated to a specific database terminology Booleans operators were utilised (AND, OR but avoiding using NOT) to combine concepts, gradually refining the width and depth of the search to capture available evidence.

A total of 1306 study papers were identified, of which 700 were considered initially to be directly relevant to the review as they contained keywords in the title and/or the abstract. For those papers where it was unclear, the full text was obtained. This search was gradually refined with a more focused inclusion/exclusion criterion. According to the criteria of being in the English language and a timeline between 1997 and 2017, the 700 papers were reduced to 312 papers then narrowed to 42 studies to be included in the review (Figure 3.1). For the purpose of this research, the following literature review provides a summary of the larger literature review undertaken to date.
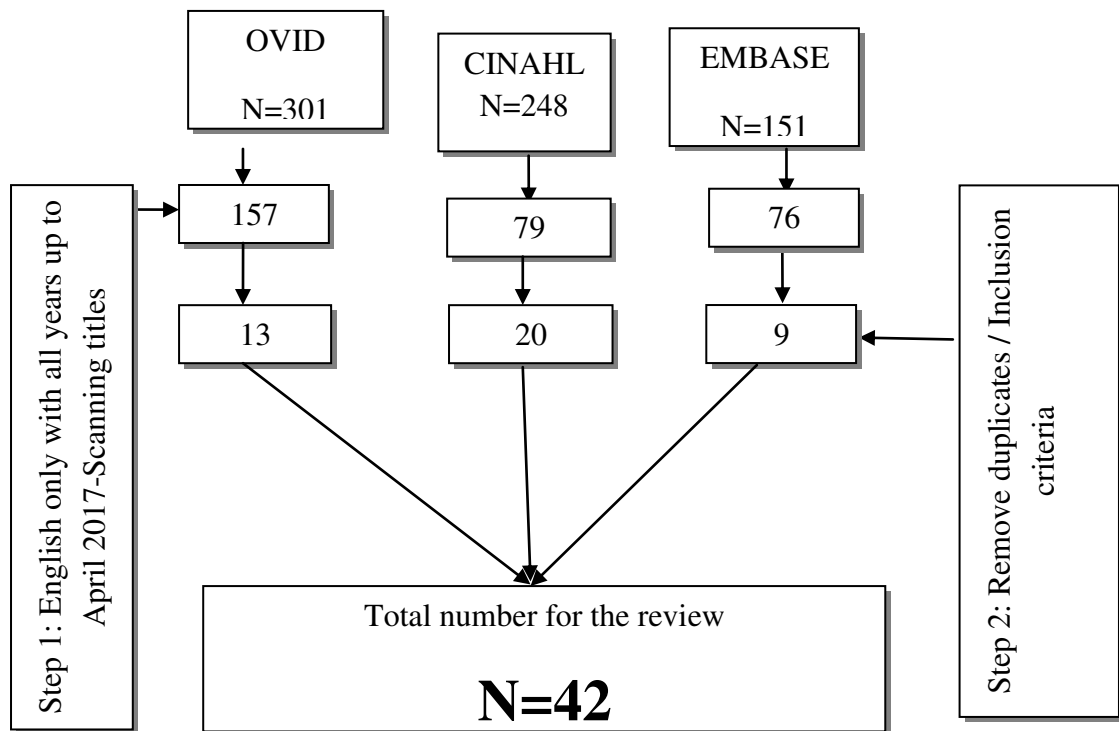
Figure 3.1. Outline of search of literature using nominated databases

3.3. Key findings and concepts

Five core themes were generated from the literature review that highlight and expose the key concepts and findings extrapolated from the review of the current evidence. These key concepts and findings will be discussed and critiqued in this chapter in the following order:

➢ The concept of research utilisation;

➢ Benefits of evidence-based practice;

➢ Research utilisation;

➢ Barriers to research utilisation;

  o Barriers to research utilisation in North America;

  o Barriers to research utilisation in Europe;

3.3.1. The concept of research utilisation

Research utilisation and evidence-based practice (EBP) are terms that have been used frequently and interchangeably. However, research utilisation can be considered as the use of knowledge typically from one or more studies (Melnyk & Fineout-Overholt, 2015). Research evidence is combined to create EBP with the proficiency and value of the trained health care providers (Melnyk & Fineout-Overholt, 2015). The literature abounds with definitions of EBP. More recent definitions emphasised the sources and levels of evidence, the influence of the practitioner's experience, and the desires of those being served such as patients, families, or societies. Sackett et al. (1997) defined EBP as:

> the integration of our clinical expertise with the best available external evidence and patients' values by translating our need for information into an answerable question and then tracking down the best information with which to answer the question (p. 1336).

This definition provides more of an overview whereas the following outlines first what EBP is not, before describing EBP in more detail:

> ritual, isolated and unsystematic clinical experiences, ungrounded opinions and tradition as a basis for nursing practices - and stresses instead the use of research findings and, as appropriate, quality improvement data, other operational and evaluation data, the consensus of recognised experts, and affirmed experience to

substantiate practice (Stetler, Brunell, Giuliano, Morsi, Prince & Newell-Stoker, 1998, p. 8).

Although these definitions do not identify a specific research method, they formulate a relationship between evidence (level), experience (providers) and expectations (patients) (Kelechi, 2007). The primary purpose of nursing research is to provide a comprehensive database for EBP. Evidence-based practice is considered an important factor in improving the quality of health-care. Research utilisation is essential to promote EBP in health fields in general and nursing in particular, where practice continues to develop and demands more liability from nurses.

3.3.2. Benefits of evidence-based practice

There are many benefits obtained from using EBP in health care settings. These benefits can have positive impacts on patients and their families, health care providers, and health care institutions (Melnyk & Fineout-Overholt, 2015). More importantly, patient safety and care quality are improved when nurses consider the up-to-date relevant empirical evidence in their clinical practice (Kelechi, 2007).

Evidence-Based Practice also impacts on the quality of care provided to patients and their families in different health care settings (Malloch & Porter-O'Grady, 2010). It was found that patients assume that health care providers know what works best to treat a patient's health condition and that health care providers practice accordingly (Courtney & McCutcheon, 2010). Building on this, nurses gain the patients' trust. Many treatments or medical decisions are based on using EBP reports to improve patients' conditions and achieve desirable outcomes. For example, Fedorow and Grocott (2010) reviewed evidence-based recommendations for investigations in cardiac surgical patients to evaluate the impact of current cardiopulmonary bypass management strategies for neurologic complications in an effort to optimise patient care and outcomes. More recently, it was showed that nurse practitioners provided more health

promotion and scored higher on quality of care measures than physicians (Kaplow, 2015). Similarly, a panel of 10 experts in the field of spinal cord trauma endorsed recommendations based on the evidence and critical review of the literature with regard to the pre-clinical and clinical evidence on the potential impact of timing of surgical decompression of the spinal cord on outcomes after traumatic spinal cord injury (Furlan et al., 2011). In this review, the results of a meta-analysis of research studies designed to examine the effectiveness of non-pharmacological interventions in the management of pain indicated that non-pharmacological nursing interventions can be effective in specific cases or as an adjunct in others.

For nurses, EBP improves nurses' performance according to the latest knowledge and research findings supported in the literature (Melnyk & Fineout-Overholt, 2015). This is because EBP advances nurses' decision making ability and improves the care plans (Polit & Beck, 2004). In addition, nurses are empowered and can practice in a professional manner and with self-confidence because they provide care supported by facts rather than routine practice (Courtney & McCutcheon, 2010). Moreover, nurses and other health care providers using EBP can initiate or adopt practice guidelines and improve their judgment abilities to reduce human errors and improve communication (Oxman, 2004). Recently, communication has been addressed as one of the benefits of EBP and was considered as a facilitator for the use of EBP in nursing and health care practice (Cline et al., 2017). It was also shown earlier that communication enables collaboration with interdisciplinary teams to develop research studies and implement EBP guidelines (Solomons & Spross, 2011).

Adopting EBP may decrease organisational burden and costs due to the expected reduction in health care providers' errors and consequently decreasing the re-admission rate (Courtney & McCutcheon, 2010). More recently, it was reported that health care costs can be reduced and variation in clinical practice can be decreased when nurses and

other health care professionals consider using EBP into their practice (Melnyk & Fineout-Overholt, 2015). Evidence-based practice can be incorporated within the institutional policy and reflected in guidelines and management plans to improve staff commitment (Sutherland et al., 2004). However, the challenge is for these organisations to evaluate research utilisation on an ongoing basis, and to disseminate and prioritise research results for application in practice. While it is difficult to estimate the cost of change accurately, it is recommended to weigh the expected health benefits in conjunction with the harms if present, in utilising research findings which can be validated by the health care outcomes (Oxman, 2004).

3.3.3. Research utilisation

Research utilisation was first introduced into nursing in the 1980s (Polit & Beck, 2017). On reviewing the literature, it was evident that a variety of definitions existed for research utilisation and can be defined as the process of incorporating the knowledge obtained from research into clinical practice (Stetler, 2001). In 1999 research utilisation was defined as the process of implementing research findings as a foundation for clinical practice (Titler, Mentes, Rakel, Abbott & Baumler, 1999). According to Estabrooks (1999), research utilisation is a specific form of scientific knowledge utilisation based on research findings. In the health care setting, evidence is a term that is related to the concepts of proof and rationality and is often derived from research (Rycroft-Malone, 2008).

Many authors used the term research utilisation and EBP interchangeably (Boström, et al., 2008; Department of Health, 2013; Fink et al., 2005; Parahoo & McCaughan, 2001). However, Newhouse (2007) suggests that research utilisation and EBP are distinct processes but related. The research utilisation process originates from findings of published studies, while EBP begins with an action that originates to solve a problem or an issue in clinical practice (Newhouse, 2007). Nevertheless, both research

utilisation and EBP involve evaluations of research and decisions to integrate evidence into practice.

Nursing research has grown on a global scale with limited attention being paid to this area of growth for clinical nursing practice or delayed application of research findings into practice (Moch, Cronje & Branson, 2010). This delay may be related to the current perception of registered nurses of the barriers to research utilisation. Although the perception may be an individual opinion, it may still be a barrier for individuals working in health care organisations to implement research findings, particularly with the absence of the support of colleagues, and the administration. While there is an expectation registered nurses will change their practice conforming to the latest research evidence, the cooperation and support of other health care providers and health administrators is required to facilitate the change in nursing practice based on research evidence (Rycroft-Malone, 2008). Organisational support including provision of resources, promotion of a quality care culture and supporting changes for health care improvement are essential factors that facilitate use of research findings in clinical nursing practice and display commitment to these changes in an organisation (Houser & Oman, 2010). It was also confirmed by the recent study of Cline et al. (2017) that organisational infrastructure, resources, environment and culture were all factors encouraging research and its application in health care settings. This was also accompanied by personal and professional incentives such as passion, energy, willingness, creativity, and eagerness of the nurse. Moreover, early in 2013 nurses in their practice also explained that encouragement, empowerment, and being able to share decisions to change toward improving patients' outcomes were also important facilitators (Wang, Jiang, Wang, Wang & Bai, 2013).

Findings from published studies may serve as a guide for research utilisation and expansion of clinical practice and confirm existing approaches related to the care of

individuals and their families (Estabrooks, Winther & Derksen, 2004). Yet, to improve the utilisation of these findings in nursing practice, evaluation of the reasons that drive nurses to prohibit this practice should be investigated and studied carefully in different health care settings and among various cultures (Oermann, Shaw-Kokot, Knafl & Dowell, 2010). Accordingly, it is essential to expand the understanding of research processes among all health care professionals including nurses. This includes developing the skills of reading and interpreting research in addition to deciding whether research findings are relevant and useful to improve clinical practice (Mateo & Foreman, 2013).

Research utilisation implies the use of the best available evidence to guide nursing practice. However, there is a gap between the availability of evidence/resources and the utilisation of this evidence in practice. This gap has been discussed in the literature. For instance, Squires, Estabrooks, Gustavsson and Wallin (2011) conducted a systematic review to determine the characteristics influencing nurses' research utilisation and limited their ability to apply evidence based practice. Results revealed six categories describing the individual nurses' characteristics which make evidence applicable to nursing practice: belief and attitudes, involvement in research activities, information seeking, education, professional characteristics, and socio-demographic/socio-economic characteristics. This was also supported by a study which argued that failure to access service points and perceived quality of care are key determinants of utilisation. Other barriers identified are perceived shortage of skilled staff in nursing facilities, health worker attitudes, costs of care and lack of knowledge (Kiwanuka et al., 2008). Ultimately, it is not only research skills or knowledge that was important, rather the organisational role as well as the role of government were crucial to push the process forward.

The gap between available research evidence and the use of this evidence in practice is a deficiency that needs to be addressed (Squires et al., 2011). Health care professionals have the responsibility to ensure that patients and their families receive care built on the best available evidence (Kiwanuka et al., 2008). Moreover, the use of this evidence in the decision-making process is also important for the quality of patient care (Rycroft-Malone, 2008). However, the process of implementing available research evidence is not easy and requires numerous strategies and efforts by health care organisations and health care providers to encourage and support this practice amongst nursing professionals (Ehrenberg & Estabrooks, 2004). This implementation entails modifying the organisations' infrastructures which may include changing health care institutions' policies, using shared governance, hiring nurses with higher qualifications and greater expertise, and planning for programs for nursing professional development (Flodgren, Rojas-Reyes, Cole & Foxcroft, 2012).

According to Gillis and Jackson (2002), research utilisation may take place at two levels: the instrumental level and the conceptual level. The instrumental utilisation of research refers to the application of evidence into clinical practice directly and clearly such as implementing innovative nursing interventions, measures, or guidelines. Conceptual utilisation refers to the use of research findings to improve the professional's comprehension of the clinical problem or phenomenon to gain knowledge about recent options for possible applicable solutions (Gillis & Jackson, 2002). In addition to these two levels of research utilisation, an earlier level was suggested by Estabrooks (1999) namely, symbolic research utilisation. This level refers to the use of evidence to persuade authorities and decision makers to change policies, practices or guidelines. Nevertheless, whatever the extent that nurses choose as to the use of research findings in their clinical settings, research utilisation serves as a process that involves change at the individual and institutional level.

Application of research findings in clinical practice can assist in using a number of sources of research, including but not limited to, practice guidelines, systematic reviews, and meta-analyses. However, it is important to judge the reliability, validity, and generalisability or trustworthiness when utilising research findings (Melnyk & Fineout-Overholt, 2015). Hence, nurses are required to assess and decide as to what knowledge can be used in clinical practice, and use it appropriately (Malloch & Porter-O'Grady, 2010). The integration of research findings into patients' care demands all health care professionals and organisations' administrators to approve, collaborate and support nurses' decisions to implement required changes so that the endorsed practice becomes the standard for care practice (Mateo & Foreman, 2013). Enhancement of the implementation of change into practise requires the overcoming of the barriers that prevent research utilisation and validate the facilitators of using research findings.

In addition to organisational support, academic preparation also plays a vital role in research utilisation (Kiwanuka et al., 2008). Research utilisation is empowered when nurses with advanced degrees utilise the skills they have attained and apply research evidence in practice. For nurses with doctoral degrees in the health care institutions, it was important to provide them with the authority and the resources to improve nursing practice according to the latest evidence obtained from research findings (Houser & Oman, 2010). If these nurses with doctoral degrees are not practising in health care institutions, nursing staff with advanced degrees can collaborative with organisation leaders to either conduct research related to clinical issues or to use published research in solving problems in clinical practice to improve current practice (Melnyk & Fineout-Overholt, 2015). Academically prepared nurses can facilitate in the development of a culture of evidence-based thinking which in turn can be fostered by training programs managed by these nurses (Malloch & Porter-O'Grady, 2010).

To conclude, research utilisation can be simply viewed as the use of knowledge obtained from research findings in clinical nursing practice. Yet, there is still a gap between the availability of the knowledge based on research findings and the clinical utilisation in real practice by nurses. In addition, for best practice, research utilisation requires judgment and critical analysis of research findings before applying them in clinical situations. This issue is significant for decisions made by policy makers as to the adoption of clinical guidelines, or the day-to-day use of these findings by nurses in clinical practice.

3.3.4. Barriers to research utilisation

Globally, the need for incorporating EBP is well-recognised but nurses' perceptions of the barriers to research utilisation still impedes application of this into practice (Malik, McKenna & Plummer, 2016). Several barriers are related to personal issues of the individual nurses, and others are related to the organisational factors within health care institutions (Kocaman et al., 2010). Generally, the chief barriers to the utilisation of research finding in clinical practice regardless of the origin of the health care institution are lack of authority, lack of time, insufficient understanding of research process and findings, lack of resources, and inadequate organisational support (Wang et al., 2013).

Many studies have been conducted worldwide which have investigated barriers to research utilisation in the nursing profession (Kocaman et al., 2010; Thompson, Chau & Lopez, 2006; Wang et al., 2013). A useful approach was to divide the literature review related to barriers to research utilisation into three themes: barriers to research utilisation in North America, barriers to research utilisation in Europe and barriers to research utilisation in Asia, which includes Australia.

3.3.5. Barriers to research utilisation in North America

Although nurses in developed counties such as in the United States of America (USA) believed that EBP assists in the improvement of patients' outcomes and reduces institutional expenses, nurses do not regularly implement best research findings in their clinical practice (Melnyk, Fineout-Overholt, Gallagher-Ford & Kaplan, 2012). In USA, identification of the barriers that hinder the use of research findings amongst nurses has been discussed at length in the literature (Cline et al., 2017). For instance, the study of Cline et al. (2017) identified the barriers of research utilisation for nurses in the USA. The study identified a variety of barriers, but most predominant were nurses do not own the institutional power to change, they lack time, lack of authority, they find the research evidence overwhelming, and many have difficulty in understanding research findings (Cline et al., 2017). Similar results were also found in other earlier studies conducted in the USA (Fink et al., 2005; Niederhauser & Kohr, 2005). Fink et al. (2005) conducted a cross-sectional study design using pre- and post-survey to identify nurses' characteristics and attitudes toward research utilisation following a multifaceted intervention. Data was collected using the Barriers Scale and the Research Factor Questionnaire developed by Funk et al. (1991). The results identified lack of time and lack of administrative support as the most significant barriers (Fink et al., 2005).

In a similar study, Brown et al. (2010) aimed to explore the relationship between the perception of 1301 nurses of barriers to research utilisation and the implementation of EBP through a cross-sectional study in Southern California, USA. The results revealed that the perceived barriers of research utilisation predicted very small factors of practice, attitude and skills associated with EBP. Furthermore, the findings indicated that the barriers to the use of research had a slight influence over the implementation of EBP for nurses in Southern California (Brown et al., 2010).

The attitude of American nurses toward research utilisation was not found to be different from that of professionals from other disciplines. A qualitative study using content analysis and consensus methods was conducted to describe the main barriers to EBP perceived by the Behavioural Science Health Professionals such as clinical psychologists, health psychologists, and behavioural medicine specialists (Pagoto et al., 2007). The study involved 37 professionals who responded by e-mail and listed 84 barriers to EBP. The most often reported barriers were related to negative attitudes and misconceptions about EBP which was linked to improper clinical judgment process, followed by lack of training, and the logistic problems during application of the findings (Pagoto et al., 2007).

More recently, a descriptive study was conducted to evaluate the existing status of EBP application by nurses across the USA (Melnyk et al., 2012). A total of 1015 registered nurses were randomly selected using an electronic database of nurses who were members of the American Nursing Association. Nurses in the study reported that the dominant barriers to research utilisation were resistance from co-workers, nurse leaders, and directors. In particular barriers were related to lack of nurses' time and knowledge, and the unavailability of mentors, and organisational support (Melnyk et al., 2012).

3.3.6. Barriers to research utilisation in Europe

There have been numerous studies which have found obstacles to research utilisation amongst nurses in Europe. These barriers were very similar to those found in USA. Most of these studies were conducted in Austria, Sweden, United Kingdom, Ireland, Finland, and Turkey.

Over the past era, the Austrian health care system has adopted standards to improve the quality of patients' care whilst emphasising the importance of health care professionals including nurses to seek evidence for best practice and apply it in their

everyday clinical practice (Courtney & McCutcheon, 2010). A relatively recent study in Austria revealed similar findings. Breimaier, Halfens and Lohrmann (2011) in a descriptive and exploratory cross-sectional survey, described perceived barriers of research utilisation for 1,823 nurses in an Austrian university hospital. Nurses' attitudes tended to be negative to research utilisation with three main barriers to the use of research in their practice which included lack of time, lack of information and lack of interest (Breimaier et al., 2011).

In Sweden, Boström, Kajermo, Nordström and Wallin (2008) conducted a cross-sectional survey in eight municipalities to describe 210 nurses reported use of research in the care of the elderly. The results revealed that although the nurses have positive attitudes toward research, there was limited research utilisation by the nurses in clinical practise. The reported barriers in this study were lack of time, heavy work load, and lack of resources. Two years later, Forsman, Rudman, Gustavsson, Ehrenberg and Wallin (2010) examined the use of research among 1,385 Swedish registered nurses after two years of graduation and any change in use according to working circumstances. The results showed a significant decline in the use of research over time mainly in the second year after graduation however, the working environments did not explain this reduction in research use (Forsman et al., 2010).

Three years later, a study was conducted in Sweden by Boström, Rudman, Ehrenberg, Gustavsson and Wallin (2013) aimed to assess the registered nurses' individual factors and the organisation's factors associated with EBP utilisation two years after graduation using a cross sectional design. Data was collected from 987 registered nurses using a six item tool measuring the nurses' degree of practising EBP. The results revealed one individual factor related to the graduate belief of EBP incapability or lack of self-efficacy. Conversely, the results of the study revealed three

organisational factors which were working in an elderly care facility, supportive leadership and high collective efficacy (Boström et al., 2013).

An earlier study was conducted in Sweden by Björkström and Hamrin, (2001) to explore 201 undergraduate nursing students' attitudes towards and awareness of research, and to illuminate factors that may have an impact on their attitudes and awareness. The results of the study showed that the majority of the students had positive attitudes towards nursing research and expected to use research findings frequently in the future. Despite the nursing students' positive attitudes to research, the study showed that the gap between the theory and the practice was still evident (Björkström & Hamrin, 2001).

In the United Kingdom, successive studies have emphasised the use of best evidence to improve the quality of health care services (Kiwanuka et al., 2008). However, the self-assessment studies showed the presence of several barriers that prohibit use of best accessible evidence in practice (Cummings et al., 2007). For example, a study aimed to identify barriers to EBP in primary care as perceived by 356 community health nurses and 356 physicians in Northern Ireland (McKenna, Ashton & Keeney, 2004). The findings demonstrated that nurses ranked poor computer services and problems in introduction of changes within primary care as the highest barriers to the effective use of research findings in health care practice (McKenna et al., 2004).

Several studies in the United Kingdom have also investigated nurses' attitudes towards research and the barriers to research utilisation (Anaele, 2008; Cummings et al., 2007; Kiwanuka et al., 2008). For example, for a study conducted in Northern Ireland by Parahoo (2000) the Barrier Scale was distributed to a convenience sample of 2600 nurses in 23 hospitals. Of this large sample 1368 (52.6%) nurses participated and the results were that the top barrier for utilisation of research was that nurses felt they lacked authority to change practice. This top barrier was followed by other barriers

including nurses not understanding statistical analyses, not enough time on the job to implement new ideas, management not allowing implementation and nurses feeling that research results were not generalisable to their own setting. Interestingly, four of these top barriers related to organisational characteristics. Another study in Northern Ireland compared nurses' use of research in clinical practice and their perceptions of barriers to research utilisation in 10 general hospitals (Parahoo & McCaughan, 2001). The sample involved 210 nurses working in medical wards and 269 nurses working in surgical wards. The results showed that the most common obstacle perceived by nurses working in the medical wards was lack of authority to change practice related to patients' care. For nurses working in the surgical ward, the most common obstacle was failure of the hospital's administration to allow nurses to implement change built on evidence. In addition, lack of confidence, lack of support and the language used in research were considered as other blocks to research use. Although the medical ward nurses showed higher rates of research utilisation, the results found the area of work had a slight effect on the utilisation of research findings (Parahoo & McCaughan, 2001).

In comparison, a study conducted by Gerrish and Clayton (2004) aimed to examine factors influencing the use of research in practice by surveying 330 nurses. The results demonstrated that nurses rely on knowledge gained from experienced health care professionals in their clinical settings. Similar to results from other countries, dearth of time and resources were perceived as the most common barriers to research utilisation by the nurses. In addition, nurses in the study expressed insufficient power to change procedures in their clinical settings as a barrier to research utilisation (Gerrish & Clayton, 2004).

Likewise, a more recent study examined 160 nurses' views on the use of research in their clinical work in different health care sectors in the United Kingdom (Heaslip et al., 2012). Data was gathered using questionnaires which asked nurses to

rate their opinions concerning several aspects of research and its use in practice. The findings revealed nurses mostly practise research, however, there was a lack of utilisation of research findings in practice due to a variety of causes. One reason was facilitating research utilisation in clinical settings was not a priority, whilst another was that the health care institution's environment did not encourage the use of research findings (Heaslip et al., 2012).

Additionally, Spanish nurses' attitudes towards research and perceived barriers to research utilisation were investigated through a cross-sectional comparative study by Moreno-Casbas et al. (2011). The study involved 917 nurses working in different hospitals, primary care centres and higher education nursing schools. Data was collected using the Spanish version of the Barrier Scale and attitudes towards nursing research instruments. The study identified three major barriers to research. These barriers included nurses' opinions about the value of research, nurses' limited self-confidence in research skills such as the inability to critically appraise research and the lack of authority given to nurses to change practice based on the latest evidence. This lack of authority for change in practice was rated as the top barrier to research utilisation. Isolation from knowledgeable co-workers with whom to discuss research findings was another chief barrier (Moreno-Casbas et al., 2011).

In comparison, a Finnish study by Kuuppelomäki and Tuomi (2003) investigated registered nurses' research and publication engagements, along with their opinions on the accessibility of research and the use of research findings in the clinical settings. A structured questionnaire was used to collect data from 400 nurses working at different centres and hospitals in Finland. The results showed that 77% of nurses reported time was a major barrier to research utilisation and 73% of nurses reported difficulty in understanding the statistical analyses of research findings. In addition, nurses reported support from ward supervisors to conduct research, but lack of support from physicians.

The researchers recommended introduction of flexible working hours for nurses to assist them in conducting and utilising research (Kuuppelomäki & Tuomi, 2003).

Similarly, an earlier study also conducted in Finland, investigated how nurses describe the barriers to research utilisation (Oranta, Routasalo & Hupli, 2002). The study included 316 registered nurses working in two major hospitals. The study demonstrated the main barriers to research utilisation were research published in a foreign language, lack of physicians' cooperation in implementing the research findings, and difficulty in understanding the research statistical analyses (Oranta et al., 2002).

Kocaman et al. (2010) identified the barriers to research utilisation as perceived by 329 Turkish staff nurses working in a university hospital. This cross sectional study used the Barriers Scale to measure nurses' perceptions. The study revealed nurses' lack of time and their incapability to read studies in English were the most perceived barriers to research utilisation. In addition, Turkish nurses in the study reported that they were unaware of research findings. This resulted in them feeling isolated from educated co-workers. The authors recommended limiting the gap between theory and practice through finding new approaches to facilitate research utilisation in clinical practice (Kocaman et al., 2010).

In a later study, Fatma and Gençtürk (2015) completed a systemic review of the use of the Barrier Scale in Turkey from 2000 to 2012. For the barriers to use of research in nursing practice in Turkey, Fatma and Gençtürk (2015) identified organisational factors as the highest ranked in their systemic review. The top four barrier items included inadequate facilities for implementation, not enough authority, insufficient time on the job to implement new ideas and physicians will not cooperate with implementation. As a result of their study, Fatma and Gençtürk (2015) recommended training of nurses in research and evidence-based applications with support from hospital management and administration. Fatma and Gençtürk (2015) suggested this

recommendation may eliminate the barriers to implementing research in clinical practice whilst creating organisational awareness.

3.3.7. Barriers to research utilisation in Asia

In Asia, many studies have been conducted to study the barriers to research utilisation in practice as perceived by nurses (Kang, 2015; Thompson, Chau & Lopez, 2006; Chien, 2010; Chien et al., 2013; Wang et al., 2013). For example, a study by Wang et al. (2013) described 590 nurses' perception of barriers for the use of research findings in three hospitals in China. The results revealed that the top barrier was lack of authority, followed by insufficient time for research and language as the majority of the literature was written in English (Wang et al., 2013). Similarly, another study conducted in China by Chien et al. (2013) assessed 800 registered nurses perceptions of barriers to research utilisation. The nurses were from four regional general hospitals located in mainland China. As with Wang et al. (2013), the top barrier was an organisational factor which included insufficient time on the job to implement new ideas. A study of barriers to research utilisation among registered nurses in Traditional Chinese Medicine hospitals also identified lack of time on the job to implement new ideas as the top barrier, followed by lack of knowledgeable colleagues and by overwhelming research publications. The study included 648 nurses employed in four Traditional Chinese Medicine hospitals located in Beijing, China (Zhou et al., 2015).

In comparison, a study conducted by Thompson et al. (2006) in Hong Kong assessed 1487 registered nurses' opinions of the barriers of the use of research findings in both the private and public health care sectors. The results of the study revealed that nurses also ranked organisational factors as the most frequent barrier. Of the organisational factors, the highest barriers included nurses not given authority to change practices and not enough facilities for research (Thompson et al., 2006).

Similarly, a conducted by Chien (2010) conducted in Hong Kong found for 710 registered nurses lack of authority followed by insufficient time to implement new ideas and nurses not feeling capable of evaluating the quality of research as the most frequent barriers.

Similarly, Chau, Lopez and Thompson (2008) examined barriers to research utilisation based on the perception of 1487 nurses working in public and private hospitals in Hong Kong. The results found the greatest barriers to research utilisation were the characteristics of the organisation such as insufficient facilities, lack of authority to change practice, lack of time, and lack of physicians' support. The study concluded that barriers may stay the same over the years even with the advancement of knowledge and research as was typical of other similar studies completed in China (Chau et al., 2008).

More recently, Kang (2015) conducted a descriptive, correlational study to identify the barriers to use of research in nursing practice as perceived by 147 registered nurses working in six geriatric hospitals in Korea. The highest perceived barriers were related to issues with communication such as misinterpretation and poor understanding of research findings. Kang (2015) recommended encouragement of nurse managers to provide nurses with opportunities to join research-related activities to overcome the barriers of research utilisation. A lack of guidance for clinical implication and insufficient time to implement new ideas in the clinical area were identified as the highest-ranking barriers to use of research for the study. Perceptions of barriers to research utilisation were significantly higher in nurses with lesser clinical experience. Kang's (2015) study supported the results of an earlier study in Korea (Oh, 2008) which aimed to identify barriers to research utilisation for practice among 63 registered nurses working in intensive care units in university hospitals. The study by Oh (2008) revealed nurses perceived organisational communication and support from the hospitals'

administration as the main barrier to attain evidence-based practice. According to the Korean nurses, deficiency of guidance for scientific implication and inadequate time to implement innovative knowledge in the clinical settings were recognised as the highest-ranking barriers to use of research (Oh, 2008). This study, however, utilised a much smaller sample than many of the other studies undertaken in this area.

In comparison, a study by Majid et al. (2011) explored nurses' awareness of, knowledge of, and attitude toward EBP and factors that produce barriers to research utilisation in Singapore. A total of 1486 registered nurses working in public hospitals in Singapore were surveyed. The results revealed that nurses perceived themselves as having moderate levels of skills of EBP; however, they felt that routine nursing practice prohibited them from keeping up to date with new knowledge and research. Findings from the study demonstrated that lack of training, time, and coaching to gain experience in EBP prohibited nurses in their preparation to effectively use evidence (Majid et al., 2011).

In **Australia,** the first study to identify perceived barriers to research utilisation in nursing practice was conducted by Retsas and Nolan in 1999. The study included149 nurses working at a large referral and teaching hospital in Queensland, Australia. The results revealed the three most frequently cited barriers to research utilisation were firstly insufficient time on the job to implement new ideas, secondly not enough time to read research and thirdly lack of awareness of research (Retsas & Nolan, 1999).

In a later study, Retsas (2000) investigated perceived barriers to research utilisation of 400 nurses working in a large tertiary referral hospital in Melbourne, Australia. Their findings were similar to those of Retsas and Nolan (1999) in that the highest ranking barrier to using research evidence was insufficient time to implement new ideas on the job. However, the other most frequently cited barriers of research utilisation for each of these studies differed. In particular, Retsas (2000) identified lack

of authority to change practice and facilities were inadequate for implementation as other most frequently cited barriers of research utilisation.

In another study conducted in Melbourne, Australia, 761 nurses working at a major teaching hospital identified nurses not having enough time to read research as the most frequent barrier to research utilisation, followed by insufficient time on the job to implement new ideas and nurses unaware of research barrier items (Hutchinson & Johnston, 2004). A more recent study of barriers and facilitators to evidence-based practice in nursing practice in Australia included 135 senior nurses working in a tertiary health care network in Victoria (Malik, McKenna & Plummer, 2016). Similar to the findings of Retsas and Nolan (1999) and Retsas (2000), Malik, McKenna and Plummer (2016) identified insufficient time at work to implement new ideas such as evidence-based practice. The other most frequently cited barriers for promotion of evidence-based practice in the study by Malik, McKenna and Plummer (2016) were nurses having no incentives to develop research skills for use in clinical practice and lack of resources (equipment) to change practice.

In the **Middle East** Region, there have been a number of studies conducted to assess nurses' views about the barriers to using research findings in clinical practice. These studies include one conducted in Bahrain (Buhaid, Lau & O'Connor, 2014), three in Jordan (Al-Ghabeesh, Abu-Moghli, Salsali & Saleh, 2013; Al-Ghabeesh, Abu-Moghli & Suleiman, 2014; Al-Khalaileh, Al-Qadire & Musa, 2016), 10 in Iran as reported in a systemic review by Sanjari et al. (2015) excluding a more recent study conducted by Bahadori, Raadabadi, Ravangard & Mahaki (2016) and only two studies in Saudi Arabia (Aboshaiqah, Qasim, Al-Bashaireh & Patalagsa, 2014; Omer, 2012).

In Bahrain, Buhaid et al. (2014) completed a cross-sectional exploratory study among registered nurses in a major teaching and research hospital. Data was collected from 219 nurses with results revealing that organisational factors were the most

frequent barrier. Organisational factors were the four highest ranked barriers and included not enough authority, facilities inadequate for implementation, insufficient time on the job to implement new ideas and no time to read research.

In Jordan, Al-Ghabeesh et al. (2013) completed a descriptive correlational study to explore the sources of knowledge among Jordanian nurses as used during their clinical practice. Data was collected from 539 nurses from 10 hospitals in Jordan. The results revealed the highest five ranked sources of knowledge used by Jordanian nurses were the knowledge learned during education at nursing schools, nurses' own experience, learning whilst providing patient care, discussions among health care providers, and information from policy and procedure manuals. A limitation of the study was related to the selection of the participants in excluding associate nurses without giving any reason for this exclusion. Another limitation was that although the study focused on exploring the sources of knowledge, facilitators of and barriers to research utilisation were not investigated.

In comparison, another study was conducted in Jordan to assess nurses' perceived barriers to research utilisation (Al-Khalaieh et al., 2016). The study included 239 nurses from four hospitals in Jordan and the Barrier Scale as developed by Funk et al. (1991) was used to determine the barriers to research utilisation. The findings revealed the highest ranked barrier items were organisational and innovative factors. The highest ranked barrier included results from research not generalisable to their setting, followed by lack of authority and publication of research results were not fast enough (Al-Khalaieh et al., 2016). In a further study in Jordan, Al-Ghabeesh et al. (2014) used a questionnaire they developed to assess nurses' perception of barriers to research utilisation. Their findings were also related to organisational characteristics as the greatest barrier to research utilisation in clinical practice. The greatest barrier was the routine which dominates nursing practice, followed by "lack of consistency between

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education and practice in nursing discipline", and "lack of organisational and administrative motivation for its employee to do research".

In Iran Sanjari et al. (2015) completed a systematic review of barriers. Sanjari et al. (2015) found six of the ten studies reviewed used the Barriers Scale or parts of the tool, and identified Iranian nurses also viewed organisational characteristics as the greatest barrier to research utilisation in clinical practice. These barriers included insufficient time at work to implement new ideas, not enough time to read research and physicians not cooperating with implementation. In particular, for two of the six studies reviewed by Sanjari et al. (2015), these studies included a larger sample size (Latifi, Khalilpour, Rabiee & Amani, 2012; Mehrdad et al., 2008). Both of these studies investigated nurses' perception of barriers to research utilisation in clinical practice. For the study conducted by Mehrdad et al. (2008), the Barrier Scale was used to collect data from 410 nurses from educational hospitals and nursing schools in universities in Tehran. The findings revealed the major barriers to research utilisation were lack of time, lack of resources and lack of nursing authority to change (Mehrdad et al., 2008).These results did not change after one year which was evident by a qualitative study conducted in Iran by Salsali and Mehrdad (2009). The objective of the study by Salsali and Mehrdad (2009) was to determine restrictions on the use of research findings in clinical practice for Iranian clinical nurses. Data was collected from 15 nurses working in three educational hospitals in Tehran. The findings showed some restraints to using research findings such as level of support, knowledge and skills about research, level of educational preparation, and theory and practice gap (Salsali & Mehrdad, 2009). However, in reviewing the findings from this study consideration must be given to the small size with only 15 nurses participating, and the limitation of the findings this small sample size provides.

For the study conducted by Latifi et al. (2012) in Iran, this study aimed at identifying the barriers to research utilisation from clinical nurses' perspectives. A cross-sectional study recruited 313 nurses working in three university hospitals in Iran. A questionnaire was used including two sections which examined the scientific professional knowledge of nurses and nurses' perceptions of barriers to research utilisation and the second part was extracted from Funk's Barrier Scale (Latifi et al., 2012). The results revealed similar barriers to the previous two studies discussed and conducted in Iran (Mehrdad et al., 2008; Salsali & Mehrdad, 2009). These barriers included insufficient time to study for implementing change in clinical practice, lack of timely and fast publication of studies, and lack of collaboration of physicians' in implementing the research findings from nursing studies (Latifi et al., 2012).

In Saudi Arabia two studies were found in the literature that explored the barriers of research findings utilisation in nursing practice. Omer (2012) conducted a descriptive study using a sample of 413 nurses working at the Saudi National Guard hospitals situated in the three cities of Riyadh, Jeddah, and Al-Ahsain in the Saudi Arabia. The purpose of the study was to explore the barriers to research utilisation in nursing practice, and to examine the association between the barriers and nurse demographic characteristics using the Barriers to Research Utilisation Scale. The results revealed that most of the barriers were rated by the participating nurses as moderate to strong. As per previous studies, organisational characteristics were the greatest barrier to research utilisation in clinical practice. These top five barriers included nurses' lack of authority, not enough time to read research, not capable of reading the research, physicians not cooperating with implementation and research results not generalizable to nurses' clinical settings. Furthermore, Omer (2012) found that the highest mean Barrier Scale related to organisational characteristics followed by communication, adopter (nurse) and innovation characteristics. For these four perceived factors, Omer

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(2012) assessed as to potential significant relationships between demographic variables and the factors. There was no significant correlation between geographic region of work (Riyadh, Jeddah or Al Ahsa), work area (outpatient or inpatient), marital status, nationality (Saudi or Non-Saudi), or level of education (Diploma, Bachelor, Masters or other). Significant correlations were found between adopter characteristics and participant age (r=.109, p=.03), innovation characteristics and gender (r=.107, p=.03), and adopter and organisation characteristics and years of experience (r=.117, p=.02 and r=.102, p=.04, respectively). However, despite these correlations demographic characteristics were not a significant barrier for participants for the Omer (2012) study.

In addition, additional barriers as perceived by nurses were collected from open-ended questions for the Omer (2012) study. From analysis of this qualitative data themes were attained with the most frequent being lack of time to read and appraise research, followed by lack of authority for implementation of change, poor physician cooperation and lack of education and training for nurses' for integration of research findings into clinical practice (Omer, 2012). Limitations of the study were the low response rate (34.42%), and using a convenience sampling technique which limited the ability to generalise the findings of the study (Omer, 2012).

Similarly, Aboshaiqah et al. (2014) conducted a descriptive study using a sample of 243 nurses working at a public hospital in Riyadh, Saudi Arabia. The purpose of the study was to explore the barriers to research utilisation in nursing practice, and to examine the demographic characteristics of nurses who participated in the study. Interestingly most of the participants were female, were aged between 26 and 40 years, were non-Saudi and either of Indian or Filipino, were clinical nurses with a Bachelor of Science nursing degree and had between 6 and 17 years of experience. As per previous studies, an organisational characteristic was the greatest barrier to research utilisation in clinical practice. This barrier included insufficient time on the job to implement new

ideas. Other top items rated as great or moderate barriers for research utilisation were adopter and organisational characteristics. These items included nurses seeing little benefit of the research for themselves (adopter), lack of authority (organisational), nurses feeling isolated from knowledgeable colleagues to discuss research (adopter) and not enough time to read research (organisation). A limitation of the study as recognised by the researchers was that it was conducted in only one hospital in Saudi Arabia (Aboshaiqah et al., 2014).

To conclude, the findings of the studies conducted in North America, Europe and Asia agreed that the most common barriers of research utilisation perceived by nurses in each country are similar. Main barriers of research utilisation were lack of knowledge, lack of authority, and unavailability of experienced staff (Solomons & Spross, 2011). Any variations in nurses' perceived barriers for each of these countries may exist due to differences in nurses' culture and background. Examples of these differences included that amongst Turkish (Solomons & Spross, 2011) and Finnish (Oranta et al., 2002) nurses language was a barrier whilst Iranian nurses (Salsali & Mehrdad, 2009) considered research was not related to nursing practice. Accordingly, examining the level of nurses' comfort and confidence with research utilisation as well as identifying the sources of their satisfaction during their work as registered nurses in hospitals will help to identify and develop strategies to improve research utilisation in these clinical settings.

3.4. Facilitators of research utilisation

While there were a remarkable shared barriers perceived by nurses regarding the use of research findings into nursing practice, there are several suggested strategies that can facilitate research utilisation and overcome these barriers. Many studies have been conducted worldwide that have investigated facilitators of research utilisation in clinical nursing practice. It was considered the more useful approach to divide the literature

review related to facilitators of research utilisation into three themes: facilitators of research utilisation in North America, facilitators of research utilisation in Europe and facilitators of research utilisation in Asia.

3.4.1. Facilitators of research utilisation in USA

In the United States of America (USA), identification of the facilitators that may foster the use of research findings amongst nurses has been discussed for decades in the literature. Recently, a study by Cline et al. (2017) aimed to identify the perceived facilitators to research utilisation and evidence-based practice among nurses employed in a tertiary care children's hospital in the USA. The study found that increasing the nurses' support including reinforcement of this support from administration and colleagues, and allowing the nurses enough time for research findings appraisal and implementation aided nurses in their use of research. The study also identified that nurses required education and mentored participation in research. The project recommended the establishment of an environment to encourage critical evaluation of research findings whilst fostering an understanding of applicability to contemporary practice and encouraging research utilisation amongst nurses (Cline et al., 2017).

Ten years earlier Fink et al. (2005) conducted a cross-sectional study using pre- and post-survey to identify nurses' characteristics and attitudes toward research utilisation following a multifaceted intervention. The results identified implementations such as participation in a journal club with an objective to improve nurses' utilisation of research were found to be effective (Fink et al., 2005).

Professionals form other disciplines in USA shared nurses' perceptions regarding the use of research in clinical practice. For instance, Pagoto et al. (2007) conducted a qualitative content analysis to investigate the facilitators of EBP as perceived by behavioural science health professionals including clinical psychologists, health psychologists, and behavioural medicine specialists. The study included 37

professionals who listed 48 facilitators of EBP. The reported facilitators in this study included the creation of supportive policies, provision of training opportunities mainly to the newly employed practitioners, and sufficient and applicable evidence base resources (Pagoto et al., 2007). However, in reviewing the findings from this study consideration must be given to the small size with only 37 participants, and the limitation of the findings this small sample size provides.

3.4.2. Facilitators of research utilisation in Europe

In Austria, a descriptive and exploratory cross-sectional survey was conducted by Breimaier et al. (2011) to assess facilitators of nursing research utilisation as perceived by 1,823 nurses in a university hospital. The results revealed that for 413 of the nurses in the study, the main facilitators for the use of research findings included gaining knowledge through participating in training courses and by allowing time for nurses to read and access research (Breimaier et al., 2011).

In an earlier study conducted in Sweden, Boström et al. (2008) examined 210 registered nurses' use of research in the care of elderly in a cross-sectional study in eight cities in Sweden. Data was collected using the Research Utilisation Questionnaire. The findings showed that although nurses seldom used research results in their everyday nursing care, they still had a positive attitude to research. Nurses reported facilitators that improved research utilisation included access to research findings, as well as providing organisational support for training programs which focused on nursing science and the use of evidence (Boström et al., 2008).

A relatively recent study in the United Kingdom revealed similar findings when it examined 160 nurses' opinions on the use of research in their clinical work in different health care sectors (Heaslip et al., 2012). Data was gathered using questionnaires which asked nurses to rate their opinions concerning several aspects of research and its use in practice. The findings revealed nurses' perceptions of what is

required to facilitate their use of research in clinical practice. These findings included modifications to the working environment to allow time for nurses to gain knowledge of carrying out the research process, investment in developing nurses' skills in the research process and nurses' having confidence to change practice according to the latest evidence-based research (Heaslip et al., 2012). This again was a relatively small sample size.

Likewise, another study in the United Kingdom conducted by Gerrish and Clayton (2004) aimed to examine factors influencing the use of research in practice by surveying 330 nurses. The findings from the study emphasised the necessity to consider the current working status of health professionals including nurses, and to ensure that evidence-based material is readily accessible in a clear and understandable format. The results of the study also demonstrated nurses' preference to gain their knowledge from hospital policies and procedure manuals rather than searching the literature. The nurses considered that these working documents were based on a more recent and trustworthy evidence-base (Gerrish & Clayton, 2004).

In comparison Spanish nurses' attitudes towards research and perceived facilitators of research utilisation were examined through a cross-sectional comparative study by Moreno-Casbas et al. (2011). The study involved 917 nurses working in different hospitals, primary care centres and higher education nursing schools. The findings of the study showed that if administrators desired to improve evidence-based practice in different clinical setting, they needed to endorse an environment that encouraged nurses to conduct, analyse, and use research (Moreno-Casbas et al., 2011).

Similarly, a study was conducted in Northern Ireland by Parahoo (2000) to identify facilitators of research utilisation. The sample included 1368 nurses across 23 hospitals from which 37 facilitators of research utilisation were identified by use of a survey instrument. The top facilitator as listed by respondents for the study included

manager's support followed by time, support from colleagues, motivated staff, access to findings, education and or training, opportunities for further study, staff who were aware of research, resourses and research which was beneficial for patient care. In another study conducted in Northern Ireland, Parahoo and McCaughan (2001) compared nurses' use of research in clinical practice and their perceptions of barriers to research utilisation in ten general hospitals. The sample involved 210 nurses working in medical wards and 269 nurses working in surgical wards. The results found that the top facilitators were administrator's and colleagues' support, provision of time for nurses to read and analyse research and access to research results for nurses (Parahoo & McCaughan, 2001).

For Finnish nurses working in hospitals, organisational support was the main facilitator for conducting and using research (Kuuppelomäki & Tuomi, 2003; Oranta et al., 2002). Oranta et al. (2002) conducted a study that documented 316 registered nurses' views about the facilitators of research use in two major hospitals in Finland. The study showed that the main facilitators of research utilisation were positive attitudes and nurses' abilities, in addition to administrative support and encouragements (Oranta et al., 2002).

3.4.3. Facilitators of research utilisation in Asia

Chau et al. (2008) conducted a survey aimed to examine 1,487 nurses' perceptions of the facilitators of research utilisation in public and private hospitals in Hong Kong. The results found the most common facilitators were management support, co-workers support, and education. Similarly, a more recent study conducted in China by Wang et al. (2013) described 590 nurses' perception of the facilitators of using research findings in practice. The facilitators were found to be enhancement of management support, educating nurses about the importance of research and providing

time and funding resources for nurses to conduct and utilise research (Wang et al., 2013).

In **Australia** investigation of facilitators of research utilisation in nursing practice included a study conducted by Hutchinson and Johnston (2004). Data was collected from 761 nurses working in a major teaching hospital located in Melbourne. A total of 90 facilitators were identified by nurses with the most important being an increase in the amount of time available for review and implementation of research findings. This finding was followed by as other items perceived by nurses as great or moderate facilitators of research utilisation including conduct of research which is more clinically focused and relevant, and provision of colleague support network/mechanisms (Hutchinson & Johnston, 2004).

In another study conducted in Australia, Malik et al. (2016) assessed factors facilitating evidence-based practice. A descriptive study was conducted using a sample of 135 senior nurses working in a tertiary health care network in Victoria. The three highest ranked facilitators to evidence-based practice included support from nursing colleagues for changing practice, followed by support from management in using evidence-based practice and organisational support for research related activities. Furthermore, from the findings of this study it was concluded that organisations could assist in the implementation of evidence-based practice by allowing nurses more time and resources to include it within their clinical settings (Malik et al., 2016).

In the **Middle East** region, Iranian nurses' perceptions of the facilitators of research utilisation was identified in two studies each using either a quantitative or qualitative approach (Mehrdad et al., 2008; Salsali & Mehrdad, 2009). Mehrdad et al. (2008) conducted a descriptive quantitative study to identify the facilitators of research utilisation from the perception of 410 Iranian nurses working in educational hospitals and nursing schools in universities in Tehran. Nurses reported that the most important

facilitators of research utilisation were to have nursing colleagues' and nursing faculty support, and opportunities and time to attend nursing conferences (Mehrdad et al., 2008).

The results of this study did not change after one year which was evident by a qualitative study conducted in Iran by Salsali and Mehrdad (2009) to determine the facilitators to research utilisation as perceived by Iranian clinical nurses. Data was collected from 15 nurses working in three educational hospitals in Tehran. The findings included facilitators categorised into two main groups of human resources and individual or organisational factors (Salsali & Mehrdad, 2009). As discussed previously, the small sample size for this study is a limitation when considering the findings for the project.

In Saudi Arabia only one study was found in the literature which explored the facilitators of research finding utilisation in nursing practice (Omer, 2012). Omer (2012) conducted a descriptive study using a sample of 413 nurses working at the Saudi National Guard hospitals situated in the three cities of Riyadh, Jeddah, and Al-Ahsain in Saudi Arabia. One of the purposes of the study was to explore the facilitators of research utilisation in nursing practice using open-ended questions asking nurses to list the factors that facilitate the research utilisation in their practice. The results revealed the most common factors perceived as facilitators of research utilisation were an increase in administrative support, an increase in the availability of research articles in the clinical settings, and allowance of sufficient time for nurses to review studies related to their clinical practice (Omer, 2012).

To conclude, the findings of the reviewed studies conducted in USA, Europe and Asia demonstrated a similarity in the main facilitators of research utilisation perceived by nurses in each country. The most common facilitators as ranked by nurses all over the world were: 1) the enhancement of the management support and co-workers

support; 2) planning for training programs or courses for nurses that focuses on using evidence and nursing science; 3) provision of time for nurses to analyse available studies and apply the findings in practice; 4) modification of work environment to allow time for nurses to gain knowledge of carrying out the research process, and gaining confidence to change practice according to the latest evidence-based research; 5) ensuring the accessibility of evidence-based material in a clear and understandable format; and 6) providing the opportunity and time for nurses to attend nursing conferences.

3.5. Factor analysis of the Barrier Scale

Over 20 years ago, Funk, Champagne, Wiese and Tournquist (1991) the first survey to quantify perceived barriers to research utilisation in a large-scale and systematic manner was completed. The survey was referred to as the Barriers Scale and was developed in order to identify and obtain information about items which acted as barriers to using research (Funk et al., 1991a). A 29-item scale was constructed from three sources: the CURN Questionnaire (Conduct and Utilisation of Research in Nursing Project, 1983), the literature and informal data obtained from nurses. For each of the 29 items a five-point Likert scale was used to identify as to whether they represented a barrier to research utilisation. The five-point Likert scale included the following: 1.To no extent; 2. To a little extent; 3. To a moderate extent; 4. To a great extent; and 5. No opinion. Funk et al. (1991a) sent the questionnaire to 5,000 nurses in the USA with a variety of educational qualifications including diploma, associate degree, bachelor, masters and doctoral degrees. A response rate of approximately 40% was achieved with the survey returned by 1,989 nurses.

From the data obtained, Funk et al. (1991a) undertook a factor analysis to identify areas which constituted barriers to explain why nurses did not use research in practice.

Initially seven factors were identified which were eventually reduced to four factors. These four factors selected by Funk et al. (1991a) included:

- *The nurse:* This factor includes characteristics of the 'adopter' including the nurses' research values, skills and awareness.

- *The setting:* This factor includes characteristics of the 'organisation' including the setting barriers and limitations.

- *The presentation:* This factor includes characteristics of the 'innovation' including the qualities of the research.

- *The research:* This factor includes characteristics of the 'communication' including the presentation and accessibility of the research.

3.6. The theoretical framework

A theory is a set of concepts, definitions, and propositions that clarifies events or situations by proposing relations among specific variables (Glanz & Bishop, 2010). A theory can guide the researcher to make decisions to accomplish their preferred goals. In clinical nursing practice, a theory improves nurses' understanding of the research process and analysis of the research findings (Houser & Oman, 2010). Accordingly, following a valid theoretical framework in utilising research findings should assist nurses in improving care for patients and their families in clinical settings.

The theoretical framework underpinning this study is based on Linkage Theory which is founded on the work of Havelock (1969) and the work of Horsley, Crane, Crabtree and Wood (1983) that seeks to explain how the nurse-consultant can form a link between the users and the system. The linkage model is concerned with the knowledge exchange between users and resource systems. The users are the individuals in the practice setting and the resource system is the researchers in the field. The model

has four main components: (1) a user system comprised of individuals in the practice setting willing to use the resources; (2) a resource system comprised of researchers in the field who generate new knowledge; (3) a mechanism for interaction between the users and the resource system; and (4) a mechanism to transform and disseminate the new knowledge to the user system (Jones, 2000).

Havelock has developed a framework entitled "Dissemination and Utilisation of Knowledge conceptual framework" in 1969 which was originated as a response to the explosion of scientific knowledge and the increasing expectation by policymakers. According to Havelock (1975), utilisation:

> refers to what happens when knowledge arrives at its destination. It speaks to the question of by whom knowledge is generated, how it will be generated and received, and by whom and to what effect it will be transformed and consumed once it has arrived at point (p. 2).

Havelock conversed that in order to utilise the new knowledge in a certain discipline, efforts should be placed for systematic integration and creation of collaborative and trusted linkages between researchers, practitioners, and policymakers to ensure that utilised knowledge was relevant and useful (Estabrooks, Thompson, Lovely & Hofmeyer, 2006). The linkage model encompasses a knowledge flow system, where knowledge moves in a system involving many individuals, groups, institutions with shared values and problems. The model also involves knowledge transfer process which relies on the interaction between the user and the resource system. This process is based on the answer of the questions: who says, what, by what channel, to whom, and what effect (Figure 3.2).
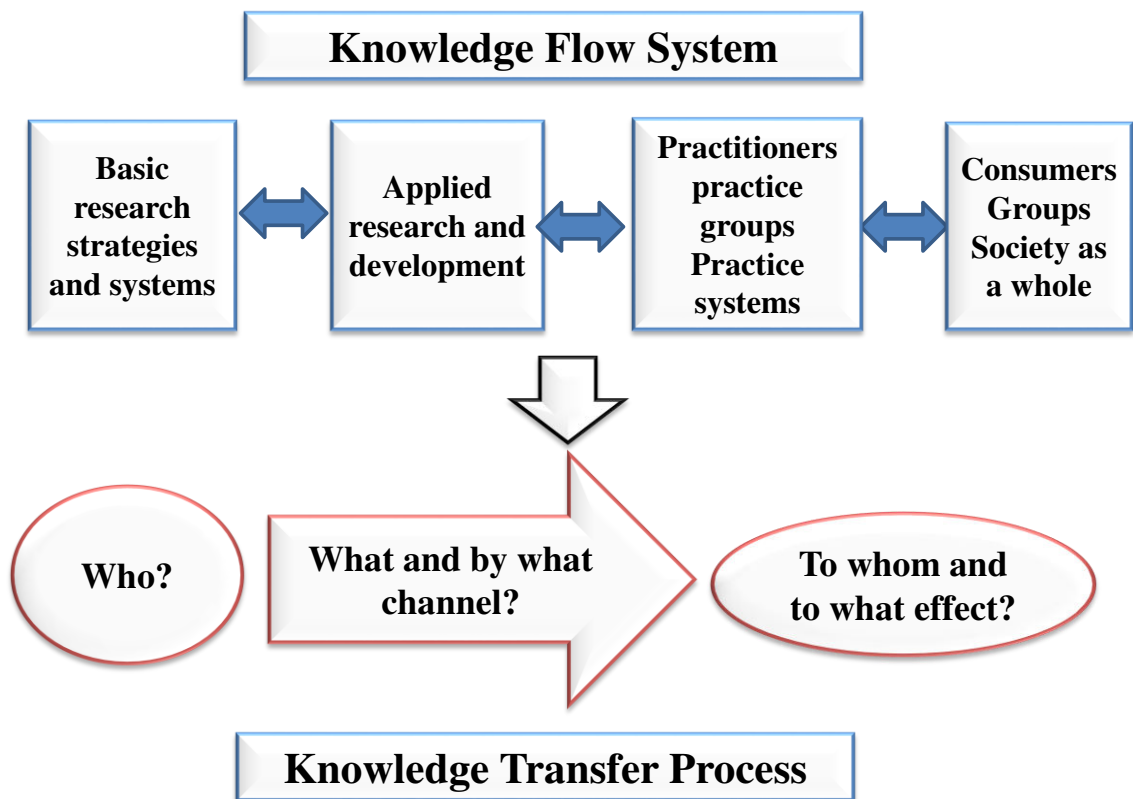
Figure 3.2. Havelock's Framework for dissemination and utilisation of knowledge

Horsley et al. (1983) adapted the Linkage Theory and suggested six stages that are required when attempting to utilise the research finding. The first stage is the identification of the clinical problem and reviewing the related studies that support solutions to the problem. The second stage is evaluating the quality of the related studies and its solutions. In the third stage a specific solution is selected and applied in the clinical setting. Then, evaluation of the effectiveness of the selected solution will take place in the fourth stage. In the fifth stage, a decision will be made to adopt, modify, or reject the solution. Finally, the new practice is installed in the institution's policy and disseminated through different communication channels (Horsley et al., 1983).

In the current study, nurses as researchers are considered the organisational change agents and the consultant in the utilisation process; they are entitled to use the research finding to improve nursing practice. They are the link between research and clinical practice. For the purpose of this study the Linkage theory was adapted

combining both the work of Havelock (1975) and Horsley et al. (1983) to form a new conceptual framework for research utilisation in different clinical settings in Saudi Arabian hospitals. The adapted Linkage theory for this research study is shown in Figure 3.3.
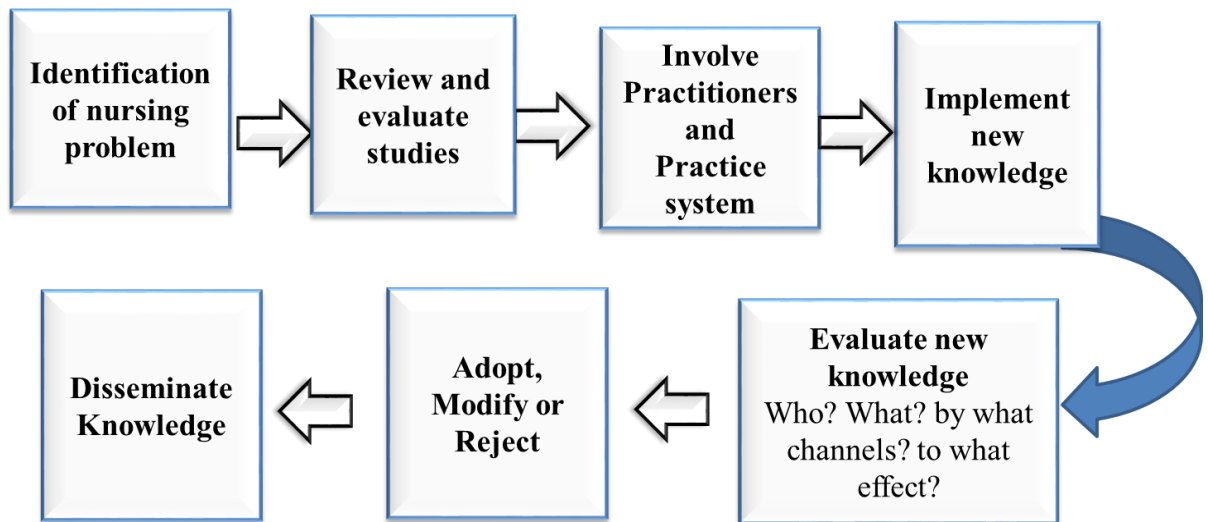
Figure 3.3. Adaptation of Linkage Model for research utilisation

The new adopted model is comprised of seven phases. First, identification of the nursing problem that needs to be solved in the clinical area. Second, the researcher, who acts as a link, will review research findings related to the problem and evaluate its relevancy. Third, the researcher involves resource systems such as practitioners and administrators to share with the decision making in implementing the solution or the new knowledge which takes place in the fourth phase. After completion of the fourth phase, the fifth phase includes the researcher and the resource systems who evaluate the solution or new knowledge by asking the suggested questions by Horsley et al. (1983). The final two phases involve the final decision in adopting, modifying or rejecting the new knowledge, and if adopted, the dissemination will take place.

Hence for this study, the theoretical assumptions will assist in addressing questions of what, why and how as to the research findings. This will provide an opportunity for the researcher to move from simply describing an observed

phenomenon but to also consider a broader view of the various aspects of the phenomenon being studied.

3.7. Limitations of the chapter

Although there have been a number of studies in various countries of barriers to and facilitators of research utilisation by nurses, a limitation has been the small number of studies conducted in Saudi Arabia as identified by this review. Furthermore, the studies undertaken in Saudi Arabia were limited to specific hospital types (one study was conducted at National Guard Health Affairs hospitals and the other at a tertiary public hospital) which may limit the generalisability of the findings. However, limited generalisability of the findings to other populations outside the survey is a limitation identified by a number of other studies included in the literature review. This is due to the use of convenience sampling often utilised for this type of research. Other limitations of review of the literature include the restriction of the literature search to English language publications over the 20 years that were reviewed.

3.8. Summary of the chapter

Research utilisation in clinical practice is the use of knowledge derived from research findings. For best practice, research utilisation requires judgment and critical analysis of research finding before applying the results in clinical situations. This chapter reviewed the literature related to the utilisation of evidence-based research in health care institutions. More precisely, the barriers to and facilitators of nursing utilisation of research in different clinical settings were studied.

The findings of the reviewed studies conducted in USA, Europe and Asia determined that the greatest barriers of research utilisation perceived by nurses were lack of authority, lack of time, insufficient understanding of research process and findings, lack or resources, and inadequate organisational support. For the main facilitators of research utilisation as perceived by nurses these were management and

co-workers support, training courses in evidence-based practice for nurses, providing nurses with time and resources for research utilisation, and improving the work environment.

Although a wide range of studies from all over the world have examined nurses' perceptions of barriers to and facilitators of research utilisation in nursing practice, an apparent gap was found in the literature mainly in the studies conducted in the Middle East and specifically in Saudi Arabia where this study took place. This gap is important because the majority of the reviewed studies were conducted in Western countries where research facilities and resources differ from those in Saudi Arabia. In addition, the culture differs widely as the nursing workforce in Saudi Arabian hospitals has been dependent on expatriates with nurses from a variety of different cultures. The next chapter will provide an overview of the research design used for this study.

Chapter 4: Methodology

4.1. Introduction

The theoretical exploration in Chapter 3 of how it would be if research findings were applied and used in nursing practice exposed the interplay of concepts such as research findings and evidence-based practice. Similarly, this theoretical exploration demonstrated how evidence-based practice may positively influence the quality of nursing practice and consequently, work output and patients' satisfaction. Additionally, in Chapter 3 the review of the literature highlighted factors that may hinder nurses' abilities to use research findings (barriers) or enable them to use these findings (facilitators). Indeed, the findings of Chapter 2 demonstrated a clear need for further research within the geographical region regarding this topic, Saudi Arabia.

This chapter focuses on the research study's methodological approach driven by the study aims and objectives, alongside the researcher's perspective. It includes the research design, settings, recruitment and sampling technique, inclusion and exclusion criteria, instruments used to collect data, data analysis, ethical consideration and rigour. The researcher being native to Saudi Arabia but accustomed to Western culture and practice examines fundamental aspects of the nurses' role in using research findings in clinical practice within Saudi Arabia. To date research of this type and extent has not previously been explored in Saudi Arabia. Indeed, simply exploring the question why such a gap in evidence exists is in itself intriguing. Examining such factors influencing nursing practice, particularly the use of research findings in clinical practice, and comparing this with the wider nursing community, could further expose the influence of other factors such as demographics as to the barriers and facilitators of research use in nursing clinical practice in Saudi Arabia. Furthermore, evidence suggests that for

nursing practice in Saudi Arabia there is clearly a lack of evidence-based practice (Omer, 2012).

4.2. Aim of the study

The overall aim of this study was to examine the perceived barriers to and facilitators of research utilisation among nurses working in hospitals in the Riyadh region of Saudi Arabia.

4.3. Research questions

The research questions for this study were:

- What are the nurses' perceived barriers to utilisation of research findings in practice in Saudi Arabia hospitals?

- What are the nurses' perceived factors that facilitate utilisation of research findings in practice in the Saudi Arabia hospitals?

- How do nurses perceive the organisational climate in relation to research utilisation of research findings in practice in Saudi Arabia hospitals?

- Is there a relationship between selected nurses' characteristics in Saudi Arabian hospitals (age, gender, level of education, years of nursing experience, work settings, nationality, position, principle job function and research experience) with their perceived barriers?

- Is there a relationship between selected characteristics in Saudi Arabian hospitals and their perceived organisational climate?

- Is there a difference between clinical nurses and nurse managers/educators regarding the barriers to and facilitators of research utilisation?

- Is there a difference in the factors for the Barriers Scale as perceived by nurses in Saudi Arabia compared to the four-factor model devised by Funk et al. (1991a)?

4.4. Research design

Quantitative research is the study of phenomena that can be assessed through statistical analysis of numerical data (Polit et al., 2001). As numerical survey data were collected, a quantitative approach was considered suitable for the purpose of this study. The use of quantitative research methods entails the collection of data through objectively measured variables (Polit & Beck, 2017). Using such a design, the researcher can formulate an organised way of handling the research problem and collecting and analysing the data to formulate a clear understanding of the underlying issue (Creswell, 2013). This study used a cross-sectional descriptive design to investigate the barriers to and the facilitators of nursing research utilisation among nurses in Saudi Arabia. Cross-sectional designs include the collection of data at one point in time when the purpose of the study is descriptive, and when it is impossible to infer causality (Schneider, Whitehead, LoBiondo-Wood & Haber, 2013). In the current study, the researcher attempted to describe the barriers to utilising research findings and the facilitators that enable the use of these findings from the nurses' perspectives who are the study population. Using a cross-sectional quantitative design is appropriate because it enabled the research to measure nurses' perceptions at one point in time and in a reasonably short period. In addition, the use of a self-administered questionnaire, that is typical in this type of design, is the most suitable instrument for data collection for this study. This measuring tool saves time and gives participants an opportunity to respond freely whilst providing more privacy than other methods (Walker, 2005).

4.5. Characteristics of quantitative research

Quantitative research is described through terms of empiricism and positivism (Duffy, 1985). It is part of the scientific process used in the physical sciences and deals with measuring reality rather than constructing the reality. This research approach is an objective, formal, systematic process which uses numerical data to quantify or measure

phenomena and produce findings. It also describes, tests, and examines cause and effect relationships (Burns & Grove, 1997), as well as using deductive processes of knowledge achievement (Duffy, 1985). Quantitative methodologies test theory deductively from existing knowledge, through developing hypothesised relationships and proposed outcomes to produce legitimate scientific answers. As a result of this, hard data and action are generated and changes take place (Melia, 1982).

Quantitative research includes two major approaches, experimental and non-experimental. The experimental design involves manipulation, control and randomisation. This design seeks to establish the existence of a cause and effect relationship (Cormack, Stevenson & Schor, 1991; Sim & Wright 2000). Therefore, the advantage of true experiments and quasi experiments is to provide adequate information about how variables may be related to each other in a study. This information enables the researcher to predict and manage future results. This can be achieved by the ability of the researcher to manipulate an independent factor to measure its effect on dependent factors (Carr, 1994). Alternatively, non-experimental research is usually designed to create a picture of an observable fact or to describe events, people, and situations that have already existed (Lobiondo-Wood & Haber, 2013). The researcher recognised that, although the quantitative approach provides a huge amount of data, the data are limited to the researcher's agenda and may address only some of the related issues (Parahoo & McCaughan, 2001).

The investigator in quantitative research preserves an independent, objective view to understand the facts (Duffy, 1985). The use of some methods may demand no direct contact with participants in any way, as in self-administered or postal questionnaire surveys. The advantage of such a detached approach is avoidance of investigator influence and involvement, limiting researcher bias and guaranteeing objectivity (Carr, 1994). Further, in quantitative research, extraneous variables are more

controllable and could be eliminated within the structure of the research, and the data generated by this approach can be assessed by standard tests (Duffy, 1985).

On the other hand, validity in a quantitative approach is more problematic than in qualitative methods. The weakness in quantitative research is related to the extent of the study control where the more strongly controlled the study, the more difficult it is to consider the research situation as authentic (Sandelowski, 1986). It could be argued that the greater the research experiment reflects reality, the greater validity, and the greater ability to generalise the results.

4.6. The study settings

The study took place in the central region in Riyadh, the capital city of Saudi Arabia. An overview of the context of Saudi Arabia is discussed in Chapter 2. This study was conducted at five hospitals in different health care sectors in Saudi Arabia, including governmental and educational hospitals. The description of each of these hospitals will be provided in the following.

King Faisal Specialist Hospital and Research Centre is a 920 bed tertiary referral speciality hospital and a research centre based in Riyadh City. For this thesis, the King Faisal Specialist Hospital and Research Centre will be referred to as the King Faisal Research Centre. The hospital provides health care in all fields and offers free health care services to all patients in Saudi Arabia. It is operated by the government and is the first Magnet accredited hospital of the Middle East. The hospital is a multidisciplinary research centre with various specialised departments including Academic and Training, Affairs Department, Nursing Affairs Department, Medical and Clinical Affairs Department, National Centre for Children and Continuing Medical Education Department. One special feature of this hospital is that it has a specialised nursing education and research department which is responsible for continuous education and research facilitation for nurses.

King Salman Governmental General Hospital is operated by the Ministry of Health (MOH) located in the North West region of Riyadh. For this study, the King Salman Governmental General Hospital will be referred to as the King Salman Hospital. The hospital has a total capacity of 500 beds with 34 beds dedicated for an adult intensive care unit (ICU) managing all types of critical patients including medical, surgical, neurological, and trauma patients. This hospital also provides primary health care, medical and surgical and eye care to the North West area of Riyadh.

Al-Yamamah Hospital is a women and children's hospital. For this thesis, the Al-Yamamah Hospital will be referred to as Al-Yamamah Hospital. It is a tertiary referral hospital located in Riyadh receiving patients from the Western province and providing specialist medical care. It has a children's intensive care unit (ICU) with 16 beds and provides care for over 600 patients annually, including obstetrics and gynaecology. The hospital is supervised operationally by the MOH and has a 500 bed capacity.

King Fahad Medical City is the largest and most advanced evidence-based medical facility and referral centre based in the heart of Riyadh City. The hospital has a capacity of 1100 beds providing health care services to all types of medical conditions under the supervision of the MOH. It is one of the largest health care facilities in the Middle East. The hospital provides a wide range of health care services including oncology, haematology, cardiology, and obstetrics. The facility is a teaching centre with an in-house Faculty of Medicine for students who are trained in the same hospital. This hospital has a dedicated research centre.

Prince Mohammad Bin Abel-Aziz Hospital is a 500 bed general referral diagnostic hospital with multi-disciplinary team specialties ranging from medical, surgical, and diagnostic medical services for adults and children above 12 years old. This hospital will be referred to as Prince Mohammed Hospital in this thesis. The

hospital has various specialised sections but it is a tertiary diagnostic centre that offers high quality care to patients based in the city of Riyadh.

The rationale for selecting each of these hospitals was that these were the largest hospitals in Saudi Arabia, with each hospital having a capacity of more than 500 beds. Given this, the total number of employed nurses was approximately 5,650 for all five hospitals. Accordingly, the selected hospitals provided a generous pool of potential participants and hence, served as an appropriate setting for the current study.

4.7. Sample and sampling technique

The population of interest in this study was three specific groups of nurses. The first group consisted of registered nurses that were identified as working in the role of a clinical nurse. The second group consisted of nurse managers with the final group being nurse educators. Clinical nurses are the bedside nurses who care for the patients and constitute the largest proportion of nurses in a hospital. Hospitals are arranged into wards which usually has one nurse manager per ward. Nurse educators usually oversee a number of wards and usually constitute the lowest number proportionally. Accordingly, the target population for this study included registered nurses working in the role of either clinical nurse, nurse managers or educators at the selected hospitals in Riyadh city and who met the eligibility criteria specified in the next section.

The study employed a convenience sample which is widely utilised in quantitative studies. Convenience sampling is a type of non-probability sampling technique that involves using the most available people for participation in the study, and is considered a sampling method that is easy to implement as it is inexpensive and accessible (Polit & Beck, 2008). The overall aim of this type of sample is to achieve good representation of the population, and it is a method of selecting subjects who are available or easy to be accessed and which provides results with minimum cost or time required to select a sample (Panacek & Thompson, 2007). In contrast, random sampling

in clinical research may be difficult to achieve sometimes due to the variation of nurses numbers or inequality of their characteristics or demographics across study hospitals. Furthermore, time, cost and ethical considerations may often limit or sometimes prevent investigators from making the required arrangements, and securing the necessary approvals to access subjects from one or more facilities or professional practices to test a hypothesis. In comparison, the convenience sampling approach enables the researcher to achieve the sample size in a reasonably fast and inexpensive manner.

4.7.1. Inclusion and exclusion criteria

Nurses in the five selected hospitals were invited to be included in the study if they were registered nurses and had a minimum experience of two years in nursing. A minimum of two years of nursing experience was needed to confirm that nurses were successfully oriented to their work including the hospital's policies, procedures, protocols, and practice guidelines. Non-registered nurses such as nursing students and nurse-assistants were excluded from this study as they were not the focus of this study.

4.7.2. Sample size

To avoid bias and assure representativeness of all study settings, a clustered technique within the sampling strategy was used with the percentages of the samples obtained from each selected hospital decided in accordance with the size and number of total nurses in each hospital. Sample size calculation was not needed because this was a survey. Moreover, in order to obtain a sample size, would need to obtain an estimate of an experimental treatment effect which was not the purpose of this study. All nurses in each hospital were recruited. Accordingly, the sample percentages were 34%, 11%, 8%, 36% and 11% for the King Faisal Research Centre, King Salman Hospital, Al-Yamamah Hospital, King Fahad Medical City, and Prince Mohammed Hospital respectively (Figure 4.1).
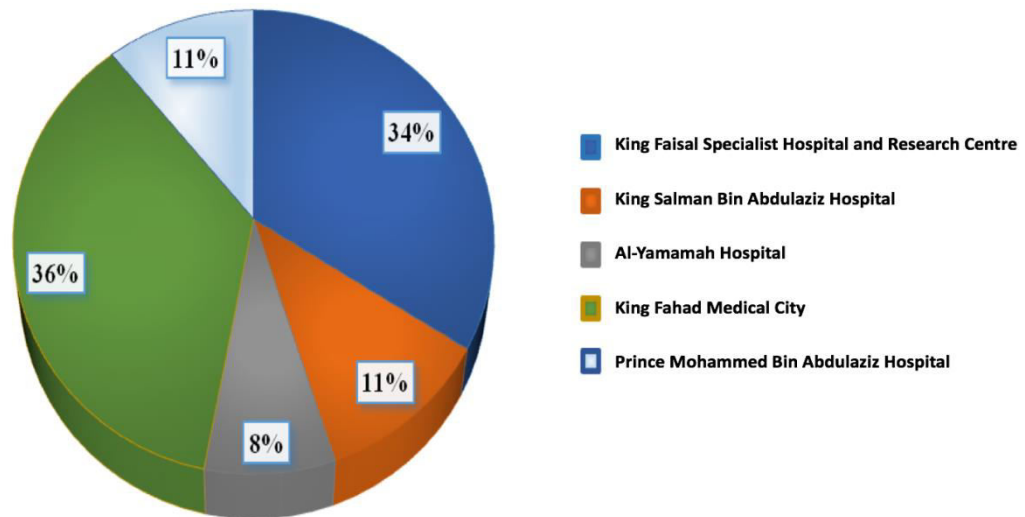
Figure 4.1. The percentage distribution of the sample across hospitals

4.7.3. Recruitment and data collection

For the collection of data for this study, the recruitment procedure commenced in June 2015 and was completed in November 2015. After gaining all ethical approvals to conduct the study (described in Section 4.12 in this chapter), the data collection was accomplished as follows:

- Formal letters were sent to nursing directors at the selected five hospitals seeking permission for data collection. A detailed description of the study proposal and copies of the ethics approvals were attached with the formal letters;

- The researcher then contacted head nurses in hospital wards and explained the purpose of the study to facilitate meeting the potential participants of the study, as well as providing information about the study. This information included the data collection instruments used, estimated time participants required to complete the questionnaires, and inclusion and exclusion criteria;

- Next, an invitation poster with information as described above was placed on noticeboards in each staff room and staff development departments of the selected hospitals inviting nurses to participate in the study. Also, the

researcher's contact details were included on the invitation poster for nurses seeking further details about the study;

- Following this, an up-to-date register of all eligible nurses employed in the target hospital wards was obtained from the head nurses of the individual wards;

- The researcher also contacted the wards' head nurses in the selected hospitals and provided sufficient information about the purposes of the study. Subsequent to this meeting, the head nurses informed the nurses in the different wards about the research and encouraged their participation;

- Research packages including a cover letter, plain language statement and questionnaire, were then left in each ward for distribution;

- Information sessions were also conducted for nurses prior to this to inform them of the research;

- Participants were informed that participation was voluntary. In addition, they were informed about their right to withdraw from the study prior to completing the questions or to refuse to answer any particular question. They were also informed that data would be aggregated and therefore impossible to remove once questionnaire has been submitted;

- Each participant was encouraged prior to the completion of the survey to examine the questionnaire carefully to assist them in their decision as to participation in the study. As the questionnaires were anonymous, informed consent was implied by submission of the completed survey;

- Nurses were asked to return the survey in a stamped, self-addressed envelope that was provided or submit completed questionnaires in a locked return box which was located at the nursing management office for each hospital in the study;

- Nurses who were on leave at the time of data collection were contacted by the main nursing management office for the researcher where possible via email to invite them to participate in the study. The surveys were sent to them electronically (email) or by return mail (two-way paid);

- Nurses were given two weeks to complete and submit the questionnaires in each selected hospital and a reminder was posted on the staff notice board after that time;

- Upon collection, the questionnaires were screened, checked, coded and prepared for analysis.

4.8. Data collection instruments

This study employed two instruments in addition to the demographic survey for collection of data. All of the questionnaires were in English. Both the expatriate and local nurses had English as a common second language. The description of these instruments is given in the following sections.

4.8.1. Demographics survey

The demographic survey was developed by the researcher to obtain information about participants' details including age, gender, nationality, length of nursing experience, nursing qualification, place where the highest level of nursing education achieved, work experience, and years of experience and position in the current hospital in Saudi Arabia in which they work. The survey also included a question regarding whether the nurses participated in any training courses or sessions regarding research utilisation and a question asking for an estimate of the number of hours training they have received in research (see Appendix A).

4.8.2. The Barriers Scale

The Barriers Scale was developed by Funk et al. (1991a, 1991b) and was used for this study to collect data about barriers to the utilisation of research for nurses in

Saudi Arabia. Permission to use this scale was obtained from Professor Sandra Funk (see Appendix B). Funk et al. (1991a) developed the questionnaire from the literature and informal data gathered from nurses. The Barriers Scale was developed in order to ascertain what acted as barriers to using research.

The Barriers Scale consists of 35 items. The first 29 items require the nurses to rate the extent of each of the listed situations considered as a barrier to nurses' use of research in their current or last clinical working setting on a five point Likert scale (1 = to no extent, 2 = to a little extent, 3 = to a moderate extent, 4 = to a great extent, 5 = no opinion). Items 30 to 33 consist of open-ended questions asking the nurses to list any further barriers they think may hinder research utilisation in practice and to rate them on the five-point Likert scale. Item 34 consists of a question asking the nurses to rank which of the items from 1 to 33 are considered the greatest, the second greatest and the third greatest barrier (see Appendix C). The final item (35) is an open-ended question, asking nurses to list what they think are facilitators of research utilisation.

4.8.3. The Facilitators Scale

The second instrument used for the study to collect data about the facilitators of research utilisation for nurses in Saudi Arabia is a survey developed by Hutchinson and Johnston (2004). The authors were contacted to give permission to use the questionnaires. The survey comprises eight items where participants are asked to rate each item as to the extent they consider it to be a facilitator of research utilisation. A five-point Likert type Scale was used for rating which included 1 = to no extent, 2 = to a little extent, 3 = to a moderate extent, 4 = to a great extent, and 5 = no opinion. The survey also asks participants to name and rate the items they consider to be the three greatest facilitators of research utilisation (Appendix D).

4.8.4. Validity and reliability of the instruments

The correctness of measurements in a study is affected by reliability and validity. According to Babbie (2004), validity is the degree to which the functional variable correctly signifies the theoretical concept it aims to measure. Expressed differently, a valid instrument accurately calculates that which it was likely to calculate (Creswell, 2005). For an instrument to be reliable, repeated use of the measure must attain similar values. Babbie and Benaquisto (2009) asserted that survey research is usually high in reliability. In light of its validity and reliability, the Barrier Scale has been used in a wealth of research studies and has been translated into many languages (Oranta et al., 2002; Thompson et al., 2006).

Reliability is generally measured using Cronbach α. When the α score is close to one, the instrument is measuring consistently what it is supposed to measure (Creswell, 2005). The Cronbach α value of the Barriers Scale has previously been tested for validity and reliability. This was validated using 300 nurses working in university hospitals and the Cronbach α value identified as 0.92 (Bayik, Uysal, Ardahan & Ozkahraman, 2010). For another similar study, the Barriers Scale was tested for internal consistency and Cronbach's α reliability was 0.80 (Omer, 2012).

4.9. Content validity

In order to establish content validity of the selected instruments for the Saudi culture, a panel of experts were consulted to rate the relevance and clarity of each question in the questionnaire. The panel of experts comprised specialists in nursing research methodology, the supervisors, and a professional nurse in Saudi Arabia. Members of the panel were selected on the basis of their expertise in undertaking research and professional work experience in Saudi Arabia. Selection was through the researchers' professional network. The purpose of the assessment was to ensure that items within the instruments were relevant and acceptable to the target population and

setting, to detect any concerns as to the words used in the instruments, and if there was a need for clarification in relation to the instruments (Reichenheim & Moraes, 2007). Following the review, the panel approved the instruments and acknowledged that they could be used without deletion of any items as the instruments were simple to complete and suitable to Saudi Arabian culture. The instruments were then tested in a pilot study.

4.10. Pilot study

Pilot testing is a technique used to ensure the validity of study instruments and to identify any possible misunderstandings and inaccuracies of questions (Creswell, 2012; Hulley, Cummings, Browner, Grady & Newman, 2013). To assess the clarity and structure of instruments for this study, a pilot study was conducted involving 50 of the original sample of nurses who met the inclusion criteria. These participants were recruited by the same means as the main sample size but at one hospital only. The pilot study was considered to determine the time required to complete the questionnaire, identify any practical limitations of the survey, difficulties that might have appeared during application of the main study in a different culture (Saudi Arabia), and to calculate the alpha coefficient reliability of the survey. Moreover, the pilot study results provided an opportunity for the student researcher to introduce any modifications to items in the questionnaires, such as questions on education, work experience, and gender in an effort to improve clarity for participants. All participants who were invited to participate in the pilot study were required to have satisfactory English language skills including reading and writing to enable them to provide more accurate comments which would increase the validity of nurses' responses in the main study.

The participants provided valuable feedback related to the time required to complete the questionnaires, clarity and understanding of the questions, and suitability and applicability of the questions to Saudi culture. According to the results of the pilot, participants viewed the questionnaires as easy to fill, the maximum of 15 minutes was

required to complete the questionnaire, and the questions were suitable for Saudi Arabian culture. Based on these findings, no changes were made to the questionnaires utilised for the main study. The data from the pilot study was included in the main study.

4.11. Data management

As per ethics requirements, once data were entered in the data analysis software, all the completed questionnaires were kept in a securely locked cabinet in the researcher's office in the school department in the university. The entered database was saved in the researcher's personal computer and was protected by a password known only to the researcher and the primary supervisor. Applicable measures were also taken to protect the data including protection by antivirus software and updating the operating system (Blaxter, Hughes & Tight, 2010). Moreover, additional measures were taken to secure the data when transferred from Saudi Arabia to Australia. This included, transfer of data from hard copy to electronic data. This electronic data was then transported by the researcher personally on the plane and not in the baggage from Saudi Arabia to Australia upon completion of the data collection.

4.12. Ethical considerations

Through all the stages of carrying out the current study, all ethical standards were maintained. Permission to use the instruments used in this study was obtained from the original authors (see Appendix B). Approval to recruit the participants was obtained from the College of Human Ethics Advisory Network (CHEAN) of the Royal Melbourne Institute of Technology University (BSEHAPP 38-14 JONES-ALMALKI) (Appendix E). In addition, permission to perform the study in Saudi Arabia was obtained from the Institutional Review Board (IRB) of the included hospitals under Ministry of Health (Appendix F) and from office of Research Affairs (ORA) at King Faisal Research Centre (Appendix G).

The plain language statement (PLS) was attached to the questionnaire (Appendix H). Adequate information about the significance and purpose of the study were provided. In addition, the contact details of the researcher were given to all participants so that they could seek clarification about any aspect of the study before consenting to participate. Further, the participants were instructed that their completion of the questionnaire was considered as implied consent to participate in the study and that their information would be used only for the purposes of this study. The potential ethical issues which were identified for this study included maintenance of participants' anonymity and confidentiality. No identifying data was, therefore, collected to maintain participants' anonymity. Participants returned the questionnaires by placing it into a sealed box in the word, thus maintaining confidentiality. Participants were also assured that their responses were treated with confidentiality and that all completed questionnaires were saved securely so that no unauthorised persons could access the document. Additionally, the study data were stored in electronic files protected with a password and only accessed by the researcher, thus further maintaining confidentiality. All completed questionnaires and the study data are kept securely at RMIT University for five years before being discarded.

4.13. Data analysis process

The study data analysis was conducted in several stages as explained in the subsequent sections.

4.13.1. Data coding, entry and cleaning

Coding of the participants' responses obtained from the study questionnaires were coded manually using the codebook as a guide (Pallant, 2011). Then, participants' responses were entered into the IBM Statistical Package for the Social Sciences (SPSS) Version 22. The data were carefully checked for any entry errors. Subsequently, screening and cleaning of the data were performed using the SPSS software. Missing

data were assessed to have occurred at random and were replaced by mean values for each variable. (Hair, Anderson, Babin, Tatman & Black, 2010). After screening and cleaning of the data, data analysis progressed in three steps. The first step was to describe the participants' characteristics. The second step was to analyse the participants' responses to each item in the questionnaire using descriptive statistics such as frequencies and percentages, median, mean and standard deviation. The final step in the analysis was to explore the relationships between the dependent variable and the independent variables using inferential statistics. For the study there were no responses to the open ended questions and hence, were not included in the results section of the thesis. This could have been because English is their second language and they may not have felt confident to address these questions. In addition, due to the participants' heavy workload they may not have had time to complete the open ended questions.

4.13.2. Analysis strategy

Prior to undertaking the analysis of the participants' responses to the study questions, measures of central tendency such as means, standard deviations, frequencies, percentages and ranges of all the study variables were examined. The independent variables were tested for multi-collinearity (high correlation, $r \geq 0.90$) for the purpose of determining the contribution of these variables to the dependent variable (research utilisation score). Further, data distributions were examined for normality. No substitution was made for the missing answers to the open questions in the Barriers Scale. Descriptive and inferential statistics were utilised for analysis of the study data.

4.13.3 Descriptive statistics

For the study, descriptive analysis of the demographic data included frequency tables and cross tabulations. Frequencies and percentages in addition to measures of central tendency such as means, standard deviations and ranges were used to describe demographic variables such as the age, gender, nationality, length of nursing experience

in nursing, nursing qualification, place where the highest level of nursing education obtained, work experience, and years of experience in position in current hospital.

4.13.4. Inferential statistics

Inferential statistical analysis of the demographic data included testing for significant differences amongst each of the categories using a one-way ANOVA for three or more groups, and the two-sample *t*-test for two groups. For three or more groups where the findings were statistically significant, appropriate multiple comparison *t*-tests controlling for Type I error were utilised. The above analysis was performed on the global Barriers Scale total score and on its four subscales total scores. Multiple regression analysis was used where appropriate to assess which demographic variables have the largest impact on the Barriers Scale total score and its sub-scale total scores. For comparison of data for clinical nurses and nurse managers, a two-sample *t*-test was used for rating scale total scores and Chi-square tests for demographic type data. The level of statistical significance was set at $p \leq 0.05$.

4.14. Summary

The main aim of this quantitative study was to examine the perceived barriers to and facilitators of research utilisation among nurses in Saudi Arabia. This chapter presents the research methodology of this study. It includes the research design, settings, recruitment and sampling technique, inclusion and exclusion criteria, instruments used to collect data, data analysis, and ethical considerations. A cross-sectional descriptive design was used in this study to investigate the barriers to and the facilitators of nursing research utilisation among nurses in Saudi Arabia. The study was conducted at five hospitals in Saudi Arabia including governmental, non-governmental and educational hospitals. The sample included 1,824 registered nurses who had a minimum of two years nursing experience and worked at the selected hospitals in Saudi Arabia. Before beginning the process of recruiting the participants, permission to

conduct the study was obtained from the Riyadh City Health Affairs Directorate and from the ethical boards at the each of the five selected hospitals. All nurses at the five hospitals who met the inclusion criteria and agreed to participate in the study were provided with adequate information about the study and assurances of confidentiality of their responses. Prior to commencement of the project, a pilot study was conducted to examine the reliability of the survey instruments and included 10% (n=182) of the sample from nurses who met the inclusion criteria.

For data collection two instruments in addition to the demographic survey were used. The instruments included a questionnaire to assess nurses' perceived barriers to the utilisation of research in Saudi Arabia. This survey tool was the Barriers Scale as developed by Funk et al. (1991a; 1991b). The second instrument was a questionnaire to assess nurses' perceived facilitators of research utilisation in Saudi Arabia (Hutchinson & Johnston, 2004). Analysis of the study data included multiple descriptive and inferential statistical tests. The next chapter will discuss the analysis of the results from this research.

Chapter 5: Results

5.1. Introduction

Examining the perceived barriers to, and facilitators of, research utilisation among nurses working in hospitals in the Riyadh region of Saudi Arabia was the central aim of the study. Eliciting the nurses' perspectives on how research was utilised and applied in nursing practice was essential to generate an evidence base of assessing and improving nursing practice in health care institutions in Saudi Arabia. This chapter presents the results according to the specified objectives and within two main themes. This included basic frequency analyses of the demographic characteristics of the respondents and nurses' perceptions of research utilisation in their clinical practice in Saudi Arabia. Results that are not significant are included in the tables but will not be discussed in the text.

5.2. Demographics

To ensure as close to a representative sample as possible, the study was conducted in Riyadh, the capital of Saudi Arabia across five hospitals representing government, other-governmental and educational health care sectors. The invited hospitals were: King Faisal Specialist Hospital and Research Centre (King Faisal Research Centre), King Salman Bin Abdulaziz Hospital (King Salman), Al-Yamamah Hospital, King Fahad Medical City and Prince Mohammed Bin Abdulaziz Hospital (Prince Mohammed). Hospital managers/directors were informed that the hospital would be identified and what the nature of the research was. Each of the selected hospitals has a bed capacity of more than 500. Table 5.1 details the bed capacity of each of the participating hospitals and the number of eligible nurses.

More than 2,500 surveys were distributed to nurses working in these five major hospitals based in Riyadh City, Saudi Arabia. Overall, 1824 nurses responded to the

survey yielding a response rate of 86%. From the responding participants, 670 (36.5%) nurses were from King Fahad Medical City, 615 (33.7%) from King Faisal Research Centre and 202 (11.1%) nurses were from Prince Mohammed Hospital. The remaining participants came from King Salman Hospital (n = 200, 11%) and Al-Yamamah Hospital (n = 137, 7.5%). The nurses from the two largest hospitals (King Faisal Research Centre and King Fahad Medical City, not surprisingly, contributed to the highest number of respondents.

Table 5.1. Bed capacity of hospitals

Hospital name	Bed capacity	Estimated number of nurses with more than two years of experience	Number of participants
King Faisal Research Centre	920	1200	615
King Salman Hospital	500	250	200
AL Yamamah Hospital	500	200	137
King Fahad Medical City	1095	750	670
Prince Mohammed Hospital	500	250	202

The demographics of the respondents appear in Table 5.2. The majority of responding nurses were females (n=1509, 82.7%). Results show that the largest proportion of participating nurses working in these particular hospitals was aged between 20 to 40 years (70.4%).

Table 5.2. Demographics of the respondents (n= 1824)

Characteristics	Number	Percentage (%)
Age		
20-30 Years	616	33.8
31-40 Years	669	36.7
41-50 Years	413	22.6
51-64 Years	126	6.7
Sex		
Male	315	17.3
Female	1509	82.7
Country of birth		
KSA	242	13.3
Philippines	857	47.0
India	501	27.5
South Africa	50	2.7
Jordan	62	3.4
Pakistan	35	1.9
Egypt	4	0.2
Australia	7	0.4
USA	13	0.7
Canada	8	0.4
Malaysia	40	2.2
Lebanon	2	0.1
UK	3	0.2
Experience (Years)		
2-5	369	20.2
6-10	544	29.8
11-15	418	22.9
16-20	175	9.6
>20	318	17.4

Most of the nurses were not from Saudi Arabia (86.7%). The largest group of expatriate nurses came from the Philippines (47%), followed by India (27.5%) while only 242 (13.3%) were from Saudi Arabia and smaller proportions of nurses came from European and Middle Eastern States (Table 5.2). This large proportion of expatriate nurses may be explained by the increasing need for health care and hence number of hospital beds in Saudi Arabia and thus the need for more nurses. It is quicker to recruit expatriate nurses compared to educating nurses from Saudi Arabia. This has been identified as the number one challenge facing the Saudi Ministry of Health (MOH).

Currently, the MOH is trying to address this through its strategic plan of increasing the training and education of Saudi Arabian nurses (Tumulty, 2001; Almalki et al., 2011a).

Nurses' experiences also varied (Table 5.2), ranging from two to twenty or more years. Their experience could be categorised as follows: 29% with 6 to 10 years, followed by 22.9% with 11 to 15 years of the total sample (1824 nurses) while nurses who had 16 to 20 years' experience comprised the smallest group in this sample (*n*=493, 18%).

The participating nurses varied in their roles from clinical bedside nursing to educational and managerial responsibilities. Clinical nurses represented the majority of respondents (82.4%), followed by nurse managers (12.7%) and nurse educators (4.9%) (see Table 5.3). This difference in numbers reflects the nursing workforce as the majority of nurses are clinical nurses who provide nursing care directly to the patients. The proportion of nurse educators was less than the proportion of nurse managers as the expectation is for nurse educators to cover several wards, while nurse managers take charge of single wards.

Nurses varied in their education qualifications. The majority of nurses had a Bachelor degree qualification (82.7%) while nurses with a hospital certificate and a Master's degree constituted the smallest proportion (0.8% and 1.8%, respectively). This is presented in Table 5.3.

The countries where the nurses obtained their qualifications were collapsed into three groups: Philippines and Malaysia (Asian), India and Pakistan, and Western qualified. This grouping was done to facilitate Chi-square testing. When collapsed by region, half of these nurses received their qualification in an Asian region (50.1%), followed by India and Pakistan as a region (29.3%) and the Middle Eastern region (16%). The remaining nurses received their qualifications in a Western region (4.5%), which includes North America, South Africa, United Kingdom and Australia.

Table 5.3. Roles and initial qualifications of nurses included in the current study

	n	*%*
Current role		
Clinical	1503	82.4
Manager	231	12.7
Educator	89	4.9
Qualification		
Hospital Certificate	14	0.8
Diploma	269	14.7
Bachelor	1508	82.7
Master	33	1.8
Qualification by country		
KSA	224	12.3
Philippines	874	47.9
India	503	27.6
Jordan	62	3.4
South Africa	46	2.5
Malaysia	39	2.1
Pakistan	32	1.8
Australia	13	0.7
USA	13	0.7
Canada	8	0.4
Egypt	4	0.2
UK	4	0.2
Lebanon	2	0.1
Hospital		
Al-Yamamah	137	7.5
Prince Mohammed	202	11.1
King Fahad Medical City	670	36.7
King Salman	200	11.0
King Faisal Research Centre	615	33.7
Qualification by region		
Middle East	292	16.0
Asia: Philippines & Malaysia	913	50.1
India/Pakistan	535	29.3
Western: America, Europe, South Africa and Australia	84	4.6

5.2.1. Comparison of demographics across the hospitals

When assessing the age distribution across the five hospitals, there was an overall tendency toward the employment of younger nurses. This trend towards employing lower age categories was particularly observed in Al-Yamamah, Prince Mohammed, King Salman and King Fahad Medical City Hospitals. The exception was

the King Faisal Research Centre which had balanced proportions of all age categories except for those older than sixty years.

Pearson's Chi-squared test showed that there was a significant association between hospital type and age category ($\chi^2(16) = 198.9$, $p < .001$). This means that age distribution was not the same across hospitals. Likewise, Pearson's Chi-squared test showed that there was a significant difference in the distribution of female and male nurses employed across all hospitals ($\chi^2(4) = 143.5$, $p < .001$). These results though interesting reflect the randomness of nursing recruitment across hospitals.

There was also found to be a difference in the qualifications of the nurses between the hospitals. Of special importance, King Faisal Research Centre and Prince Mohammed Hospital had the highest number of Bachelor degree qualified nurses, fewer Diplomas and the least number of Master's degree qualifications in the sample. A trend in the data toward more Bachelor nurse qualifications was also evident across all hospitals.

As identified in Table 5.4, Pearson's Chi-square test showed that there was a significant association between hospital type and nurses' role ($\chi^2(8) = 16.6, p = .034$). This indicates that the proportion of nurses in each role varied by hospital, which may show that hospitals also differed in recruiting different levels of staff but it could also indicate the areas that had higher attrition of nurses.

Table 5.4. Nurses' role by hospital

		Al-Yamamah Hospital	Prince Mohammed Hospital	King Fahad Medical City	King Salman Hospital	King Faisal Research Centre	Total
Clinical Nurse	*n*	112	162	549	155	526	1504
	%	81.8	80.2	81.9	77.5	85.5	82.5
Nurse Manager	*n*	15	25	97	31	63	231
	%	10.9	12.4	14.5	15.5	10.2	12.7
Nurse Educator	*n*	10	15	24	14	26	89
	%	7.3	7.4	3.6	7.0	4.2	4.9
		137	202	670	200	615	1824

Table 5.5. Region where nurses' received their qualifications across hospitals

Qualifying region		Al-Yamamah Hospital	Prince Mohammed Hospital	King Fahad Medical City	King Salman Hospital	King Faisal Research Centre	Total
Middle East	*n*	61	4	22	95	110	292
	%	44.5	2.0	3.3	47.5	17.9	16.0
Asia: Philippines & Malaysia	*n*	28	159	405	52	269	913
	%	20.4	78.7	60.4	26.0	43.7	50.1
India/ Pakistan	*n*	44	36	235	50	170	535
	%	32.1	17.8	35.1	25.0	27.6	29.3
Western	*n*	4	3	8	3	66	84
	%	2.9	1.5	1.2	1.5	10.7	4.6
Total	*n*	137	202	670	200	615	1824

The detailed breakdown of where nurses' received their initial qualification by country across hospitals is displayed in Table 5.5. Pearson's Chi-square test of association between hospital and country of origin showed a statistically significant association between hospital type and qualifying country group ($\chi^2(12) = 482.3$, p <.001). Thus, the proportion of nurses who obtained their qualifications from various country groups varied in their practice with the hospital they worked in. There was an overall tendency of hospitals to recruit nurses educated in Asian countries and less frequently from Middle Eastern countries and least from Western educated nurses. This may reflect the number of nurses in these regions who apply for these positions. It is worth noting that nurses from these countries were unequally distributed over the selected hospital which may influence the application of standardised care especially with the absence of education programs for new nurses. For example, the proportion of nurses who obtained their qualification from Western states was highest for the King Faisal Research Centre, representing 10.7% (66) who responded to the survey in this hospital.

5.2.2. Participation in research related activities

At the end of the demographics section, nurses were asked a series of questions (12 questions) which required a yes/no response. These questions assessed the level of education and participation in various research related activities. The questions included are listed in Table 5.6 and Table 5.7. The responses to these questions were then compared between the five hospitals. A Chi-squared test of association was used to assess the association between hospital type and participation in these key scientific activities.

Table 5.6. Association between research activities and hospital type (*n*=1824) Part 1

		Total	Al-Yamamah Hospital	Prince Mohammed Hospital	King Fahad Medical City	King Salman Hospital	King Faisal Research Centre	χ^2	*p*
In the last 12 months have you participated in any education concerning research utilisation?	Yes	506 (27.7%)	20 (14.6%)	20 (9.9%)	95 (14.2%)	45 (22.5%)	326 (53%)	303.5	<.001
	No	1318 (72.3%)	117 (85.4%)	182 (90.1%)	575 (85.8%)	155 (77.5%)	289 (47%)		
Does your hospital have a research culture	Yes	1398 (76.6%)	95 (69.3%)	72 (35.6%)	582 (86.9%)	41 (20.5%)	608 (98.9%)	764.844[a]	<.001
	No	426 (23.4%)	42 (30.7%)	125 (64.8%)	88 (13.1 %)	159 (79.5%)	7 (1.1%)		
Do you read/subscribe to any nursing journal?	Yes	1485 (81.4%)	103 (75.2%)	146 (72.3%)	521 (77.8%)	135 (67.5%)	580 (94.3%)	119.93	<.001
	No	339 (18.6%)	34 (24.8%)	56 (27.7%)	149 (22.2%)	65 (32.5%)	35 (5.7%)		
Do you read nursing articles?	Yes	1340 (73.5%)	110 (81%)	173 (85.6%)	566 (84.5%)	143 (71.5%)	347 (56.4%)	153.91	<.001
	No	483 (26.5%)	26 (19 %)	29 (14.4%)	104 (15.5%)	57 (28.5%)	268 (43.6%)		
Have you participated in any journal clubs?	Yes	473 (25.9%)	39 (28.5%)	23 (11.4%)	98 (14.6%)	46 (23%)	267 (43.4%)	164.88	<.001
	No	1351 (74.1%)	98 (71.5%)	179 (88.6%)	568 (85.4%)	154 (77%)	348 (56.6%)		
Have you participated in any research?	Yes	658 (36.1%)	54 (39.4%)	76 (37.6%)	172 (25.7%)	51 (25.5%)	305 (49.6%)	90.8	<.001
	No	1166 (63.9%)	83 (60.2%)	126 (62.4%)	498 (74.3%)	149 (74.5%)	310 (50.4%)		

As identified in Table 5.6, the Pearson Chi-squared test of association showed that nurses from King Faisal Research Centre participated in educational sessions about research utilisation significantly higher (53%) than the nurses from the other hospitals. Nurses coming from Prince Mohammed Hospital participated the least in these activities (9.9%), (χ^2 (4) = 303.5, p<.001). Furthermore, when these nurses were asked whether their hospital had a tangible research culture, the nurses from King Salman Hospital (20%) and from Prince Mohammed Hospital (35.6%) agreed less than the rest of the hospitals. In particular, the majority of nurses from King Faisal Research Centre believed that there was a research culture (98.9%), followed by nurses from King Fahad Medical City (86.9%) and those from Al-Yamamah Hospital (69.3%). A Pearson Chi-squared test showed that the difference in responses across hospitals was statistically significant, (χ^2 (4) = 746.84, p<.001).

When nurses across all hospitals were asked whether they had subscribed to a special nursing journal, the majority of them responded with agreement. Those nurses employed by King Faisal Research Centre however, were the highest subscribers (94.3%) and those employed by Prince Mohammed Hospital were the least likely to subscribe to journals (72.3%). This could be because nurses at King Faisal Research Centre were in more of a research culture environment and therefore subscribed to journals in order to make them accessible to staff. A Pearson Chi-squared test showed the difference between nurses coming from various hospitals on subscribing to journals was significant, (χ^2 (4) = 119.93, p<.001).

When nurses were asked whether they read nursing articles published from various resources, nurses working in King Faisal Research Centre were the least likely to do so (56.4%). The type of hospital was significantly associated with nurses' responses to this question (χ^2 (4) =53.91, p<.001). This contradicts the previous point that nurses from King Faisal Research Centre were more likely to subscribe to journals

but least likely to read the articles. It could be that the hospital subscribes to the journals and that the nurses misunderstood or were confused by the question.

Alternatively, when nurses were asked if they had participated in any journal clubs on at least one occasion in the past, more nurses from King Faisal Research Centre reported attending a journal club compared to nurses from the other hospitals, (χ^2 (4) =164.9, p<.001). This may be because these nurses read less than their colleagues from other hospitals and thus, attended more journal clubs to compensate for that. Attending a journal club does not necessarily require the reading of the article. This could account for the finding that nurses from King Faisal Research Centre were less likely to read articles.

Table 5.7 contains the results regarding the availability and attendance of in-service or continuing education sessions. Regarding regular in-service education sessions, nearly all nurses from all hospitals responded in the affirmative and thus, there was no significant association found between hospital type and having regular education sessions (χ^2 = 8.03, p=0.09).

When nurses were asked whether or not they were able to attend in-service educational sessions, results indicated a statistically significant difference in attendance across hospitals (χ^2 (4) =71.9, p<.001). In fact, those nurses who responded from King Faisal Research Centre (97.1%) were the most likely to attend, indicating that they are given the greatest opportunity and encouragement to attend these sessions when compared to the nurses from the other hospitals. The nurses from King Fahad Medical City (95.7%) were the next largest attendees. However, the nurses from Al-Yamamah Hospital (86.1%) were the least likely to attend denoting that at least 14% of the Al-Yamamah Hospital nurses believed they were not able to attend educational sessions at their work areas.

Table 5.7. Association between research activities and hospital types (*n*=1824) Part 2

		Total	Al-Yamamah Hospital	Prince Mohammed Hospital	King Fahad Medical City	King Salman Hospital	King Faisal Research Centre	χ^2	*p*
Does your ward/unit have regular in-service education sessions?	Yes	1823 (99.9%)	137 (100%)	201 (99.5%)	670 (100%)	200 (100%)	615 (100%)	8.03	.090
	No	1 (0.1%)	0 (0%)	1 (0.5%)	0	0	0		
Are you able to attend these sessions?	Yes	1705 (93.5%)	118 (86.1%)	184 (91.1%)	641 (95.7%)	165 (82.5%)	597 (97.1%)	71.9	<.001
	No	120 (6.5%)	20 (13.9%)	19 (8.9%)	30 (4.3%)	36 (17.5%)	19 (2.9%)		
Do you have to undertake any mandatory competencies?	Yes	1812 (99.3%)	134 (97.8%)	199 (98.5%)	664 (99.1%)	200 (100%)	615 (100%)	15.8	.011
	No	12 (0.7%)	3 (2.2%)	3 (1.5%)	6 (0.9%)	0	0		
Have you attended any conferences?	Yes	1502 (82.3%)	122 (89.1%)	181 (89.6%)	479 (71.5%)	157 (78.5%)	563 (91.5%)	103.7	<.001
	No	322 (17.7%)	15 (10.9%)	21 (10.4%)	191 (28.5%)	43 (21.5%)	52 (8.5%)		
Are you provided with any financial support to attend these conferences?	Yes	622 (34.1%)	44 (31.4%)	61 (30.2%)	152 (22.7%)	60 (30%)	306 (49.8%)	109.2	<.001
	No	1203 (65.9%)	95 (68.6%)	141 (69.8%)	518 (77.3%)	1410 (70%)	309 (50.2%)		
Are you provided with any leave support to attend these conferences?	Yes	806 (44.2%)	65 (47.4%)	104 (51.5%)	370 (55.2%)	64 (32%)	203 (33%)	81.3	<.001
	No	1018 (55.8%)	72 (52.6%)	98 (48.5%)	300 (44.8%)	136 (68%)	412 (67%)		

In the same manner, nurses were asked whether their hospital mandated specific annual training competencies (check-offs). The Likelihood Ratio Chi-squared test was used due to the presence of nil responses as the majority of the nurses across the five hospitals responded with agreement. Results indicated that a statistically significant difference existed between nurses from various hospitals (χ^2 (4) = 15.8, p=.011). In particular, few nurses from Al-Yamamah Hospital (2.2%), Prince Mohammed Hospital (1.5%) and King Fahad Medical City (0.9%) believed their hospitals mandated annual check- offs. Results below 100% warrant further investigation as all hospitals in Saudi Arabia Riyadh are required to have annual mandatory check-offs for all staff on procedures such as cardiopulmonary resuscitation (CPR), basic life support (BLS) and advanced cardiovascular life support (ACLS). Therefore, a value of 100% is expected for all hospitals. It may be that these are considered as a normal requirement for nurses and consequently, the check-offs were not considered as mandatory competencies by the participants in the study.

The nurses were also asked if they had attended any conferences (see Table 5.7). The Chi-squared test of association showed that a statistically significant difference exists between nurses' abilities to attend conferences across hospitals (χ^2 (4) = 103.7 p<.001). It is important to note that those nurses coming from King Fahad Medical City (28.5%) and King Salman Hospital (21.5%) were the highest to report that they had not attended conferences before when compared to the lower percentages of nurses from other hospitals. Nurses from King Faisal Research Centre reported that they were the most likely to attend conferences (91.5%).

When asked whether they received financial support to attend conferences, nurses at King Faisal Research Centre reported significantly (χ^2 (4) = 10.9.2, p<.001) greater opportunity (49.8%) to be supported when compared to nurses coming from King Fahad Medical City (22.7%), King Salman Hospital (30%), Prince Mohammed

Hospital (30.2%), or from Al-Yamamah Hospital (34.1%). This may reflect the fact that attending conferences was encouraged more at King Faisal Research Centre because it has more of a research culture and hence attendance at conferences contributes to that culture.

In the same manner, the nurses were asked whether they were provided with leave to attend conferences while at work. The majority of the nurses at King Fahad Medical City (55.1%) and Prince Mohammed Hospital (51.5%) reported significantly greater opportunity to be given leave by their supervisors at work to attend conferences compared to nurses from King Salman Hospital (32%), King Faisal Research Centre (33%), or Al-Yamamah Hospital (44.7%), (χ^2 (4) = 81.3, p<.001). The reason why nurses at King Faisal Research Centre were more likely to attend conferences could be because they were more likely to be given financial assistance. However, they were less likely to be provided with leave support to attend conferences. In contrast, the nurses from King Fahad Medical City are the least likely to attend conferences, or receive financial support but more likely to be provided with leave to support attendance at conferences. It would appear therefore, that providing financial support was more likely to influence nurses' attendance at conferences compared to providing leave support.

5.3. Barriers to research

The responses to each of the 29 items of the Barriers to Research Utilisation questionnaire were rated on a 5-point scale. This scale ranged from 1 that represents 'to no extent' to 4 that represents 'to a great extent' with 0 representing 'no opinion'. For each respondent, these ratings were summed to obtain a total Barrier Score across all items on the questionnaire. The responses to all of the items on the barriers to research utilisation questionnaire were then ranked in descending order for the 'moderate to great extent' and 'low to no extent' categories. Table 5.8 indicates the total scores for each item for the 'moderate to great extent' category. The highest total mean score for

perception of barriers to research utilisation for the 'moderate to great extent' category was 2.61 (S.D. = 0.99). Notably, for the top four barriers for the 'moderate to great extent' category the range for the total mean Barrier score was small (0.07). For each of the top four barriers, the number of nurses who selected 'no opinion' compared with the 'moderate to great extent' category was low with frequencies less than five per cent. Indeed, the results for 'no opinion' were small when compared with frequencies of responses for the barrier items for the 'moderate to great extent' category as the highest frequency was 11.2%.

Table 5.8. Ranking of barriers to research utilisation (moderate to great extent)

Barrier item	moderate-great extent (n)	(%)	Item mean	Item SD	No opinion n (%)
There is insufficient time on the job to implement new ideas	1066	58.4	2.61	0.99	76 (4.20)
The nurse does not feel she/he has enough authority	1048	57.5	2.60	0.98	66 (3.6)
Implications for practice are not made clear	1046	57.3	2.54	0.89	54 (3.0)
The nurse does not have time to read research	1034	56.7	2.61	1.02	62 (3.4)
Amount of research information is overwhelming	1004	55.1	2.50	1.01	110 (6.0)
Other staff are not supportive of implementation	979	53.7	2.48	1.04	106 (5.8)
The research is not reported clearly and readably	975	53.5	2.43	1.07	133 (7.3)
The nurse is isolated from knowledgeable colleagues with whom	970	53.2	2.51	0.94	59 (3.2)
Physicians will not cooperate with implementation	968	53.1	2.48	1.02	102 (5.6)
The research has not been replicated	961	52.7	2.44	1.04	126 (6.9)
The nurse does not feel capable of evaluating the quality of the research	960	52.6	2.49	0.99	82 (4.5)
The nurse feels the benefits of changing practice will be minimal	958	52.5	2.46	1.0	100 (5.5)
Research reports/articles are not published fast enough	954	52	2.46	1.02	121(6.6)
The nurse is uncertain whether to believe the results of the research	952	52.2	2.45	0.97	95 (5.2)
The facilities are inadequate for implementation	947	51.9	2.48	0.99	77 (4.2)
The literature reports conflicting results	944	51.8	2.36	1.04	162 (8.9)
The nurse is unwilling to change/try new ideas	939	51.5	2.41	1.07	114 (6.3)
The nurse feels results are not generalizable to own setting	926	50	2.48	0.93	78 (4.3)

Barrier item	moderate-great extent (*n*)	(%)	Item mean	Item SD	No opinion *n* (%)
Statistical analyses are not understandable	926	50.8	2.46	0.97	82 (4.5)
The nurse is unaware of the research	923	50.6	2.46	1.00	63 (3.5)
The relevant literature is not compiled in one place	917	50.3	2.41	1.05	140 (7.7)
The research has methodological inadequacies	915	50.2	2.38	1.03	139 (7.6)
Research reports/articles are not readily available	911	49.9	2.44	0.93	64 (3.5)
The nurse sees little benefit for self	910	49.9	2.45	0.99	78 (4.3)
The research is not relevant to the nurse's practice	875	48	2.37	0.96	72 (3.9)
There is not a documented need to change practice	858	47	2.34	1.05	125 (6.9)
The conclusions drawn from the research are not justified	853	46.8	2.32	1.10	175 (9.6)
The nurse does not see the value of research for practice	845	46.3	2.29	1.04	100 (5.5)
Administration will not allow implementation	641	35.1	2.13	1.09	204 (11.2)

From this total ranking, the top four ranked barriers for the 'moderate to great extent' category were identified and listed in Table 5.9.

Table 5.9. Top four ranked barriers to research utilisation (moderate to great extent)

Barriers to research questionnaire items	Moderate to Great extent	Percentage
There is insufficient time on the job to implement new ideas	1066	58.4
Nurses do not feel they have enough authority	1048	57.5
Implications for practice are not made clear	1046	57.3
Nurses do not have time to read research	1034	56.7

Table 5.9 shows the top barrier identified by the nurses was 'there is insufficient time on the job to implement new ideas' and was reported by 58.4% of the participants. This was followed by 'nurses feeling of not having enough authority' (57%), 'implications for practice not made clear' (57.3%) and 'not having the time to read research' (56.7%) in about equal percentages. Collectively, insufficient time, lack of authority, unclear practice implications were identified as major barriers in implementing research. This indicates the nurses were too busy and therefore, did not have time to read the research or to implement new ideas which are organisational issues. Not having the authority to implement is also outside the nurses' control as this could be related to the power of doctors over nurses in making clinical decisions.

These top four barriers were agreed upon by more than half of the nurses (60%) in hospitals assessed which indicates how serious these problems were and shows that hospitals in Riyadh should direct more effort to solving such problems. For example, the issue of insufficient time can be solved by employing more nurses and a problem such as not having time to read research can be solved by organising more journal clubs on a regular basis.

The same process was implemented to identify the least four barriers as perceived by nurses (Table 5.10). It can be seen that the majority (53.7%) of nurses from all hospitals reported that the item 'hospital administration will not allow implementation' was not perceived as a serious difficulty. This was followed by the nurses' perception that they 'do not see the value of research for practice' (48.5%). Next, the nurses who believed that 'research is not relevant to the nurse's practice' was not identified as a serious barrier (48.1%), and the fourth barrier that was perceived as 'little to no extent' was the 'research reports/articles are not readily available' (46.5%). In other words, this group of nurses perceived that administration was supportive and that the nurses could see the value of research, its relevancy to practice and that research is readily available.

In addition, each of these four responses was agreed upon by nearly 50% of the nurses. This indicates that the administration supports implementation although 50% may not be the optimal response. Moreover, nearly 50% of the nurses appeared to appreciate the value of research to practice and results further reflect how well-educated nurses are as 50% of them understand the relevance of research to nursing practice. Moreover, 50% of the nurses found it easy to have access to reports/articles. It may be necessary to further investigate why the remaining 50% do not perceive it as such.

Table 5.10. Top four ranked barriers to research utilisation (little to no extent)

Barriers to research questionnaire items	Little to No extent	Percentage
Administration will not allow implementation	979	53.7
Nurses do not see the value of research for practice	879	48.2
The research is irrelevant to the nursing practice	877	48.1
Research reports/articles are not readily available	849	46.5

5.3.1. Total Barrier Score

The responses to each of the items of the Barriers to Research Utilisation questionnaire were rated on a 5-point scale. For each respondent, these ratings were summed to obtain a total Barrier Score. There were 29 items and so the maximum possible total score is 116 if the category 'To a great extent', coded with the value 4, was selected for all 29 items. The higher the total Barrier Score, the greater the perceived barriers to research utilisation are. For the study, the mean total Barrier Score of the survey participants across all hospitals was 70.08.

The total Barrier Scores were calculated for participants in each of the five different hospitals to assess whether there were any differences in the mean total Barrier Score across the hospitals and to identify hospitals with the highest barrier to research (Table 5.11).

Table 5.11. Mean total Barrier Score for hospitals

Hospital	*n*	Mean	SD
Al-Yamamah Hospital	137	67.20	10.53
Prince Mohammed Hospital	202	73.40	18.74
King Fahad Medical City	670	69.50	18.11
King Salman Hospital	200	66.60	14.14
King Faisal Research Centre	615	73.70	12.40
All hospitals	1824	70.08	14.78

As can be seen in Table 5.11, there was a difference in the mean total Barrier Scores across the five hospitals. The highest mean total Barrier Scores were reported from King Faisal Research Centre (73.70) and Prince Mohammed Hospital (73.40) while King Salman Hospital had the lowest recorded mean total Barrier Score (66.60). The perceived mean total Barrier Scores were tested for statistically significant differences across hospitals using a one-way analysis of variance with an adjustment for

violation of homogeneity of variance through the Welch correction where needed (Table 5.12).

Table 5.12. Comparison of mean total Barrier Score across hospitals

Hospital	Comparison Hospital	ANOVA p-value	Pairwise p-value	95% CI Mean Difference
Al-Yamamah Hospital	Prince Mohammed Hospital		<.001	(-10.7, -1.7)
	King Fahad Medical City		0.357	(-5.6, 0.91)
	King Salman Hospital		1.0	(-3.1, 4.2)
	King Faisal Research Centre	F (4,989.5) 14.5	<.001	(-9.4, -3.7)
Prince Mohammed Hospital	King Fahad Medical City		0.108	(-0.4, 8.2)
	King Salman Hospital	<.001	<.001	(2.2,11.4)
	King Faisal Research Centre		1.0	(-4.3, 3.7)
King Fahad Medical City	King Salman Hospital		0.169	(-0.6, 6.4)
	King Faisal Research Centre		<.001	(-6.7, -1.7)
King Salman Hospital	King Faisal Research Centre		<.001	(-10.2, -4.1)

The one-way ANOVA indicated a significant difference across hospitals with respect to the mean total Barrier Scores $(F$ (4,989.5) = 14.5, p < .001). Pairwise comparisons across hospitals using either Dunnett's T3 multiple comparison tests, controlling for Type 1 error where homogeneity of variance was violated (or the Bonferroni procedure when it was not), indicated significant differences in mean total Barrier Scores between nurses working in the different hospitals as follow: Al-Yamamah Hospital and Prince Mohammed Hospital (p < .001, 95% CI: -10.7, -1.7); Al-Yamamah Hospital and King Faisal Research Centre (p < .001, 95% CI: -9.4, -3.7); King Fahad Medical City and King Faisal Research Centre (p <.001, 95% CI: -6.7, -1.7); King Salman Hospital and King Faisal Research Centre (p < .001, 95% CI: -10.2, -4.1). There was no significant difference in mean total Barrier Scores between King Faisal Research Centre and Prince Mohammed Hospital. This finding would be expected as the mean total Barrier Score for King Faisal Research Centre and Prince

Mohammed were the highest among the hospitals assessed, whilst the mean total score for King Salman Hospital was the lowest. This may be because both King Faisal Research Centre and King Fahad Medical City are tertiary referral hospitals, and are among the top leading hospitals with both being Joint Commission International (JCI) accredited. This accreditation requires the hospitals to implement structures and processes that will help nurses read and utilise scientific evidence as part of the JCI accreditation requirements. In contrast, the smaller general hospitals provide primary health care and are not as well-established as the bigger centres. Therefore, it is not expected that nurses in these smaller general hospitals encounter any pressure for using research evidence to enhance the quality of the care they provide. Despite this, the mean total Barrier Score to research utilisation at King Faisal Research Centre was higher than that of the smaller hospitals such as the King Salman Hospital. This may be attributed to the greater work load in such tertiary hospitals which may be a barrier to research utilisation. Additionally, it is difficult to offer an explanation for the higher mean total Barrier Score for nurses at the smaller Prince Mohammed Hospital.

5.3.2. Association of demographics with Barrier Score

Nurses were divided into groups according to their qualifications and the mean total Barrier Score was compared to determine whether there were significant differences in the nurses' perceptions according to their qualification (Table 5.13). The mean total Barrier Score for the nurses was compared across the three nursing qualifications: Diploma, Bachelor and Master's degree in nursing, using one-way analysis of variance. This analysis indicated the mean total Barrier Score was significantly different across various qualifications ($F(2,1809) = 22.3$, $p=.005$) (Table 5.14).

Table 5.13. Mean total Barrier Score for various qualifications of nurses

Education levels	N	Mean	SD
Diploma	269	68.50	16.40
Bachelor	1508	71.10	15.53
Masters	33	76.70	14.93

Pairwise comparisons across nurse qualifications was undertaken to assess which of them differed in the perceptions of barriers to research utilisation. Dunnett's T3 or Bonferroni multiple comparison tests indicated a significant difference in mean total barrier perception score between nurses with a Diploma qualification and those with a Masters qualification ($p=.014$, 95% CI: -15.0, -1.34). The other comparisons were not statistically significant (see Table 5.14). These results are possibly related to the difference in the study programs where these nurses acquired their first nursing qualifications. In other words, nurses who had undertaken a Diploma in nursing usually completed their program some time previously. Diploma programs tend to be more compact with the focus more on primary nursing skills. These programs do not usually go beyond the nursing education required to qualify them to work as nurses and with little focus on evidence-based practice and research. In contrast, nurses with a Masters degree undertake programs with much more emphasis on EBP and research alike, especially within the past twenty years.

Table 5.14. Comparison of mean total Barrier Score across nurse qualifications

Qualifications	Comparison Qualification.	ANOVA *p*-value	Pairwise *p*- value	Mean Difference (95% CI)
Diploma	Bachelor		0.059	(-5.3, 0.07)
	Masters	$F (2,1809)$ 22.3 $p=.005$	0.014	(-15, -1.34)
Bachelor				
	Masters		0.108	(-12.1, 0.89)

The mean total Barrier Scores were compared across the various levels of years of nurses' experience. The aim was to assess whether nurses' perceptions of barriers of research utilisation differed depending on their years of nursing experience. These results indicated that nurses who had the most years of experience had the highest mean total Barrier Score, whilst nurses with the least experience had the lowest mean total Barrier Score (Table 5.15). A One-Way ANOVA was conducted to assess whether the differences in mean total Barrier Scores were significant across various levels of years of nurses' experience. This showed that there was no significant difference in mean total Barrier Scores which indicates that nurses' perceptions of barriers to research utilisation were not influenced by their years of experience (F (4,1815) = 1.3, p=0.277).

Table 5.15. Mean total Barrier Score for nurses' experience levels

Years of experience	*n*	Mean	SD
2-5	369	70.20	16.3
6-10	544	70.30	17.6
11-15	418	71.40	14.6
16-20	175	71.00	14.5
>20	318	72.50	13.5

The mean total Barrier Scores were compared across the various regions where nurses had attained their nursing qualifications. The aim was to assess whether nurses' perceptions of barriers of research utilisation differed depending on the region of qualification. These results indicated that nurses who had completed their nursing qualification in India and Pakistan had the highest mean total Barrier Score, whilst nurses with qualifications from Western regions had the lowest mean total Barrier Score (Table 5.16).

Table 5.16. Mean total Barrier Score for region of qualification

	n	**Mean**	**SD**
Middle East	292	71.00	11.4
Asia: Philippines & Malaysia	913	71.30	17.4
India & Pakistan	535	72.50	14.5
Western	84	70.90	15.4

A One-Way ANOVA was conducted to assess whether the differences in mean total Barrier Scores were significant across various regions of qualifications. This showed that there was no significant difference in mean total Barrier Scores which indicates that nurses' perceptions of barriers to research utilisation were not influenced by the region where their qualification was attained (Welch Statistic $F_{(3, 348.34)}= 2.6$, $p= 0.055$).

Similarly, the mean total Barriers Score for research utilisation for the various clinical roles of nurses were compared to assess whether there were differences between nurses working in different clinical roles (Table 5.17).

Table 5.17. Mean total Barriers Score for clinical roles of nurses

Roles	*n*	**Mean**	**SD**
Clinical nurse	1504	70.90	15.90
Manager	231	69.30	15.65
Educator	89	77.10	10.84

Results indicated that nurse educators in the study perceived more barriers to research utilisation (mean score= 77.1) than those who had clinical or managerial roles (mean scores of 70.9 and 69.3, respectively). A One-Way ANOVA was conducted to assess whether these differences in mean total Barrier Scores were significant across various nurse roles (Table 5.18). This showed that there was an overall significant difference in mean total Barrier Scores which indicates that the perception of nurses of

barriers to research utilisation varied by role (*F* (2,389.6)=10.9, *p*<.001). Dunnett T3 pairwise comparisons showed that there was a statistically significant difference in the mean total Barriers Score between nurse educators and nurse managers (p<.001, 95% CI: 4.1, 11.6) as well as nurse educators and clinical nurses (*p*<.001, 95% CI: 3.3, 9.2). Mean total Barrier Score did not differ significantly between nurse managers and clinical nurses (Table 5.18).

Table 5.18. Comparison of mean total Barrier Score across clinical roles of nurses

Clinical Role	Comparison Clinical Role	ANOVA *p*-value	Pairwise *p*-value	Mean Difference 95% CI
Nurse Educator	Nurse Manager	*F* (2,398.6) 10.9 *p*<.001	<.001	(4.1, 11.6)
	Clinical Nurse		<.001	(3.3, 9.2)
Clinical Nurse	Nurse Manager		0.362	(-1.0, 4.3)

It is worth noting that clinical educators are more likely to have undertaken further education and are required to implement research education, participate in EBP and to contribute to setting up structures and processes that reflect EBP such as conducting journal clubs. Nurse educators thus face tremendous pressure when they lack the resources, educational modules and the appropriate training to serve as clinical role models for their peers. Not surprisingly, clinical educators differ with their perceptions of barriers to research utilisation when compared to their managers who are focused on managing the ward routine and clinical nurses who are focused on the bedside care and less on research utilisation.

Table 5.19. Mean total Barrier Score by age group of nurses

Age	*n*	Mean	SD
20-30 Years	616	70.70	16.5
31-40 Years	669	71.00	16.2
41-50 Years	413	71.30	14.3
51-64 Years	126	72.10	14.2

The mean total Barrier Scores were compared across the various nurse age groups. The aim was to assess whether nurses' perceptions of barriers of research utilisation differed depending on their age. These results indicated that the oldest age group (51-64 years) had the highest mean total Barrier Score whilst the youngest age group (20-30 years) had the lowest mean total Barrier Score (Table 5.19).

A One-Way ANOVA was conducted to assess whether the differences in mean total Barrier Scores were significant across various age groups of nurses. This showed that there was no significant difference in mean total Barrier Scores which indicates that nurses' perceptions of barriers to research utilisation were not influenced by their age (F $(3,1816) = 0.4$, $p = 0.753$).

5.4. Facilitators of research utilisation

Nurses in this study were also asked to rate eight required facilitators of research utilisation using a 5-point Likert scale with 1 representing 'to no extent' and 4 representing 'to great extent' and 0 representing 'no opinion'. These ratings were summed for each participant in the survey, resulting in a total Facilitator Score. The responses to all of the items for the facilitators of research were ranked in descending order using the percentage of participants who opted for the 'moderate to great extent' and the 'low to no extent' categories. Table 5.20 indicates the percentage of participants who opted for the combined 'moderate to great extent' category for the items displayed. The highest total mean score for facilitators of research utilisation for the 'moderate to

great extent' category was 3.32 (S.D. = 0.87). However, for the 'moderate to great extent' category the range for the total mean facilitator score was small (0.15). Furthermore, the number of nurses who selected 'no opinion' compared with the 'moderate to great extent' category was low with frequencies less than four per cent.

Table 5.20. Ranking of facilitators of research utilisation (moderate to great extent)

Facilitator of research utilisation questionnaire items	moderate-great extent *n*	Percentage	Item Mean	Item SD	No opinion *n* (%)
Advanced education to increase your research knowledge base	1542	84.6	3.32	0.87	26 (1.4)
Providing colleague support network/mechanisms	1526	83.7	3.29	0.88	28 (1.5)
Conducting more clinically focused and relevant research	1518	83.2	3.28	0.88	32 (1.8)
Employing nurses with research skills to serve as role models	1498	82.1	3.30	0.94	43 (2.4)
Enhancing managerial support and encouragement of research implementation	1493	81.9	3.22	0.96	60 (3.3)
Improving the understandability of research reports	1486	81.5	3.24	0.92	41 (2.2)
Improving availability and accessibility of research reports	1463	80.2	3.22	0.94	43 (2.4)
Increasing the time available for reviewing and implementing research findings	1448	79.4	3.17	0.94	38 (2.1)

Overall, the majority of nurses responded with 'to a moderate extent' or 'to a great extent' for all of the eight facilitator items. Responses varied by a maximum of 5% between the top ranked and the bottom ranked facilitators which indicates that nurses perceived all these items as strong facilitators of research utilisation. From this

total ranking, the top four ranked facilitators for the 'moderate to great extent' category were identified and listed in Table 5.21 for closer exploration.

Table 5.21. Top four ranked facilitators of research utilisation (moderate to great extent)

Facilitator of research utilisation questionnaire items	moderate-great extent	
	n	*%*
Advanced education to increase your research knowledge base	1542	84.5
Providing colleague support network/mechanisms	1526	83.7
Conducting more clinically focused and relevant research	1518	83.2
Employing nurses with research skills to serve as role models	1498	82.1

As can be observed from Table 5.21, the most important facilitator identified by the nurses was that advanced education increases research knowledge with this finding reported by 84.5% of nurses. This finding was followed by the facilitator item of providing a colleague support network (83.7%), followed by conducting more clinically focused and relevant research (83.2%) and employing nurses with research skills to serve as role models (82.1%). The frequency of these top four facilitators of research did not differ greatly for the nurses with only a 2.4% difference between the most and least frequent finding for this group.

The same process was implemented to identify the least four facilitators as perceived by nurses (Table 5.22).

Table 5.22. Top four ranked facilitators of research utilisation (little to no extent)

Facilitator of research utilisation questionnaire items	Little to No extent n	Percentage
Increasing the time available for reviewing and implementing research findings	338	18.5
Improving availability and accessibility of research reports	318	17.4
Improving the level of understanding of research reports	297	16.3
Employing nurses with research skills to serve as role models	283	15.5

The most frequent least ranked facilitator was 'increasing time available for reviewing and implementing findings' (18.5%), followed by 'improving availability and accessibility of research reports' (17.4%), 'improving the level of understanding of research reports' (16.3%) and 'employing nurses with research skills to serve as role models' (15.5%). Insufficient time was identified as one of the top barriers or least facilitator and from this group of results, appears to be also an issue regarding research utilisation.

5.4.1. Total Facilitator Score

There was a total of eight items included in the facilitator questionnaire. The responses to each of the items of the facilitators of research questionnaire were rated on a 5-point scale. For each respondent these ratings were summed to obtain a total Facilitator Score with a highest possible score of 32 if the 'To a great extent' category, coded 4, was selected for all 8 items of the Facilitators scale. For the study, the mean total Facilitator Score across all hospitals was 26.10.

The mean total Facilitator Scores were calculated for the participants from each of the five different hospitals to assess whether there were any differences in these mean values across the hospitals and to identify hospitals with high facilitators of research. The higher the mean total Facilitator Score, the more these factors are perceived as facilitators of research utilisation. As can be identified in Table 5.23, the nurses at King

Faisal Research Centre had the highest mean total Facilitator score (27.90), followed by nurses from Prince Mohammed Hospital (27.10), King Fahad Medical City (25.50), King Salman Hospital (24.30) and Al-Yamamah Hospital (Table 5.23).

Table 5.23. Mean total Facilitator Score for hospitals

Hospital	*n*	Mean	SD
Al-Yamamah Hospital	137	21.00	4.68
Prince Mohammed Hospital	202	27.10	5.68
King Fahad Medical City	670	25.50	15.17
King Salman Hospital	200	24.30	4.24
King Faisal Research Centre	615	27.90	2.47
All hospitals	1824	26.10	5.60

King Faisal Research Centre and King Fahad Medical City represent the biggest medical centres and are both accredited hospitals with implemented structures and processes for evidence-based practice and nursing research despite the varying modes of organisation in the these hospitals. This is compared to the rest of the hospitals, such as Al-Yamamah Hospital where, for example, nurses reported the least mean total Facilitators score, followed by nurses at King Salman Hospital. Similar to the results for the mean total Barrier Score, Prince Mohammad Hospital had the second highest mean total Facilitator Score. Furthermore, as per the Barrier Score results, it is difficult to offer an explanation for the higher mean total Facilitator Score for nurses at the smaller Prince Mohammed Hospital.

The perceived mean total Facilitator Scores were assessed for significant differences across hospitals using a one-way analysis of variance with an adjustment for violation of homogeneity of variance through the Welch correction (Table 5.24).

Table 5.24. Comparison of mean total Facilitator Score across hospitals

Hospital	Comparison hospital	One-Way ANOVA *p*-value	Pairwise *p*-value	Mean Difference (95% CI)
Al-Yamamah Hospital	Prince Mohammed Hospital		<.001	(-7.8, -4.3)
	King Fahad Medical City		<.001	(-5.9, -3)
	King Salman Hospital		<.001	(-4.9, -1.8)
	King Faisal Research Centre		<.001	(-8.3, -5.6)
Prince Mohammed Hospital	King Fahad Medical City	$F(4,939.2)$ $=60.4$ $p<.001$	0.016	(0.2, 3)
	King Salman Hospital		<.001	(1.2, 4.3)
	King Faisal Research Centre		0.4	(-2.2, 0.4)
King Fahad Medical City	King Salman Hospital		<.001	(0.001, 2.3)
	King Faisal Research Centre		<.001	(-3.3, -1.7)
King Salman Hospital	King Faisal Research Centre		<.011	(-4.6, -2.6)

Results showed that nurses coming from various hospitals perceived required facilitations differently ($F(4,939.2)=60.4$, $p<.001$). Dunnett T3 pairwise comparisons revealed significant differences in mean total facilitator score between nurses working in the different hospitals (Table 5.24) as follows:

- Nurses working in Al-Yamamah Hospital had significantly lower mean perceived total Facilitator Scores than those in Prince Mohammed Hospital ($p<.001$, 95%, CI: -7.8, -4.3), and from those working in King Fahad Medical City ($p<.001$, 95% CI: -5.9, -3) as well as from those working in King Salman Hospital ($p<.001$, 95% CI: -4.9, -1.8) and King Fahad Medical City ($p<.001$. 95% CI: -8.3, -5.6);

- Nurses working in Prince Mohammed Hospital had a significantly higher mean perceived total Facilitator score than those working in King Fahad Medical City

(*p=* .016, 95% CI: 0.2, - 3) and then those working in King Salman Hospital (*p<*.001, 95% CI: 1.2, 4.3);

- King Fahad Medical City had a slightly higher mean perceived total Facilitator score than King Salman Hospital (*p<*.001 95% CI: 0.001, 2.3) but a lower mean score than King Faisal Research Centre (*p<*.001, 95% CI: -3.3, -1.7;

- Nurses working in King Salman Hospital had a significantly lower mean perceived total Facilitator score than those in King Faisal Research Centre (*p=*0.011, 95% I: -4.6, -2.6); and Nurses at King Faisal Research Centre and Prince Mohammed Hospitals did not differ significantly on their mean perceived total Facilitator scores for utilising research (*p=*0.40, 95% CI: -2.2, 0.4).

These results indicate, as previously mentioned, that King Faisal Research Centre and Prince Mohammed hospitals had nearly equal mean total Facilitator Scores. These hospitals also had the highest mean scores amongst all hospitals which indicated nurses' perception of facilitators at this hospital to be more effective for research utilisation than other hospitals.

The mean percentage total Barrier and total Facilitator Scores were compared between the five hospitals to examine if there was any correlation between these scores for each of the individual hospitals (Figure 5.1).
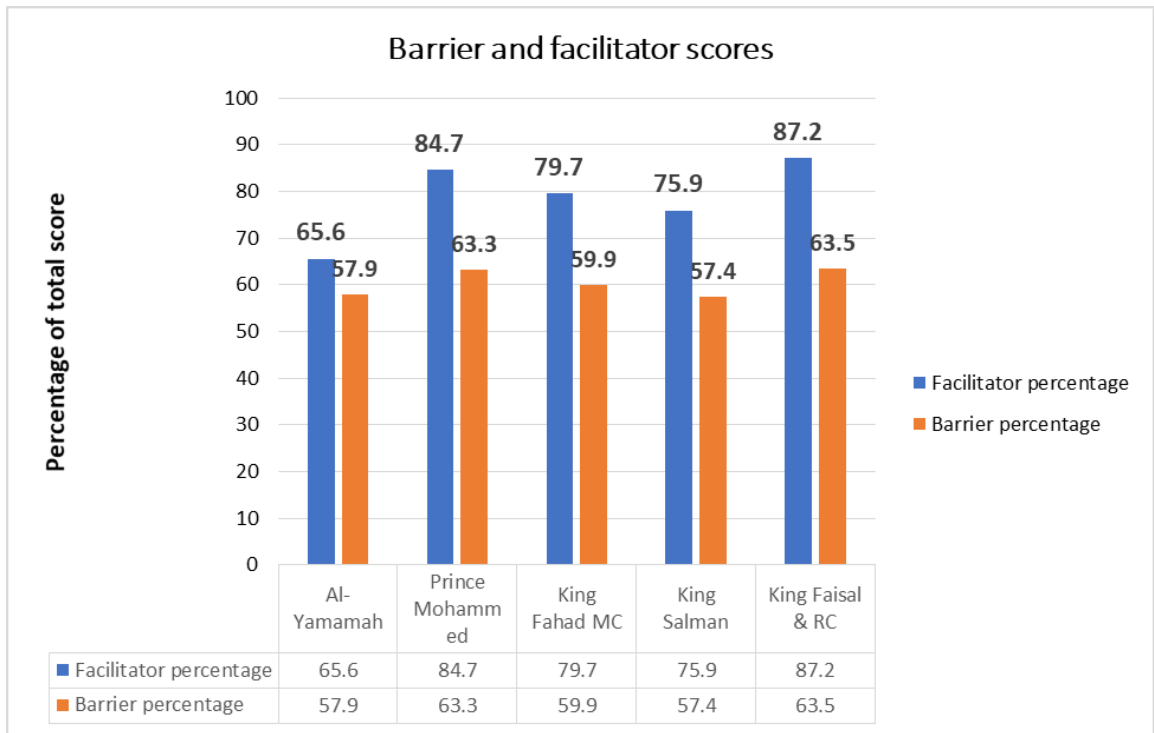
Figure 5.1. Comparison of mean total Barrier and Facilitators Scores as a percentage of total scores across hospitals

As can be identified from Figure 5.1, Al-Yamamah Hospital and King Salman Hospital had the lowest percentage Facilitator Scores. This indicates that nurses' perceptions of facilitators of research utilisation in these hospitals were lower compared to nurses in other hospitals for the study. In contrast, nurses at these two hospitals also had the lowest percentage Barrier Score which is indicative of opportunities for good research utilisation as the barrier to research utilisation is low. Conversely, nurses at King Faisal Research Centre had the highest percentage Barrier Score which indicates the presence of more barriers to research utilisation in that hospital when compared to the other hospitals. As discussed previously, this may be attributed to the greater work load in such tertiary hospitals as the King Faisal Research Centre which may be a barrier to research utilisation. Furthermore, King Faisal Research Centre also had the highest percentage perceived Facilitator Score which indicated nurses' perception of facilitators at this hospital to be more effective for research utilisation than other

hospitals (Figure 5.1). King Faisal Research Centre has more of a research culture, as identified by the participants, which supports these results.

5.4.2. Association of demographics with Facilitator Score

The mean total Facilitator Score was compared across various demographics to assess the association between nurses' demographics and mean total Facilitator Scores. These mean scores were compared across various levels of nursing education to assess whether nurses with various education levels differed on their mean total Facilitator Scores for research utilisation (Table 5.25). Results indicated that nurses with the highest mean total Facilitator Score were nurses with a Masters qualification, whilst Diploma qualified nurses had the lowest perceived mean Facilitator Score. This is consistent with the perceived mean total Barrier Score of these nurses and can be explained by the differences in the education programs as discussed earlier.

Table 5.25. Mean total Facilitator Score for various qualifications of nurses

Qualification	n	Mean	SD
Diploma	269	24.20	21.32
Bachelor	1508	26.30	3.88
Masters	33	29.20	4.02

Hypothesis testing using one-Way ANOVA showed significant differences in mean perceived total Facilitator Scores amongst the levels of nursing qualifications (F $(2,1807) = 22.34$, $p < .001$). These results indicate that nurses' perceptions of facilitators of research utilisation differed according to their nursing qualification (Table 5.26). A Dunnett T3 pairwise comparison showed significant differences in mean perceived total Facilitator Scores between nurses with Diploma and those with Bachelor qualifications ($p < .001$, 95% CI: -3.03, -1.3) and between those with Diploma and those nurses with a Master degree ($p < .001$, 95% CI: -7.033, -3.02). Moreover, nurses with a Bachelor qualification had a significantly lower perceived mean total Facilitator Score when

compared to those with a Master's degree ($p < .001$, CI: -4.8, -1.01) (Table 5.26). This indicates that as education increased, the mean perceived Facilitator Scores tended to increase as well.

Table 5.26. Comparison of mean total Facilitator Score across nurse qualifications

Qualification	Comparison Qualification	ANOVA *p*-value	Pairwise *p*-value	Mean Difference 95% CI
Diploma	Bachelor	F (2,1807) =22.34 $p<.001$	<.001	(-3, -1.3)
	Masters		<.001	(-7.1, -3)
Bachelor	Masters		<.001	(-4.8, -1.01)

Mean total Facilitator Scores were compared across various experience levels using one-way ANOVA (Table 5.27). The aim was to assess whether nurses' mean perceptions on required facilitations to doing research utilisation differed by experience levels. Results show that there was a significant difference in the mean perceived total Facilitator Scores between nurses with various experience levels F (4,1391) =8.9, $p<.001$).

Table 5.27. Mean total Facilitator Score for nurses' experience levels

Years of experience	*n*	Mean	SD
2-5	369	25.40	5.76
6-10	544	25.20	6.99
11-15	418	26.70	3.13
16-20	175	26.70	4.81
>20	318	27.10	5.34

Dunnett T3 pairwise comparison follow up tests were conducted to determine which pairs differ significantly from each other. The results indicated that nurses with 2 to 5 years of experience perceived less required facilitations than those with 11 to 15 years of experience *(p=0.011, 95% CI: (-2.4, -1.83)*, and those with greater than 20

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years of experience *(p < .001, 95% CI: -2.8, -0.54)*. Likewise, those with 6 to 10 years of experience also perceived less facilitation to doing research than those with 11 or more years of experience *(p = .001. 95% CI: -2.4, -0.4)* and those with 16 to 20 years of experience *(p= 0.039, 95% CI: -2.92, - 0.04)*, as well as those with 20 or more years of experience *(p<.001, 95% CI: -2.9, - 0.8)*. However, mean perceived total facilitation scores did not differ significantly from that of nurses with 16 years or more of experience. The remaining comparisons were not statistically significant (Table5.28).

Overall, results show that the mean total Facilitator Score increased with nurses' experience; that is, the more experience the nurses had, the higher was the mean total Facilitator Score (Table 5.27). This trend clearly suggests that the more experienced nurses (according to years of experience) tended to perceive/ require more facilitation in general for research utilisation. This could be explained by the fact that most experienced nurses who have practised for a long period of time are farther from their initial nursing education. Furthermore, they are less likely to have knowledge or limited skills in EBP and critical appraisal of research as the nature of the education programs have changed over time to place more emphasis in these areas. In contrast, the newly graduated nurses are more likely to have had increased exposure to the scientific method, and EBP concepts in curricula that include an understanding of research and methodological procedures required for the appraisal of evidence. The time from qualification is also an influence as information of EBP becomes more distant as the day to day practice of nursing takes priority.

Table 5.28. Comparison of mean total Facilitator Score across nurses' experience levels

Work Experience (years)	Comparison Work Experience (years)	ANOVA *p*-value	Pairwise *p*-value	Mean Difference 95% CI
2-5	6-10		1.000	(-1,1.2)
	11-15		0.011	(-2.4, -1.8)
	16-20		0.125	(-2.8, 0.18)
	>20		<.001	(-2.8, -0.54)
6-10	11-15	$F(4,1391)$ =8.9 $p<.001$	0.001	(-2.4, -0.4)
	16-20		0.039	(-2.9, -0.04)
	>20.		<.001	(-2.9, - 0.8)
11-15	16-20		1.000	(-1.5,1.3)
	>20		0.969	(-1.5,0.7)
16-20	>20		0.999	(-1.8,1.1)

The mean total Facilitator Scores were compared across various regions where nurses obtained their qualifications. The aim was to assess whether nurses' perceptions of required facilitators of research utilisation differed according to the region where nurses attained their qualification (Table 5.29). Results indicated that nurses who received their qualification from a Western region had the highest mean total Facilitator Score whilst nurses who qualified from the Middle East and India/Pakistan had the lowest mean total Facilitator Scores.

Table 5.29. Mean total Facilitator Score for region of nurses' qualification

Region	*n*	Mean	SD
Middle East	292	25.40	5.12
Asia: Philippines & Malaysia	913	26.50	6.04
India & Pakistan	535	25.40	6.93
Western	84	27.90	4.58

Hypothesis testing using one-Way ANOVA demonstrated statistically significant differences in mean total Facilitator Scores based on the region where the

nurses' attained their qualification (F (3, 861.5) = 8.9, p<.001). Dunnett's T3 pairwise comparisons were used to identify which nurses' qualifying regions differed significantly in mean total Facilitator Scores (Table 5.30).

Table 5.30. Comparison of mean total Facilitator Score across region of nurses' qualification

Region	Qualifying Region.	ANOVA *p*-value	Pairwise *p*-value	Mean difference (95% CI)
Middle East	Asia		0.008	(-2, -0.2)
	India & Pakistan	*F* (3,861.5) =8.9 *p*<.001	1.0	(-1.1, 0.92)
	Western		<.001	(-4, -0.99)
Asia: Philippines & Malaysia.	India & Pakistan		0.008	(0.18, 1.9)
	Western		0.050	(-2.8, 0.001)
India & Pakistan.	Western		<.001	(-3.9, -0.95)

Nurses who qualified in the Middle East differed significantly in the perceived mean total Facilitators Scores compared to nurses who qualified in the Asia region (*p*=0.008, 95% CI: (-1.97, -0.2)) and to those who qualified in the Western region (*p*<.001, 95% CI: (-4, - 0.99). Nurses who qualified in the Asia region differed significantly in perceived mean total Facilitator Scores compared to nurses who qualified in India/Pakistan (*p*=0.008, 95% CI: (0.18, 1.85)), In addition, nurses who qualified in India/Pakistan differed significantly in perceived mean total Facilitator Scores compared to those who qualified in the Western region (*p* <.001, 95% CI: -3.9, - 0.95). However, nurses who qualified in the Middle East did not differ significantly from those qualified in India/Pakistan when contrasted *(p*=1.0). Furthermore, there was no statistically significant difference in perceived mean total Facilitator Scores between those who qualified in the Asia and Western regions perceived mean total Facilitator Scores (*p*=0.05). Nonetheless, these results reflect the potential differences in education programs in different countries. Western countries have a tendency to include more on EBP and research in their nursing education programs. Other countries tend to place

more emphasis in their nursing curricula in other areas, such as English language, religion and culture.

The mean total Facilitator Scores were compared across the various clinical roles. The aim was to assess whether nurses' perceptions of required facilitators of research utilisation differed depending on their clinical role. These results indicate that nurse educators had the highest mean total Facilitator score while the clinical nurses had the lowest mean total Facilitator score (Table 5.31).

Table 5.31. Mean total Facilitator Score for clinical roles of nurses

Role	*n*	Mean	SD
Clinical Nurse	1,504	25.70	5.90
Nurse Manager	231	26.80	5.92
Nurse Educator	89	28.60	4.71

Hypothesis testing using one-way ANOVA revealed that nurses occupying different clinical roles had significantly different mean total Facilitator Scores (F (2, 365.1)*, p* < .001). Dunnett's T3 pairwise comparisons were performed to determine which clinical roles differed significantly on mean scores. As illustrated in Table 5.32, nurse educators had significantly higher mean total Facilitator Scores than nurse managers (*p*=0.016, 95% CI: 0.27, 3.33) and clinical nurses (*p*<0.001*,* 95% CI: 1.6, 4.1)*.* Clinical nurses and nurse managers also demonstrated statistically significant difference in their mean Facilitator Scores (*p*=0.041, 95% CI: (-2.04, -0.033). These results may reflect the greater emphasis placed on the role of the nurse educator to promote research and EBP as well as the fact that they are more likely to have a higher qualification compared to nurse managers and clinical nurses. This was discussed in more detail earlier.

Table 5.32. Comparison of mean total Facilitator Score across clinical roles of nurses

Clinical Role	Clinical Role	ANOVA *p*-value	Pairwise *p*-value	Mean Difference (95% CI)
Nurse Educator	Nurse Manager	F (2, 365.1) =14.4 *p*<.001	0.016	(0.3 ,3.3)
	Clinical Nurse		<.001	(1.6, 4.1)
Clinical Nurse	Nurse Manager		0.041	(-2, -0.033)

The mean total Facilitator Scores were compared across the various age categories of nurses. The aim was to assess whether nurses' perceptions of facilitators of research utilisation differed depending on their age category. These results indicate that nurses aged 41-50 years had the highest mean total Facilitator Score whilst the youngest age group of 20-30 years had the lowest mean total Facilitator Score (Table 5.33).

Table 5.33. Mean total Facilitator Score for nurses' age categories

Age (years)	*n*	Mean	SD
20-30	616	25.30	5.7
31-40	669	26.20	5.7
41-50	413	26.80	4.9
51-64	126	26.50	6.2

A One-Way ANOVA was conducted to assess whether the differences in mean total Facilitator Scores were significantly different across various age categories of nurses. A one -way ANOVA showed a significant difference between nurses' age groups on perceived facilitation (F(3,748.7), *p*<.001) using the Welch adjustment to counteract lack of homogeneity of variance. Moreover, the pairwise post-hoc comparisons using the Dunnetts T3 test showed that nurses aged 20-30 years significantly perceived less required facilitation than those aged 41-50 and 31-40 years (Table 5. 34).

Table 5.34. Comparison of mean total Facilitator Score across age of nurses' age categories

Nurse age category (years)	Comparison age category (years)	ANOVA *p*-value	Pairwise *p*-value	Mean Difference 95% CI
20-30	31-40		0.016	(-1.7,0.12)
	41-50	*F*	<.001	(-2.4, -0.7)
	51-64	(3,1820)	0.204	(-2.8, 0.3)
31-40	41-50	=7.3	0.330	(-1.5, -0.26)
	51-64	*p*<.001	0.997	(-1.9, 1.3)
41-50	51-64		0.996	(-1.3,1.9)

5.5. Comparison of Barrier and Facilitator Scores across gender

From the researcher's perspective and with the cultural care preference (same gender preference), the Student's *t*-test was used to compare mean total Barrier and Facilitator Scores between males and females. The objective was to assess whether gender may impact on nurses' perceived barriers and facilitators of research utilisation.

Table 5.35. Comparison of Barrier and Facilitator Scores for males and females

Domain	Male (*n*=315) Mean (SD)	Female (*n*=1509) Mean (SD)	*t*-value	*p*-value	mean difference (95% CI)
Barrier Score	73.3 (11.34)	70.4 (16.84)	3.8	<.001	(1.4, 4.4)
Facilitator Score	26.9 (4.42)	25.9 (5.80)	3.5	<.001	(0.44, 1.5)

As per Table 5.35, the Student's *t*-test demonstrated that male and female nurses differ significantly in their mean total Barriers and Facilitator Scores. Male nurses had statistically significantly higher mean total Barrier Scores than females, as well as higher mean total Facilitator Scores compared to female peers.

5.6. Exploration of potential influential factors of the Barrier Score

5.6.1. Multiple Linear Regression

Potential influencing factors such as gender, age, education level, Saudi Arabian experience, current nursing role were explored to determine whether these and other variables had significant impacts on the Barrier Score using multiple linear regression.

This was done across each hospital surveyed separately to determine whether there were any differences across hospitals on the factors that significantly influenced the barriers to research utilisation score.

5.6.2. Al-Yamamah Hospital

On performing regression analysis to predict the perceived barriers to utilisation score at Al-Yamamah Hospital, the multiple linear regression model was statistically significant. This suggested that at least one, or more, of the included predictors had a significant impact on the Barrier Score ($F(11,133)=2.7$, $p=.004$). The regression model with the included variables explained a total of 19.5% of the variability in nurses' perceived Barrier Score. The variables that had a negative impact on the Barrier to research utilisation score, indicating less of a barrier were age, awareness of impact of facilitation in doing research, reading nursing journals and nursing qualifications. The model, however, suggested that reading nursing journals was a significant predictor of the Barrier Score to research utilisation ($t = 3.9$, $p < .001$) indicating that this variable was less of a barrier to research utilisation (as per Table 5.36).

In addition, nurses reporting attendance at scientific conferences was a significant positive predictor of research utilisation scores ($t=2.1$, $p=0.042$) whilst none of the remaining predictors had a significant impact on the perceived Barrier Score to research utilisation (as per Table 5.36). In brief, only nurses reading of nursing journals and their ability to attend scientific conferences appear to have a significant effect on the nurses' perceived Barrier Score.

Table 5.36. Multivariate Linear Regression Model of the relationship between nurse characteristics and the Barrier Score at Al-Yamamah Hospital

	B	SE	Beta	t	p
(Constant)	2.261	0.236		9.563	**<.001**
Sex: male.	0.013	0.087	0.013	0.147	0.883
Age group of respondent	-0.066	0.042	-0.160	-1.561	0.121
KSA experience years	0.040	0.039	0.101	1.021	0.309
Awareness regarding the impact of facilitations	-0.008	0.039	-0.018	-0.206	0.837
Recent cont. education on research (past 12 Months)	0.126	0.089	0.124	1.416	0.159
Reads nurse journals	-0.306	0.080	-0.369	-3.833	**<.001**
Contributed to Journal Clubs	0.090	0.073	0.112	1.225	0.223
Attends cont. education regularly	0.120	0.099	0.111	1.211	0.228
Attends scientific conferences	0.202	0.098	0.176	2.059	0.042
Nursing qualification	-0.039	0.066	-0.054	-0.591	0.556
Current nursing position	0.066	0.059	0.100	1.119	0.265

Dependent variable = nurse perceived Barrier to Research Utilisation Score

5.6.3. Prince Mohammed Hospital

On performing regression analysis to predict the perceived barriers to utilisation score at Prince Mohammed Hospital, the multiple regression model was statistically significant ($F(11,196)=4.6$, $p<.001$). These results denoted that at least one or more of the predictors included had a significant impact on nurses' perceived barrier to research utilisation scores. The model with the included variables collectively explained 21.4% of the variability in the perceived Barrier Score. Results show that nurses who were more aware of the positive impact of various facilitators were more likely to perceive the barriers to research utilisation ($t=6.1$, $p<.001$). Consequently, higher awareness regarding the useful impact of facilitators predicts higher Barrier Scores, holding the other variables constant (see Table 5.37). This may indicate that nurses who understand research and appreciate the role of various facilitators are more likely to be aware of the

various barriers that face research and thus, the higher perceived Barrier Score. None of the other variables were found to have a significant impact on the Barrier Score.

Table 5.37. Multivariate Linear Regression Model of the relationship between nurse characteristics and the Barrier Score at Prince Mohammed Hospital

	B	SE	Beta	*t*-value	*p*
(Constant)	2.473	0.511		4.838	**<0.001**
Sex: male	-0.174	0.150	-0.077	-1.158	0.248
Age group of respondents	-0.114	0.092	-0.110	-1.237	0.218
KSA experience years	0.025	0.092	0.025	0.269	0.788
Awareness regarding the impact of facilitations	0.262	0.043	0.409	6.059	**<0.001**
Recent cont. education on research (past 12 Months)	0.041	0.147	0.019	0.278	0.781
Reads nurse journals	0.156	0.099	0.108	1.571	0.118
Contributed to Journal Clubs	-0.125	0.137	-0.062	-0.912	0.363
Attends cont. education regularly	0.009	0.164	0.004	0.056	0.955
Attends scientific conferences	0.261	0.144	0.124	1.807	0.072
Nursing qualification	-0.059	0.152	-0.026	-0.390	0.697
Current nursing position	0.094	0.087	0.084	1.090	0.277

Dependent variable = nurse perceived Barriers to Research Utilisation Score

5.6.4. King Fahad Medical City

On performing regression analysis to predict the perceived barriers to utilisation score at King Fahad Medical City, the Regression Model was statistically significant, ($F(11,27)=3.9$, $p<.001$). These results highlighted the fact that these predictors had an overall significant impact on the nurses' Barrier Scores, with at least, one or more of them, having a significant impact on the nurses' perceived barriers to research utilisation score explaining 25.5% of its variation. As per Table 5.38, results show that higher awareness regarding the useful impact of facilitators predicts higher perceived barriers to using research utilisation score, holding the other variables constant ($t=5.03$, $p<.001$).

Moreover, years of experience at King Fahad Medical City was a significant predictor of perceived barriers to research utilisation score *(t*=2.8, *p*=0.006). This indicates that as nurses at this hospital tended to have greater exposure to the system in Saudi Arabia, they became more able to recognise problems. Consequently, their perceived barriers to research utilisation score tended to scale up significantly as well. As these nurses gain experience, they become more aware of the problems that face research utilisation in the hospital. Also, this may be attributed to the increase in their work load which may form a barrier to research utilisation. Likewise, reading nursing journals significantly predicts the barrier to research utilisation score (*t*=2.13, *p*=0.034), denoting that the mean Barrier Score increases with reading nursing journals.

The rest of the tested predictors appear to have had no statistically significant impact on the nurses' perceived barriers to research utilisation scores at King Fahad Medical City. Overall, nurses who read journals and those who have had greater experience as a nurse beside those who were aware of the useful effects of various facilitators of research tended to perceive greater barriers, on average keeping the other variables constant.

Table 5.38. Multivariate Linear Regression Model of the relationship between Nurse characteristics and the Barrier Score at King Fahad Medical City

	B	SE	Beta	*t*-value	*p*
(Constant)	2.315	0.255		9.068	**<.001**
Sex: male.	0.070	0.098	0.029	0.708	0.0479
Age group of respondent	-0.050	0.034	-0.075	-1.470	0.142
KSA experience years	0.085	0.031	0.139	2.754	**<.006**
Awareness regarding the impact of facilitations	0.119	0.024	0.200	5.030	**<.001**
Recent cont. education on research (past 12 Months)	0.064	0.070	0.037	0.920	0.358
Reads nursing journals	0.123	0.058	0.085	2.130	0.034
Contributed to Journal Clubs	-0.076	0.070	-0.045	-1.073	0.283
Attends cont. education regularly	-0.032	0.124	-0.010	-0.257	0.797
Attends scientific conferences	0.056	0.054	0.042	1.053	0.293
Nursing qualification	-0.041	0.063	-0.026	-0.644	0.520
Current nursing position.	0.027	0.055	0.021	0.481	0.630

Dependent variable = nurse perceived Barriers to Research Utilisation Score

5.6.5. King Salman Hospital

On performing regression analysis to predict the perceived barriers to utilisation score at King Salman Hospital, it was observed that the model was statistically significant (F (11,188) = 5.4, p<.001), denoting that at least one or more of the predictors had a statistically significant impact on the nurses perceived barrier to research utilisation score.

The model explained 25.2% of the variance in the Barrier Score. The results show that attending continuous education regularly was a significant positive predictor of mean Barrier Score (t= 4.4, p<.001). Reading nursing journals and the remaining predictors were found not to have a significant impact on the nurses' perceived barriers to research utilisation score (refer to Table 5.39).

Table 5.39. Multivariate Linear Regression Model of the relationship between nurse characteristics and the Barrier Score at King Salman Hospital

	B	SE	Beta	*t*-value	*p*
(Constant)	1.676	0.235		7.125	**<.001**
Sex: male.	0.063	0.080	0.053	0.783	0.435
Age group of respondent	-0.008	0.051	-0.014	-0.155	0.877
KSA experience years	0.030	0.042	0.066	0.732	0.465
Awareness regarding the impact of facilitations	0.053	0.044	0.087	1.185	0.238
Recent cont. education on research (past 12 Months)	0.040	0.085	0.035	0.476	0.634
Reads nursing journals	0.145	0.086	0.142	1.691	**0.093**
Contributed to Journal Clubs	-0.048	0.086	-0.041	-0.554	0.580
Attends cont. education regularly	0.446	0.101	0.335	4.395	**<.001**
Attends scientific conferences	0.055	0.084	0.045	0.653	0.515
Nursing qualification	-0.009	0.076	-0.009	-0.123	0.902
Current nursing position	0.061	0.059	0.073	1.035	0.302

Dependent variable = nurse perceived Barriers to Research Utilisation Score

5.6.6. King Faisal Research Centre

Finally, analysis of the multivariate regression model for nurses coming from the large medical and research hospital, the King Faisal Research Centre, was statistically significant ($F(11, 604)=8.1$, $p<.001$). This highlighted that one or more variables were a significant predictor of the Barrier Score.

The model explained 13.1% of the variability in the Barrier Scores. Results indicated that awareness regarding the useful effects of various facilitators of research significantly predicts barriers to research utilisation score ($t=4.8$, $p<.001$). Likewise, nurses current position appeared to be a significant predictor of the nurses' perceived barriers ($t=4.2$, $p<.001$).

Having a continuous nursing education on research utilisation within the past twelve months was a significant predictor of barrier score ($t=3.2$, $p=.001$) holding the

other variables constant. Attending journal clubs was a significant predictor of the Barrier Score (t =-2.2, p=.025) indicating such attendance reduced barriers to research utilisation.

Attending scientific conferences was also a significant predictor of the perceived Barrier Score (t=2.6, p=.010). Nurses' level of education was a significant negative predictor of barrier score (t =-4.2, p<.001). This means that higher levels of education lowered perceived barrier scores.

The rest of the tested predictors were found to have no significant impact on the nurse's perceptions of research barriers at King Faisal Hospital and Research Center (see Table 5.40).

Table 5.40. Multivariate Linear Regression Model of the relationship between nurse characteristics and the Barrier Score at King Faisal Research Centre

	B	SE	Beta	t-value	p
(Constant)	2.351	0.179		13.117	**<.001**
Sex: male.	-0.053	0.030	-0.070	-1.762	0.079
Age group of respondent	-0.035	0.022	-0.091	-1.612	0.107
KSA experience years	0.028	0.020	0.084	1.448	0.148
Awareness regarding the impact of facilitations	0.125	0.026	0.205	4.759	**<.001**
Recent cont. education on research (past 12 Months)	0.093	0.029	0.134	3.202	**<.001**
Reads nursing journals	-0.103	0.066	-0.069	-1.561	0.119
Contributed to Journal Clubs	-0.063	0.028	-0.091	-2.248	0.025
Attends cont. education regularly	0.041	0.094	0.018	0.432	0.666
Attends scientific conferences	0.145	0.056	0.112	2.573	**<.010**
Nursing qualification	0.084	0.047	0.071	1.781	0.075
Current nursing position	-0.120	0.029	-0.170	-4.222	**<.001**

Dependent variable = nurse perceived Barriers to Research Utilisation Score

5.7. Findings from survey open-ended questions

The survey instruments for this study included a number of open-ended questions. As the participants for the study failed to complete this section of the survey there was no data collected for these questions. As discussed earlier this probably was because English was their second language for participants and they may not have had time to complete this section due to the workload.

5.8. Summary of the chapter

This chapter provided an overview of the results from the survey distributed to nurses for this research. Examining the perceived barriers to and facilitators of research utilisation among nurses working in hospitals in the Riyadh region of Saudi Arabia was the central aim of the study. The analysis of the results identified the relationship between the demographics and the barriers and facilitators in order to provide an understanding of the factors that affect research utilisation in this group of nurses. The next chapter will discuss the factor analysis of barriers of research utilisation.

Chapter 6: Exploratory factor analysis of the Barriers Scale

6.1. Introduction

This chapter presents the factor analysis of the responses to the items on the Barriers Scale. A factor analysis was also undertaken on the Facilitator scale but after statistical analysis, only one factor was embedded in the items and therefore not included in this thesis. Included is some background information from previous studies which have completed a factor analysis of the Barrier Scale. This is followed by a review of the process that was undertaken to complete the factor analysis for this study. Finally, a discussion of the implications of these results will be presented.

6.2. Background information on factor analysis of the Barriers Scale

The Barriers Scale has been utilised in the research literature to survey nurses' responses to item statements that are perceived as barriers to incorporating research findings to nursing clinical practice literature and was the first survey to quantify these barriers in a large-scale, systematic manner (Funk et al., 1991a). Factor analysis is a statistical technique which simplifies results by data reduction. The technique reduces large numbers of variables and groups these into smaller numbers of variables. The original Barrier Scale questionnaire as developed by Funk et al. (1991a) was subjected to factor analysis. This analysis identified seven factors, each comprising groups of items from the questionnaire and with an eigenvalue above one. With an eigenvalue greater than one, this indicates that the factor accounts for more variance than any one of the items from the original survey. Funk et al. (1991a) then devised a range of answers which included two to seven factors and reviewed these solutions to determine which was the most interpretable. From this process four factors were finally selected and included:

- *The nurse:* This factor includes characteristics of the 'adopter' including the nurses' research values, skills and awareness.

- *The setting:* This factor includes characteristics of the 'organisation' including the setting barriers and limitations.

- *The presentation:* This factor includes characteristics of the 'innovation' including the qualities of the research.

- *The research:* This factor includes characteristics of the 'communication' including the presentation and accessibility of the research.

The factors as described above have referred to and applied previously in this thesis including the review of the literature in chapter three and reporting of results in chapter five.

Factor analyses of the Barriers Scale item responses from a number of studies have not produced factors that have coincided with those obtained by the originators of the scale, Funk et al. (1991a). For nurses in the UK, Hicks (1995, 1996) identified barriers that affected nurses' abilities to use research in their clinical practice. This five-factor model included: nurses' subjective barriers to nursing research, organisational/structural barriers to nursing research, doctors' reactions to nursing research, healthcare professionals' attitudes to nursing research and the impact of nursing research (Hicks, 1995, 1996). In another British study undertaken by Dunn et al. (1998), a confirmatory factor analysis was conducted using a convenience sample of 316 nurses. They found inconsistencies between their data and the four-factor US model as developed by Funk et al. (1991a). In another study, Retsas and Nolan (1999) undertook a study in Australia of barriers to research utilisation of 149 nurses using the Barriers Scale. They adopted the same procedure as Funk et al. (1991a) and from their findings they produced a three-factor solution. These three-factors included: the usefulness of research to clinical practice; generating change to practice based on

research; and the accessibility of research (Retsas & Nolan, 1999). Subsequently Retsas (2000) undertook a study of 400 nurses and derived a four-factor solution. Nonetheless these four factors were different from those established by Funk et al. (1991a) and included: accessibility of research findings; anticipated outcomes of using research; organisational support to use research; and support from others to use research. In an additional study, Closs and Bryar (2001) undertook an exploratory factor analysis of 2,009 nurses in the United Kingdom. Four factors were identified which were similar but not identical to the factors identified in the original US study by Funk et al. (1991a). The four factors as derived by Closs and Bryar (2001) included: the benefits of research; the quality of research; the accessibility of research; and resources for implementation of research. Closs and Bryar (2001) concluded that their four-factor solution was "roughly comparable" to the US model although fewer items were retained with 22 instead of the original 29. Furthermore, they recommended that the US model may not be suitable for use in the UK without further changes including further emphasis on organisational issues and both the positive and negative features of research culture (Closs & Bryar, 2001). Following on from these various studies, it was decided that it would be interesting to explore factor analysis of responses to the scale provided by the Saudi Arabian nurses surveyed. However, as explained in the factor analysis results in this chapter, the factors extracted did not uniquely reflect the ones obtained by the originators of the Barriers Scale, Funk et al., (1991a), which were: Nursing (N), Presentation (P), Research (R) and Setting (S).

6.3. Method for exploratory factor analysis of the Barriers Scale

The responses to the 29-item Barriers Scale were subjected to a factor analysis using Principal Axes Factoring as an extraction method and subjected to a Promax rotation to enhance interpretability of the extracted factors using the SPSS version 22 statistical package. Use of the particular extraction and rotation methods took into

account the assumption that the factors produced are inter-related to some extent. Other methods of extraction and rotation were also attempted. However, they did not produce factor outputs that were very meaningful. The data from the scale items were assessed for adequacy of sample size via the Kaiser-Meyer-Olkin test (p=0.9) which deemed that the sample size was adequate. A significant Bartlett's Test of Sphericity ($\chi 2$ (276) = 13135.8, p<.0001) indicated that the correlation matrix fulfilled the conditions for a factor analysis.

6.4. Results for exploratory factor analysis of the Barriers Scale

Initially, using the eigenvalue > 1 and the scree plot criteria, six factors were extracted (Table 6.1). On examining the rotated factor loadings, it was observed that the items: 'research is not relevant to the nurse's practice', 'nurse is unaware of the research', 'nurse does not have time to read research', 'research has not been replicated', and 'research has methodological inadequacies had very poor loadings on the extracted factors'. This is not surprising as most of the survey respondents were clinical nurses involved in hands-on nursing. Consequently, these items were removed and the factor analysis was repeated with the results as reported in Table 6.2. This produced five factors with corresponding scale items under each listed in Table 6.2 where loadings greater than 0.3 were retained.

Table 6.1. Total Variance Explained by the five-factor solution *n*=1824

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	7.607	31.697	31.697	7.017	29.239	29.239	5.980
2	1.402	5.843	37.541	.822	3.427	32.666	5.501
3	1.304	5.434	42.975	.763	3.178	35.844	3.616

4	1.077	4.488	47.463	.554	2.309	38.153	4.486
5	1.005	4.189	51.652	.474	1.974	40.127	4.399
Extraction Method: Principal Axis Factoring.							

Table 6.2. Promax Rotated Pattern Matrix with PAF extraction 5-factor solution for the 24-item Barriers Scale

ITEM (**Funk et al.** factor classification)	Factor				
	1	2	3	4	5
The nurse does not feel she/he has enough authority(S)	.683				
The nurse feels results are not generalisable to own setting(S)	.642				
The nurse sees little benefit for self(N)	.544				
Research reports/articles are not published fast enough(R)	.534				
Physicians will not cooperate with implementation(S)	.528				
The nurse is uncertain whether to believe the results of the research(R)	.509				
The nurse feels the benefits of changing practice will be minimal(N)	.505				
The nurse is isolated from knowledgeable colleagues with whom to discuss research(N)	.472				
The relevant literature is not compiled in one place(P)	.425				
The facilities are inadequate for implementation(S)	.341				
The amount of research information is overwhelming #		.640			
The nurse is unwilling to change/try new ideas(N)		.639			
Other staff are not supportive of implementation(S)		.598			
The nurse does not feel capable of evaluating the quality of the research(N)		.579			
There is insufficient time on the job to		.575			

ITEM (**Funk et al. factor classification)	Factor				
	1	2	3	4	5
implement new ideas(S)					
Implications for practice are not made clear(P)			.749		
Research reports/articles are not readily available(R)			.667		
Statistical analyses are not understandable(P)			.329		
The literature reports conflicting results(R)				.876	
The conclusions drawn from the research are not justified(R)				.557	
The research is not reported clearly and readably(P)				.449	
The nurse does not see the value of research for practice(N)					.727
There is not a documented need to change practice(N)					.670
Administration will not allow implementation(S)					.382

** Factor as identified by *Funk et al*. (1991a): N = nursing, P = presentation, R = research, S = setting. # Was not included in four-factor model by *Funk et al*. (1991a. Rotation Method: Promax with Kaiser Normalization.[a]a. Rotation converged in 7 iterations

6.4.1. Factor One (Lack of incentives in applying Research)

From the exploratory factor analysis of the sample of 1824 nurses for this study, a factor was derived and referred to as factor four which is referred to as 'inadequacies of current research'. This factor included the following items from the original model by Funk et al. (1991a):

- *The nurse does not feel she/he has enough authority*

- *The nurse feels results are not generalizable to own setting*

- *The nurse sees little benefit for self*

- *Research reports/articles are not published fast enough*

- *Physicians will not cooperate with implementation*

- *The nurse is isolated from knowledgeable colleagues with whom to discuss research*

- *The relevant literature is not compiled in one place*

- *The facilities are inadequate for implementation*

6.4.2. Factor Two (Drawbacks in applying Research)

Similarly, this factor included the following items from the original model by Funk et al. (1991a):

- *The amount of research information is overwhelming*

- *The nurse is unwilling to change/try new ideas*

- *Other staff are not supportive of implementation*

- *The nurse does not feel capable of evaluating the quality of the research*

- *There is insufficient time on the job to implement new ideas*

6.4.3. Factor Three (Drawbacks in consuming Research)

Likewise, this factor included the following items from the original model by Funk et al. (1991a):

- *Implications for practice are not made clear*

- *Research reports/articles are not readily available*

- *Statistical analyses are not understandable*

6.4.4. Factor Four (Inadequacies of current Research)

This factor included the following items from the original model by Funk et al. (1991a):

- *The literature reports conflicting results*

- *The conclusions drawn from the research are not justified*

- *The research is not reported clearly and readably*

6.4.5. Factor Five (Implementing Research)

The final factor included the following items from the original model by Funk et al. (1991a):

- *The nurse does not see the value of research for practice*

- *There is not a documented need to change practice*

- *Administration will not allow implementation*

From these results it can be seen that the first factor consisted of a mixture of nurse-centred barriers and setting-based items from the original Barrier Scale questionnaire. Likewise, factor two incorporated a mixture of nurse-based and setting-based barriers. Factors three and four were a mixture of research and place-centred barrier items whilst factor five had two of the three items as nurse-centred barrier items. In conclusion, the factors extracted for this study did not support the four-factor model by Funk et al. (1991a).

6.5. Summary of the chapter

This chapter discussed the factor analysis of the responses to the items on the Barriers Scale. Included in this discussion were the implications of the factor analysis for the results of this study. The next chapter will discuss the research results from Chapter five and this chapter as a catalyst to explore the study insights in terms of the literature.

Chapter 7: Discussion

7.1. Introduction

This chapter will firstly present a synthesis of the research results from this study which encompasses the attainment of the aim of this study. The overall aim of the study was to to examine the perceived barriers to, and facilitators of, research utilisation among nurses in Saudi Arabia. The research results will then be used as a catalyst to explore the study insights in terms of the literature. These insights can broadly be characterised into those that confirm existing knowledge, those that build on existing literature and those that reveal new contributions to the literature in this area of research utilisation.

The research questions will first be outlined in this chapter in order to ground these study results in relation to the achievement of the research aim. This will then be followed by a brief overview of the significant results revealed from the data. These results will then be compared with what the literature reveals in order to identify where these results contribute to the body of knowledge in this area. Finally, this chapter will critique the theoretical framework used for this study. The strengths and limitations of this study and recommendations will appear in the next chapter.

7.2. Research aim

The overall aim of this cross-sectional descriptive design study was to examine the perceived barriers and facilitators of research utilisation among nurses in five hospitals in Riyadh, Saudi Arabia. This was to be achieved through the following research questions:

1. What are the nurses' perceived barriers to utilisation of research findings in practice in Saudi Arabian hospitals?

2. What are the nurses' perceived factors that facilitate utilisation of research findings in practice in Saudi Arabian hospitals?

3. How do nurses perceive the organisational climate in relation to research utilisation of research findings in practice in Saudi Arabian hospitals?

4. Is there a relationship between selected nurses' characteristics in Saudi Arabian hospitals (age, gender, level of education, years of nursing experience, work settings, nationality, position, principal job function and research experience) with their perceived barriers?

5. Is there a relationship between selected characteristics in Saudi Arabia hospitals and their perceived organisational climate?

6. Is there a difference between clinical nurses and nurse managers/educators regarding the barriers to and facilitators of research utilisation?

7. Is there a difference in the factors for the Barriers Scale as perceived by nurses in Saudi Arabia compared to the four-factor model devised by Funk et al. (1991a)?

Whether these research questions have been answered from this research will be demonstrated by placing the appropriate research question beside each section. Some of the research questions are addressed in more than one section and some sections address more than one research question. As a consequence of the substantial data set, more than these research questions have been able to be explored as the analysis followed the data and what could be achieved.

7.3. Response rate

More than 2,500 surveys were distributed to five major hospitals based in Riyadh region of Saudi Arabia. Overall, 1,824 nurses from these five hospitals responded to the survey yielding a response rate of 86%. This is consistent with Bander

and Jones (2017) who had a response rate of 91%, both of which are higher than the response rate from the other Saudi Arabian study on barriers conducted by Omer (2012) who had a response rate of 42%. A response rate was not documented in the other barriers to research utilisation research undertaken in Saudi Arabia (Aboshaiqah et al., 2014). The high response rate for this research project could be attributed to the fact that the researcher spoke to the nurse manager of each ward and undertook an information session on the ward. This would have made many staff aware of the research being undertaken and so more likely to complete the surveys.

7.4. Demographics

Participating nurses were clinical nurses, nurse managers or nurse educators from the selected five hospitals in Riyadh city Saudi Arabia. Data was collected from these participants regarding the barriers to research utilisation using the Barriers Scale developed by Funk et al. (1991). Furthermore, in order to collect data regarding the facilitators to research utilisation from these participants, a survey developed by Hutchinson and Johnston (2004) was used. Prior to these surveys, participants were asked a number of demographic questions. This section discusses the results from this portion of the data collection. A brief overview of the significant results only will be presented here beginning with the demographics.

The majority of the responding nurses were females (1509, 82.7%). This contrasts to the data from MOH (2015) identifying 52% female nurses. The average age of the participants in this study was between 20 to 40 years (70.4%), having a Bachelor degree initial qualification (82.7%), and with 6 to 10 years of nursing experience (29%). These results, including the gender, are comparable to the statistical data from other studies undertaken in Saudi Arabia (Bander & Jones, 2017; Alqahtani & Jones, 2015; Omer, 2012). The average age of participants in this study is younger, however, than

those in Australia which has an average age of greater than 50 years (Australian Health Practitioner Regulatory Agency, 2015).

There are a number of explanations for these differences. Younger nurses are more likely to be recruited and attracted to working in Saudi as they are early in their career and are less likely to have family commitments (Miller-Rosser et al., 2006). Bachelor programs for nursing education have gradually been increasing in number with Diploma programs decreasing over time with Bachelor programs currently the most common education pathway into nursing (Aiken, Clarke, Cheung, Sloane & Silber, 2003). In addition, the agencies recruiting nurses tend to favour less experienced nurses as they are cheaper. Plus less experienced nurses see that working in Saudi Arabia for a short period of time will give them experience and marketability. This experience they can take with them when they move into a position in a developed country such as Canada or Australia (Almalki et al., 2011a).

Most of the participating nurses were expatriate (87%), with the largest group of nurses coming from the Philippines (47%), followed by India (28%). The percentage of expatriate nurses in this study however, is lower than reported by Omer (2012) at 95% and higher then reported by Alqahtani and Jones (2015) at 75% and MOH (2015) at 62%. This demonstrates a declining trend generally, and reflects the success that the Saudi government has had in encouraging more Saudi nationals to undertake nurse education (Tumulty, 2001). This refers to the Saudisation process that has been implemented specifically to encourage this, as mentioned in Chapter 2. The relaxation of cultural beliefs, such as improving the image of nursing, has contributed to this success by facilitating the recruitment of female Saudi nurses and making it more attractive and acceptable (Miller-Rosser et al., 2006).

The fact that this study demonstrated having the largest group of nurses from the Philippines is not surprising as they are the largest exporter of nurses across the world

(Lorenzo, Galvez-Tan, Icamina & Javier, 2007). This is because the Philippines have a government approved program aimed specifically at educating nurses for export (Aiken, Buchan, Sochalski, Nicholas & Powell, 2004). There is therefore an overproduction of nurses specifically for this purpose (Brush & Sochalski, 1997). This is coupled with poor working conditions in the Philippines that motivate nurses to seek work in other countries (Lorenzo et al., 2007). In addition, the agencies recruiting nurses are based in India and Philippines specifically for that purpose (Almalki et al., 2011a; Bander & Jones, 2017; Tumulty, 2001).

In relation to the nursing role that the nurses were employed, not surprisingly the majority of nurses were clinical or bedside nurses (82.4%), followed by nurse managers (12.7%) and nurse educators (4.9%). This is comparable to any hospital as bedside clinical nurses are by far the majority as each ward has three shifts of nurses and one nurse manager usually. The hospital then has a clinical educator overseeing many wards.

Exploring the demographic variables further across the five hospitals, there was an overall tendency toward the employment of younger nurses in some hospitals. This was specifically observed in Al-Yamamah, Prince Mohammed and King Salman Hospitals, and King Fahad Medical City. The relationship between hospital type and age category was found to be significant indicating that the number of nurses in the age categories differed across the hospitals. Likewise, with gender, there was found to be a significant difference in female and male nurses employed across the five hospitals. Specifically, there were more female nurses at King Fahad Medical City and Prince Mohammed Hospital, with Al-Yamamah Hospital having the next biggest group of female nurses. This is surprising as the latter is a women's hospital and would be expected to have predominantly female nurses. There is a strong cultural segregation of

males and females in Saudi Arabia. It is a requirement that Saudi women must be cared for by a female nurse only (Bander & Jones, 2017).

In relation to qualifications, there was a trend in the sample size toward more degree qualified nurses across all hospitals. This was more noticeable in large hospital centres such as King Faisal Research Centre. Half of the participating nurses had received their nurse qualification from the Asian region (50.1%), followed by India and Pakistan (29.3%) and the Middle East region (16%). The remaining nurses received their initial nurse qualification from the Western region (4.5%). There was an overall tendency to have more nurses educated in the Asian region in these hospitals. This is not surprising as the largest group of nurses are recruited from the Philippines, for reasons discussed above. Western region nurses are more expensive to recruit and therefore less likely to be working in Saudi Arabia hospitals (Tumulty, 2001).

The relationship between hospital and country of the initial nurse qualification, and thus origin, was found to be significant. In addition, the number of nurses obtaining their initial qualification in the country regions also varied with the hospital they worked at. For instance, Prince Mohammed Hospital had the largest number of nurses educated from the Philippines and the lowest from Saudi Arabia. Interestingly the proportion of nurses qualified from the Western region was highest in only King Faisal Research Centre. As to whether this is because these nurses are more attracted to this hospital because it is a research centre is not clear. It could also be that this hospital has specifically targeted recruiting more nurses from the Western region.

Exploring the variable of nurse role across the five hospitals, a significant association was found. This indicated that the number of nurses in the different roles differed by hospital. For instance, King Salman Hospital had a higher proportion of nurse managers and educators and less clinical nurses compared to the other hospitals. Independently from other nursing roles, responses from clinical nurses were nearly

equal in proportion across the five hospitals. As previously identified, there is usually only one nurse manager per ward. So whether King Salman Hospital has more wards or more than one manager per ward is not clear. It could be that there are more nurse educators because King Salman Hospital specifically employs more educators for some reason. These results could of course also be explained by a varying number of nurses responding from the different nursing role groups proportionally.

7.5. Barriers to research utilisation

This section is addressing research question 1.

The next part of the research was to explore barriers to research utilisation as perceived by the nurses included in this study. First, the highest barriers to research utilisation were explored by ranking the items on the barrier score in the 'moderate to great extent' category. This revealed that the major barriers identified by the nurse participants in this study were insufficient time to implement new ideas, lack of authority, unclear practice implications and not having time to read research. These top four barriers were agreed upon by the more than half of the nurses (60%) in these five hospitals. These results indicated how serious these problems were in that the nurses were too busy and did not have the time to implement new ideas which are examples of organisational characteristics. These barriers are preventing nurses from implementing research findings into practice. Organisational characteristics refer to such things as infrastructure, systems and processes important for the reinforcement and implementation of research findings. Not having the authority to implement new ideas, however, is outside the nurse's control as this is often because nurses have to follow doctors' orders. The fact that the implications for practice are not made clear is a communication characteristic and relates to presentation and accessibility of the research.

The top barrier identified by the nurses in the Saudi Arabian study undertaken by Omer (2012) was not having enough authority. Furthermore, the top barrier for this study of insufficient time to implement new ideas was not included in the results for the moderate to strong barriers of the Omer (2012) study. However, lack of authority did rank second in this study. In contrast, another study conducted in Saudi Arabia by Abosqhaiqah et al. (2014) did identify insufficient time on the job to implement new ideas as the top barrier to research utilisation. Given the use of convenience sampling for each of these studies in Saudi Arabia including this project, this does restrict the generalisation of the findings to other populations outside the population surveyed. Although this study did include a larger sample size compared to the other Saudi Arabia studies as there was a greater number and variety of hospitals included.

In another study, Sommer (2003) who noted commonalities across multiple studies in her thesis did identify a lack of authority as the greatest barrier. This was supported by Wang, Jiang, Wang, Wang and Bai (2013) and Thompson et al. (2006) as well. Insufficient time to read research was identified as the next most common barrier to research utilisation in both of these other studies (Omer, 2012; Sommer, 2003) compared to this current study which identified this as the fourth greatest barrier by nurses. Time in this study was identified as a barrier but this was more about time to implement new ideas. Lack of time on the job to implement new ideas is therefore a significant organisational issue for the nurses in this study. This was also found by others (Brenner, 2005; Breimaier et al., 2011; Bryar et al., 2003; Chien et al., 2013; Dunn et al., 1998; Hutchinson & Johnston, 2004; Kocamen et al., 2010; Kuuppelomäki & Tuomi, 2003; Latifi et al., 2012; Mehrdad et al., 2008; Oh, 2008; Retsas & Nolan, 1999; Tan et al., 2012; Tsai, 2000; Zhou et al., 2015). It is difficult to interpret what this could mean. Does this refer to the fact that nurses would have to spend time discussing new ideas with doctors who have the authority to sanction these new ideas? This largely

expatriate workforce is also grappling with other issues such as communication difficulties and workloads due to nurse shortages (Bander & Jones, 2017). There are a number of contributing factors to nurses' workloads, such as undertaking non-nursing duties and other challenges as discussed in Chapter 2. Certainly workload and patient acuity has been identified as contributing factors to nurses having insufficient time to implement new ideas by others (Oranta et al., 2002). For instance, the overall ratio of nurses to patients in Saudi Arabia is far lower than in other countries; 40 per 10,000 compared to Australia which is 97 per 10,000 patients (Almalki et al., 2011a). This factor alone would contribute to nurses not having the time.

In relation to nurses not having authority to make changes is supported by a study that explored the differences between hospital and community nurses' viewpoint (Walsh, 1997). This is because hospital nurses more directly receive and act on orders from doctors in hospitals compared to nurses in the community who are more autonomous. In addition, it has been identified that doctors are less likely to support implementation of new ideas (Oranta et al., 2002). Saudi Arabian hospitals, like many other hospitals in the world, are overseen by doctors restricting the autonomy of nurses to make decisions and further explain this organisational barrier (Omer, 2012). Certainly organisational factors being the highest ranked barriers was a common thread in other studies (Brenner, 2005; Breimaier et al., 2011; Bryar et al., 2003; Chien et al., 2013; Cummings et al., 2007; Dunn et al., 1998; Hutchinson & Johnston, 2004; Kang, 2015; Kiwanuka et al., 2008; Kocamen et al., 2010; Kuuppelomäki & Tuomi, 2003; Latifi et al., 2012; Mehrdad et al., 2008; Oh, 2008; Retsas & Nolan, 1999; Tan et al., 2012; Thompson et al., 2006; Tsai, 2000; Wang et al., 2013; Zhou et al., 2015).

Likewise, the four least barriers as perceived by these nurses were identified revealing that nearly 50% of them perceived that a number of factors were not perceived as barriers to research utilisation. This included the fact that administration was

supportive and allowed implementation, nurses saw the value of research and research being readily available. This reflects the fact that nurses are well educated and that research was readily available which communication characteristics are. Research utilisation is empowered when nurses with advanced qualifications utilise the skills they have attained and apply research evidence in practice (Kiwanuka et al., 2008). Indeed, in a systematic review of individual determinants of research utilisation by nurses, Squires et al. (2011) found having a graduate degree in nursing was an important individual characteristic for research utilisation. Interestingly, although reported for this project, least barriers were usually not identified in other barriers to research utilisation studies. These results therefore contribute to the knowledge in this area.

The responses to each of the barrier items were added to determine what the mean total Barrier Score across the five hospitals was, which was 70.08 out of a possible 116. The higher the score the higher the barriers to research utilisation were. This was then explored further by ascertaining the individual hospitals score. The highest mean Barrier Score was reported from the nurses at King Faisal Research Centre (73.7) and the lowest was from King Salman Hospital (66.6). Exploring the mean total Barrier Score between the five hospitals further revealed significant differences in the mean total Barrier Score between nurses working in the different hospitals. Namely, the total mean Barrier Score from the participating nurses employed at King Faisal Research Centre and Prince Mohammed Hospital were the highest with Al-Yamamah Hospital nurses reporting the lowest Barrier Score. An exploration of these results appears later in this chapter. This was an area that no other barriers to research utilisation studies explored and therefore contributes to the knowledge in this area.

7.6. Effect of demographics on Barrier Score

This section addresses research question 4. As the role of the nurse was asked as part of the demographics, this section addresses the demographics as a whole. Research question 6 is the differences between the clinical roles.

A number of comparisons between the Barrier Score and demographics were then undertaken. First, comparing the total mean Barrier Score across the nursing qualification revealed that there was a statistically significant difference between nurses with a Diploma and a Masters qualification.

In addition, when comparing the total mean Barrier Score across clinical roles this revealed that there was a statistically significant difference between nurse educators and nurse managers and between nurse educators and clinical nurses. In conclusion and from these results, nurses who had a Masters qualification and who were nurse educators were more likely to have a higher Barrier Score. This finding will be explored later in this chapter.

No significant relationship between barriers and demographic variables were found in the other Saudi study (Omer, 2012). Barriers to research utilisation were found not to be related to level of education but were related to being a clinical nurse and having less experience in another study (Oh, 2008). In contrast, lower levels of education were found to be associated with greater barriers, that is, Bachelor educated nurses' perceived greater barriers compared to Master prepared nurses (Kang, 2015). Similarly, Bostrom et al. (2008) demonstrated that education was the second most important predictor of perceived barriers to research utilisation. Kang (2015) however, identified that barriers to research utilisation were significantly higher in nurses with less clinical experience. This study also found that younger and clinical nurses had greater perceived barriers to research utilisation than older nurses or those who were nurse managers or educators. This is consistent with previous studies that have

identified that nurse managers perceive less barriers to research utilisation (Bostrom et al., 2008; and Oh, 2008). There was not a lot of other evidence of this exploration of demographics and Barrier Scores in other research and contributes to the knowledge in this area. Wang et al. (2013) explored the differences between demographics and subscales of the barriers and found a significant difference regarding education and research experience. This was not explored in the current study.

7.7. Exploratory factor analysis of the Barrier Scale

This section is addressing research question 7.

In relation to the exploratory factor analysis of the key factors underlining the 29 items of the Barriers Scale utilised for this study, it was found that there were differences between the original four factors as derived by Funk et al. (1991a) and those five for this study. As previously discussed, these results are not new as a number of other studies who have completed similar factor analyses have derived factors not identical to those of the original USA study (Closs & Bryar, 2001; Dunn et al., 1998; Hicks, 1995, 1996; Retsas & Nolan, 1999; Retsas, 2000). For the five-factor model for this study the characteristic of the nurse is not singled out as a factor in their own right unlike the four-factor model by Funk et al. (1991a). Instead, the five-factor model included a combination of nurse-centred, presentation-centred, research-centred and setting-based barrier items from the original Barrier Scale questionnaire. Nonetheless the nurse characteristic is a central element and included in all of the five factors. These results would be expected given that the nurse as the participant in the survey is asked to apply research in their own practice, then to make sense of the research and then overcome any difficulties that may encounter as part of this process. Retsas and Nolan (1999) had similar results to this study although they derived a three-factor model including 26 of the original 29 barrier items. Their three-factor solution included:

usefulness of research to clinical practice, generating change to practice based on research and accessibility of research (Retsas & Nolan, 1999).

Similarly, there are a number of factors which may explain the differences in factor analysis of the Barrier Scale for this study and that of Funk et al. (1991a). These may include temporal changes as the USA study is 26 years old as well as different sampling methods. The original study by Funk et al. (1991a) was a stratified random sample unlike the convenience sample used for this study. Funk et al. (1991a) drew participants from the American Nursing Association membership roster from 22 states with only registered nurses employed full-time included in the study. The samples produce dissimilar response rates as for the original four-factor model the response rate was low (44.6%), compared with the high response rate for this study (86%). Furthermore, the geographical location of this study in Saudi Arabia is potentially an important influence and this impact has been recognised in other similar studies (Closs & Bryar, 2001; Dunn et al., 1998). Dunn et al. (1998) did identify differences in responses for several items of the Barriers Scale for nurses from the United Kingdom compared to those nurses from North America. Closs and Bryar (2001) based on their exploratory factor analysis for a sample of 2,009 nurses in the UK, found their derived factors were "roughly comparable" to the original USA model. However, they did suggest the Barrier Scale may not be suitable for use in the UK without further changes (Closs & Bryar, 2001). Another influence which may have contributed to the resultant factors for this study included the professional status of the majority of nurses who participated. Most were clinical nurses and appeared to be ambivalent regarding the role of research in nursing practice. Consequently, they were not focused on clinical practice informed by research which was not assisted by a work environment management structures that were not totally conducive to this occurring. This may have been another

contributing factor to the results in that the factor analysis did not cluster items under the unique original four-factor model as developed by Funk et al. (1991a).

7.8. Facilitators of research utilisation

This section is addressing research question 2.

The next part of the research was to explore what the group of nurses in this study perceived as to what the facilitators to research utilisation were. First, exploring what the highest facilitators of research utilisation were by ranking the items on the facilitation score in order for the 'moderate to great extent' category. This revealed that the major facilitators identified by the nurse participants in this study were advanced education, providing colleague support, conducting more clinically relevant research and employing nurses with research skills. These top four facilitators were agreed upon by more than 80% of the nurses in these five hospitals, with a variation of less than 5%. This indicates that nurses perceived these factors as strong facilitators to research.

Likewise, the least four ranked facilitators as perceived by these nurses were identified and revealed that less than 20% of these nurses perceived that a number of factors were not perceived as facilitators to research utilisation. These included increasing time for reviewing findings, improving availability of research, improving the level of understanding of research and employing nurses with research skills. This reflects that for this group of nurses, these were not identified as major facilitators to research utilisation.

Not every study actually used the survey to assess facilitators developed by Hutchinson and Johnston (2004). Omer (2012) for instance, used open ended questions to ascertain the facilitators and found that increased administrative support was important to make research available and allow nurses the time to read and implement accordingly. Interestingly, this is in contrast to the current study which identified these as the least facilitative to research utilisation. Participants in this study reported that

advanced education was the best way to facilitate research utilisation. Yet Masters qualified nurses and clinical educators were identified as having higher Barrier Scores in comparison. These results indicate that the more educated the nurse, the more aware they are of the need for research utilisation and therefore, more likely to recognise the difficulties in implementation. Similarly, Squires et al. (2011) identified a positive association between having a graduate degree and research utilisation for nurses. Lacking authority is something that nurses have little control over. Nurses being knowledgeable about the importance of implementing evidence-based practice are constrained if there is a lack of authority to implement this.

An 8 item facilitator survey was used in a study in China (Wang et al., 2013). These participants identified enhancing managerial support as the greatest facilitator, followed by advancing education and increasing time for reviewing research. In contrast, advanced education was identified in the current study as the greatest facilitator. Interestingly, increasing time for reviewing research was ranked as one of the least facilitative items in the current study.

The responses from the facilitator items were added and averaged to determine the mean total facilitation score across the five hospitals, which were 26.10 out of a possible 32. The higher the score the more facilitators to research utilisation there were. King Faisal Research Centre had the highest total mean Facilitation Score (27.9) and Al-Yamamah Hospital had the lowest (21). Exploring the mean total Facilitation Score between the five hospitals further revealed significant differences between the hospitals in the total mean Facilitation Score. However, King Faisal Research Centre and Prince Mohammed Hospital had nearly equal scores which were the highest compared to the other hospitals. This indicates that nurses in these two hospitals perceive the facilitators to have a greater impact on research utilisation than those nurses in other hospitals.

Total facilitation scores do not appear to have been explored in other research undertaken in this area. These results therefore contribute to the knowledge in this area.

7.9. Influence of demographics on Facilitation Score

This section addresses research question 4. As the role of the nurse was asked as part of the demographics, this section addresses this as a whole. Research question 6 is the differences between the roles of the nurses.

A number of comparisons between the Facilitation Score and demographics were then undertaken. When comparing the levels of nurse education on the Facilitation Score, those nurses with the highest level of education (Masters) had the highest Facilitation Score compared to those with a Diploma qualification. This difference was found to be significant indicating that as the level of education increased from Diploma to Bachelor to Masters, the perceived Facilitation Score tended to increase as well.

Similarly, the results indicated that the more experience a nurse had the higher the mean Facilitation Score was compared to those nurses with less experience. Assessing whether nurses' mean perception on required facilitation to research utilisation significantly differed depending on which country the nurse received their qualification. Nurses who received their nurse qualification from a Western region had the highest Facilitation Score compared with nurses qualified from the Middle East and India/Pakistan who had the lowest Facilitation Score.

Whether there was a difference between nurses' mean perception on required facilitators of research utilisation and the different roles they had was also assessed and found to be significant. The results indicated that nurse educators had the highest Facilitation Score compared to the clinical nurses who scored the lowest.

In conclusion, the nurses with a Master qualification achieved from the Western region, having more experience and being nurse educators had the highest Facilitator Scores. This will be discussed in more detail later in this chapter.

Very few studies have used the research Facilitator Score nor compared this score with demographic data. These therefore contribute to the knowledge in this area.

7.10. Relationship between demographics and barriers and facilitators of research

This section addresses research questions 1 and 4.

Nurses who participated in this study who had a Masters qualification and who were nurse educators were more likely to have a higher Barrier Score. The higher Facilitator Scores identified in this study were from nurses who had a Masters qualification, from a Western country, had more experience and were nurse educators.

In addition, nurses with more experience had higher Facilitator Scores. However, experience was not found to make a significant difference to the Barrier Score. Having a higher Facilitation Score means a person identifies more facilitators to research utilisation. This is somewhat contradictory as nurses with more experience are less likely to have received much information on research as nurse education programs over time have placed varying emphasis on research. These nurses are also more likely to not have undertaken a Bachelor qualification as this has become more the norm in recent years (Sommer, 2003). These nurses are also further away from their nurse education program. These results could possibly be related to simply having more experience and therefore, being able to identify more facilitators to research utilisation purely on this basis and not related to any other factors. This is supported by Kang (2015) who had found that barriers to research utilisation are higher in nurses with less experience. Similarly, Oh (2008) found that professional status and length of clinical experience were significantly related to barriers to research utilisation. In particular, participants who were staff nurses with less than 10 years of clinical experience perceived more barriers.

Masters nurses identified higher barriers to research utilisation compared to those with a Diploma. This reflects the higher education received by Masters graduates related to research and the greater expectation this places on these nurses. These Masters educated nurses are more aware of EBP and the need to utilise research and consequently, find it harder to do so. Viewing these results with the top barriers identified by these nurses, which were organisational factors, helps explain why this is the case. That is, having insufficient time to implement new ideas relates more to the workload issues that these nurses face. The second barrier is lack of authority, which as previously mentioned, can only be addressed through cultural change. On the other hand, Diploma courses are more focused on education regarding nursing care and little to no content on research and EBP. Masters nurses in contrast identified higher Facilitation Scores, emphasising that education is crucial in helping these nurses facilitate research utilisation. This, however, is not consistent with the literature in this area reporting that nurses with lower levels of education are associated with greater barriers to research utilisation (Bostrom et al., 2008; Kang, 2015). This points to a lack of education impeding these nurses to utilise research findings in the clinical practice.

In the reviewed studies it was clear that if nurses with doctoral degrees collaborated with organisation leaders to either conduct research related to clinical issues or to use published research to solve problems in clinical settings this tends to bring up the level of nursing practice to be EBP (Melnyk & Fineout-Overholt, 2015). It was also found that the availability of nurses with higher degrees can create a culture of evidence-based thinking which can be empowered by training programs managed by these nurses (Malloch & Porter-O'Grady, 2010). This clearly reinforces the difference that education can make to research utilisation. However, when confronted with organisational barriers out of the nurses control impedes this somewhat.

Nurse educators identified higher barriers to research utilisation compared to nurse managers or clinical nurses. The role of the educator is to encourage application of EBP and research culture, plus to undertake research or at least be involved in the process. These nurses are therefore more aware of the expectations. In addition, as identified earlier, nurse educators are more likely to have undertaken further education for their role and therefore, more likely to have more knowledge of research. This in turn places a greater expectation on these nurses to perform. The fact that nurse educators have higher Facilitation Scores than managers or clinical nurses supports this claim. Organisational barriers would again impede this. This contrasts with other studies that have found that clinical nurses had higher perceived barriers then nurse managers or nurse educators (Bostrom et al., 2008; Oh, 2008). This again could be explained by the different workforce issues that nurses in Saudi Arabia face. In contrast, the studies undertaken by Bostrom et al. (2008) and Kang, (2015) included nurses who care for elderly patients in aged care facilities, whilst Oh (2008) reviewed critical care nurses

Western nurses had higher Facilitation Scores compared to nurses from the Middle East region. This reflects the different emphasis in the curricula in these countries. Western countries are more likely to have research content in their curricula whereas for other countries the emphasis tends to be more on English language, religion and culture (Gerrish & Clayton 2004). In Saudi Arabia, the nursing curriculum does include a foundational research course which does provide an introduction to research so that nurses may take part in conducting and applying research in their care facilities.

Again, it was the difference in education across hospitals which were also supported by Funk et al. (2005) who identified education, implementations such as participation in a journal club and reading would improve nurses' utilisation of research. This was supported by Kang (2015) who recommended that nurse managers provide nurses with opportunities to join research related activities to overcome barriers to

research utilisation. More recently a study undertaken in China also found that nurses needed ongoing education to assist with research utilisation in nursing practice (Cline et al., 2017). However, as identified earlier, nursing education has changed over time. Nurses' knowledge and skills need updating constantly, even for nurses with higher degrees, such as Masters, as they become focused on their practice. This education can occur through reading up-to-date research articles and for example, participation in journal clubs and case based in-service education.

In the review of the literature, nurse managers were reported as not having a great part to play in conduct of research but they can play an important role in encouraging nurses and providing them with opportunities to join research-related activities to overcome the barriers of research utilisation (Kang, 2015). This may highlight the importance of distributing roles over the hospitals to standardise the process of research utilisation and consequently foster the evidence-based practice.

Males had higher Barrier Scores (73) and higher Facilitator Scores (27) compared to females (Barrier Score 70, Facilitator Score 25). These results may relate to the fact that male nurses are more likely to see this as a career as gender of nurses has been recognised as an influencing factor in facilitating or impeding research utilisation in Saudi Arabia. Gender as a social construction in Saudi Arabia is shaped by and works within a patriarchal society and Islamic masculinity is grounded within institutions which governs people's ways of thinking and practices (Adibi, 2006). Regardless of the fact that the majority of nurses in the study were females (82.7%), there was a minority of males working in the hospitals included in the study. It would seem sensible then to work with the gender bias and to develop gender sensitive policies and education programs that work with the different nursing gender groups separately. This would enable genders to work together to set educational programs to suit gender issues like

other policies such as working together, males with males, females with females with the aim of improving health outcomes.

7.11. Organisational climate: research related activities

This section is addressing research questions 3 and 5.

At the end of the demographic survey, nurses were asked a series of questions which assessed their level of participation in various research activities. The responses to these questions were then compared between the five hospitals. Generally, the majority of the nurses from all of the hospitals identified that their hospital has a research culture (77%), they subscribed to a nursing journals (81%), and actually read these articles (74%). In contrast, however, only 27% of the nurses had participated in education regarding research utilisation, 26% participated in journal clubs and 36% had been part of a research project. In contrast, these rates were higher than other studies that have found only 28% of nurses are reading articles and 28% are involved in any research (Uysal, Temel, Melek & Ozkahraman, 2010).

Exploring the answers to these questions further across the different hospitals, nurses from King Faisal Research Centre participated in educational sessions on research utilisation significantly higher (53%) than the nurses from the other hospitals. Nurses coming from Prince Mohammed Hospital participated the least in these activities (9.9%). In addition, the majority of nurses from King Faisal Research Centre believed that there was a research culture (98.9%), followed by nurses from King Fahad Medical City (86.9%) and those coming from Al-Yamamah Hospital (69.3%).

The nurses coming from King Faisal Research Centre were also remarkably the highest (94.3%) subscribers to journals and those coming from Prince Mohammed Hospital (72.3%) were the least likely to subscribe to journals. The difference between nurses coming from various hospitals on subscribing to journals was found to be significant. Nurses were then asked whether they read nursing articles published from

various resources. Interestingly, those nurses coming from King Faisal Research Centre were the least likely to read articles (56.4%), compared to the majority of nurses coming from the other hospitals. Nurses coming from King Faisal Research Centre however, reported significantly greater experience attending a Journal Club compared to nurses coming from the other hospitals. This is an interesting contradiction in that King Faisal Research Centre nurses were more likely to have participated in Journal Clubs but least likely to read articles and more likely to subscribe to journals. It could be speculated that the King Faisal Research Centre is the one that actually subscribes to the journals and so they are available for the nurses. Nurses may not need to read articles as they are more likely to be attending Journal Clubs. Attending Journal Clubs is believed to help nurses gain experience and understanding in reading research articles and encourages EBP (Kleinpell, 2002). This is supported by a study which found that perception of barriers to research utilisation may decrease through participation of nurses in Journal Clubs (O'Nan, 2011). However, attending Journal Clubs may not necessarily equate to reading articles but at least it means that nurses are being exposed to nursing research articles. Through the process of Journal Clubs nurses are learning how to appraise the evidence and foster an environment where clinical practice is based on best evidence (Alzayyat, 2014; Lee et al., 2005).

The next series of questions asked the nurses from these hospitals about attendance at in-service education sessions, conferences and mandatory competencies. All of the nurses responded with agreement that hospitals had in-service education sessions with no statistically significant differences between the hospitals. In-service sessions are usually held in the ward area during work time and include continuing educational topics or case studies designed to help nurses keep up to date with the latest evidence. These sessions may also be undertaken in the education department of the hospital which would be away from the ward and, therefore, not quite as easy

necessarily to get to. Nurses' abilities to attend these sessions however, indicated a significant difference across hospitals. In fact, nurses who responded from King Faisal Research Centre were mostly (97%) in agreement, indicating that they were given the greatest opportunity to attend these sessions when compared to the nurses from the other hospitals. The nurses from King Fahad Medical City (96%) were next but the nurses from Al-Yamamah Hospital were the least (86.1%) denoting that at least 14% of the Al-Yamamah Hospital nurses believed they were not able to attend educational sessions at their work areas. The ward areas may be too busy to permit nurses to attend these sessions and it can be up to the nurse managers and educators to encourage staff to attend. This may not always happen. Nursing workload issues in Saudi Arabia were discussed in Chapter 2 and outline the many challenges that nurses' face.

Nurses were asked whether their hospital mandated specific annual training (check-offs). These are undertaken to ensure competency of the nurse and include such things as resuscitation, fire and safety procedures, documentation and any other safe practice item. A significant difference was found between nurses from various hospitals. In particular, a few nurses from Al-Yamamah (2.2%) and Prince Mohammed Hospitals (1.5%), and King Fahad Medical City (0.9%) believed their hospital did not mandate annual check-offs. This is an interesting finding as these are mandated competency assessments and could indicate nurses' perceptions of these activities such that they are a normal part of practice so they do not acknowledge them. It could of course indicate that these mandated competencies are not happening in these hospitals.

The nurses' abilities to attend conferences were the next series of question. A significant difference was found between nurses' abilities to attend conferences across hospitals, indicating that nurses from King Fahad Medical City (29%) and King Salman Hospital (22%) were least likely to have attended conferences when compared to the nurses from other hospitals. Nurses from King Faisal Research Centre reported

significantly greater opportunity (49.8%) to be financially supported to attend conferences when compared to nurses coming from King Fahad Medical City (22.7%), King Salman (30%), Prince Mohammed (30.2%), or from Al-Yamamah Hospitals (34.1%). In addition, the majority of nurses at King Fahad Medical City (55.1%) and those at Prince Mohammed Hospital (51.5%) reported significantly greater opportunity to have been given leave by their supervisors at work to attend conferences when compared to nurses from King Salman Hospital (32%), King Faisal Research Centre (33%), or Al-Yamamah Hospital (44.7%).

The fact that nurses from King Faisal Research Centre were more likely to attend conferences and more likely to get financial assistance to attend conferences indicates that nurses are more likely to attend conferences if they are given financial assistance to do so. Given leave to attend did not appear to make a difference to conference attendance. Nurses not being given incentives has been recognised as a barrier to research utilisation (O'Nan, 2011). Financial assistance is a good incentive for nurses to attend conferences. This was also supported by an Iranian study which found that both time and financial assistance were important facilitators to encourage nurses to attend conferences (Mehrdad et al., 2008). Barriers to research utilisation, however, were found not to be related to attendance at conferences (Oh, 2008). These results were explained as nurse with higher education qualification generally have higher attendance rates at conferences result (Oh, 2008).

7.12. Overview of results

Nurses from King Faisal Research Centre were more likely to be able to attend educational sessions on research utilisation, believed there was a research culture, were the highest subscribers to journals, least likely to read articles, more likely to attend journal clubs, given the greatest opportunity to attend in-service sessions, more likely to attend conferences and be financially supported to do so but not necessarily given leave

to attend. Nurses from King Faisal Research Centre and Prince Mohammed Hospital had the highest Barrier Score. King Faisal Research Centre had the highest Facilitator Score indicating that these facilitators were more effective for research utilisation then in other hospitals. For King Faisal Research Centre this reflects the pressure the nurses are experiencing in this hospital to uphold the research culture and use the research evidence, plus it is a tertiary referral hospital and has a high workload as well as the highest number of Western and Bachelor qualified nurses.

Another factor which could help explain the high Facilitator Score for King Faisal Research Centre was the fact that nurses working in this hospital reported that they participated in more education sessions on research as part of in-service education which was part of the research culture in the hospital. This was also supported by the finding that the vast majority of nurses in this hospital (98.9%) believed that there was a research culture in the hospital. The education in research combined with the nurses' experience would enable them to conduct research and apply it as well. Further, King Faisal Research Centre nurses also reported that they were more likely to attend conferences and more likely to get financial assistance to attend conferences. Ultimately, having a research culture places pressure on staff to perform and also puts more expectations on them.

Surprisingly, Prince Mohammed Hospital which is a smaller hospital had high Barrier Scores. These results may be explained as the hospital may be serving a higher number of patients compared to the size of the hospital since the hospital provides a number of services for a large area. This would limit the time nurses have for research practice and utilisation. Furthermore, Prince Mohammed Hospital had the highest number of nurses from the Philippines and was more likely to have younger nurses which may have contributed to this results. It is also a referral diagnostic hospital which would contribute to a high workload.

Relating this information to the top Barriers and Facilitator Scores contributes to some understanding and potential explanation for the results of this study and also assists in making recommendations. The top barrier by all nurses in this study was insufficient time on the job to implement new ideas which is an organisation factor. Presentation of research, quality of research and nurse characteristics still feature in the top eight barriers. These characteristics, however, feature more on the bottom ranking and therefore are least likely to be barriers. This point to the fact that education of nurses is still necessary but maybe more on how to overcome some of the organisational barriers. Lack of authority requires a change in culture to be able to increase the autonomy of nurses and increasing the workforce takes time. One way that could facilitate research utilisation and break down the barriers is to have evidenced based policies in place. Nursing practice would then be from these policies that are embedded with research findings.

The top facilitators included advanced education, providing colleague support, more clinically focused research and employing nurses with research skills. The least likely facilitators were time for reviewing and facilitating research, availability of research, level of understanding, and employing nurses with research skills. These results confirm the importance and value to nurses of education for utilisation of research.

7.13. Research and EBP practice

This gap between nurses' beliefs about the importance of utilising research and their actual actions providing such evidence-based care is not a new research finding. Individual nurse characteristics: belief and attitudes, involvement in research activities, information seeking, education, professional characteristics, and socio-demographic/socio-economic characteristics were all factors found to influence research utilisation (Squires et al., 2011). It was argued earlier that health care professionals are

responsible for providing care built on the best available evidence (Rycroft-Malone et al., 2004). Moreover, in the latter it was also found that the use of this evidence in the decision-making process is important for quality of patients' care. This finding within Saudi Arabia supported evidence from the studies in the literature review that research was not utilised in nursing practice, despite the majority of nurses recognising evidence-based practice was important for patients' health outcomes. Utilising research was introduced to nursing practice early in the 1980s (Stetler, 2001) which means that there has been sufficient time to read, research and improve nursing practice. The results of this study were not so far from those outside Saudi Arabia as Moch et al. (2010) also reported the growth of nursing research globally with limited or delayed application of research findings in practice. In the studies reviewed, it was believed that health care providers are aware of what they do best to treat a patient's health condition and that health care providers practice accordingly (Courtney & McCutcheon, 2010). More recently, it was also argued that evidence-based practice would increase patients' trust in nurses (Hogue et al., 2006).

Nevertheless, when a number of nurses in this study agreed that administration could be a barrier, the ramifications of this is that nurses struggled to apply research in practice. This was also found by Ehrenberg and Estabrooks (2004) who said that the process of implementing research evidence is not easy and requires focused strategies and efforts by organisations as well as health care providers to encourage and support this practice amongst nursing professionals. This was clear in a recent study by Cline et al. (2017) who argued that organisational infrastructure, resources, environment and culture were all factors encouraging research and its application in health care settings. The latter also found that personal and professional incentives such as passion, energy, willingness, creativity, and eagerness of the nurse were likely to progress the process of applying research in practice (Cline et al., 2017). Moreover, nurses in this study also

explained that encouragement, empowerment, and being able to share decisions to change toward improving patients' outcomes were also important facilitators. Of note, it has been reported from a British study that nurses were prohibited by environmental reasons, including the absence of research utilisation from the priority list of the institution, as well as the discouragement of nurses to apply research findings (Heaslip et al., 2012). It might be argued that English language is the dominant language for publishing research and consequently, may limit the opportunity of nurses to utilise research for those whose first language is not English. Nonetheless, even those nurses with capabilities of understanding the English language still need to be well educated to read and understand research in order to apply it to their practise.

An important issue which was presented in the literature review was the reasons behind nurses' prohibition to applying research in practice. This was clear in Oermann, et al. (2010) who investigated reasons that drive nurses to not practise evidence-based practice. Oermann et al. (2010) identified the importance of education of nurses for utilisation of research. The results from this study have also highlighted the importance of research education to prepare nurses to not only utilise research findings but also to conduct research in their work places. This was also evident in Mateo and Foreman (2013) who valued the importance of expanding the understanding of research processes amongst nurses and other health care professionals. Recommendations for increasing understanding of research in clinical practice were reading research, interpreting results and relating these findings to real-life practice through case studies (Mateo & Foreman, 2013).

7.14. Organisational

Many of the barriers as previously identified, relate to the organisation (organisational culture). This is supported by the results from another Saudi Arabian study by Omer (2012) who investigated barriers to research utilisation. Introducing

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change is an important organisational factor especially when considering the issue of lack of authority given to nurses in their work settings. Early in the last decade, this issue was reported in Iran by Mehrdad et al. (2008) and Salsali and Mehrdad (2009). These researchers reported lack of nursing authority to change as well as lack of time, lack of resources and level of support. Similar results were also found in another study by Latifi et al. (2012). Moreover, these results were also demonstrated by Majid et al. (2011) who studied nurses in Singapore. Majiid et al. (2011) found that nursing work routines restricted nurses' up to date knowledge, and opportunity for research skills development.

In addition, in the United States of America, different studies over different periods of time have also concluded that barriers to utilise research were predominantly nurses' limited role to own the institutional power to change, lack of time, lack of authority, the research evidence is overwhelming, and many find unawareness and difficulty in understanding research findings (Cline et al., 2017; Fink et al., 2005; Niederhauser & Kohr, 2005; Thompson et al., 2006). These barriers were not restricted to nurses in Saudi Arabia or even USA. In Europe for example, lack of time, lack of information and lack of interest were perceived by nurses as barriers to apply research in practice (Breimaier et al., 2011). Even if nurses have positive attitudes to apply EBP they still have these barriers in their clinical settings (Boström et al., 2008). This argument might imply that nursing managers should be encouraged to provide nurses with opportunities to join research-related activities to overcome the barriers of research utilisation (Kang, 2015).

Recently, in the USA , the role of nursing managers and leaders is considered essential to support the role of nurses toward a better standard of care for patients in health care settings and with different health problems (Cline et al., 2017). However, in Saudi Arabia the results of the current study highlighted that nurses in some situations

were frequently discouraged by their managers, reinforcing cultural and societal expectations, that research should be utilised to improve nursing practice where others require it for employment or job promotion. Such behaviour is often modelled, transmitted and opinions exchanged between nurses in their individual sub-cultures within their organisations (Holland & Hogg, 2001; Leininger, 1994). Nurses learn how to read, understand and apply research in their hospitals whilst interpreting issues related to research utilisation within their value system (Serrat, 2008). It is important then to make sure such role models that are enhancing care development and encouraging nurses in hospitals to feel empowered to choose to apply evidence-based practice are available (Carol & McCabe, 2008). Educating and acquisition of support of nurse managers and other organisation decision makers, could be the starting point to activating appropriate and best practice in Saudi Arabia (Omer, 2012). Importantly, medical and nursing led research in Saudi Arabia surrounding utilising research could provide a catalyst with which to endorse such higher levels of managerial education as well.

Conversely, support of managers and other people in hospitals were perceived sometimes as barriers to apply research findings in nursing practice. This was clear in an American study where nurses reported resistance from co-workers, nurse leaders, and directors as the dominant barriers (Melnyk et al., 2012). These barriers were related to lack of nurses' time and knowledge, and the unavailability of mentors as well as organisational support. In an earlier Swedish study, it was found that supportive leadership increased nursing work efficacy of an elderly care facility (Björkström et al., 2003). The study also found barriers to research utilisation which included poor computer services and lack of organisational support to introduce change (Björkström et al., 2003). Similarly, in a Northern Ireland study, a lack of computer services and problems in the introduction of changes within primary care were the highest barriers to

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the effective use of research findings in health care practice (McKenna et al., 2004). Once more it was the lack of authority and nurses' inabilities to change practice themselves. This was clear in an Irish study which was conducted in ten hospitals. The results indicated that nurses' having autonomy to implement new ideas, in addition to the administration allowing nurses to implement change, would be more likely to encourage research and build practice based on evidence (Parahoo and McCaughan, 2001). Furthermore, in the United Kingdom, nurses were familiar with research findings but were not able to implement this research into their practice. The nurses believed that research utilisation was not a priority of the organisation (Heaslip et al., 2012).

7.15. Individual factors

A study by Salsali and Mehrdad (2009) showed factors related to individuals such as level of education, which was also reported in the current study, as factor influencing nurses' ability to utilise research findings in their practice. For example, in the current study nurses with higher degrees considered more barriers to apply research in their practice than those of lower degrees. However, this might be explained by the fact that people who do research were the only people who can see or are familiar with barriers and therefore the higher Barrier Scores were recorded by nurses from higher education (research degrees). Similarly, those who work in education reported more barriers more than those in clinical role ($p<.001$) or managerial roles ($p<.001$) which may indicate that educators were more concerned with research.

7.16. Education and preparation

Education has been addressed at a conceptual level at which research utilisation may take place at and which refers to acquiring knowledge. This is also combined with the instrumental level which is referred to as the application of research findings to nursing practice (Gillis & Jackson, 2002). For this study education was the most important facilitator to conduct research in Saudi Arabia as nurses holding Master

degrees had significantly higher Facilitator Scores when compared to those holding Bachelor qualifications. This may indicate that those nurses with higher degrees would be allocated to positions which allow them to make changes to nursing practice though applying research findings. This was clearly found by Houser and Oman (2010) who also reported that nurses with advanced degrees (Masters and PhD) were allocated to authority and provided with resources to improve nursing practice according to the latest evidence obtained from research findings. It was evident from the literature review presented for this study that academically prepared nurses can create a culture of evidence-based thinking which can be improved by training programs prepared and provided by these experienced nurses, as well as increase the number of similar academically prepared nurses (Malloch & Porter-O'Grady, 2010). This was also found by Cline et al. (2017) who showed that nurses required guided education, mentored participation in research as well as environments that encourage critical evolution of research findings and utilisation and applicability of research to contemporary practice. An earlier study also recommended training of nurses through activities like participation in Journal clubs and taking part in research projects inside the institution as ways of encouraging research utilisation (Fink et al., 2005).

Furthermore, nurse educators identified higher Barrier Scores to research utilisation compared to nurse managers or clinical nurses. Interestingly the role of nurse educators was to encourage application of EBP and research culture toward undertaking research. They are therefore more aware of what expectations and needs of nursing staff and the quality of care. Moreover, educators are more likely to have undertaken further education for their role and therefore more likely to have more knowledge of research. This was not far from what has been published about education and gaining knowledge over the years and in different countries in the world. In Austria, a study by Breimaier et al. (2011) revealed that gaining knowledge through participating in training courses and

by allowing time for nurses to read and access research were the main facilitators for the use of research findings. More earlier, nurses in Sweden recommended providing training programs by the organisation to improve nurses' knowledge and skills on evidence-based practice (Boström et al., 2008). In the United Kingdom, preparing a research environment and allowing time for nurses to gain knowledge in research skills were also one of the main concerns of nurses (Heaslip et al., 2012). A number of other studies also found similar perceptions about the importance of knowledge and skills in research to facilitate reading, conducting and utilising research in nursing practice (Chau et al., 2008; Gerrish & Clayton 2004; Moreno-Casbas, Fuentelsaz-Gallego, de Miguel, González-María & Clarke, 2011; Parahoo & McCaughan 2001; Oranta et al., 2002; Wang et al., 2013). Indeed, this might give more value for education as a power for nurses to seek authority to take part in research as well as policies and guidelines to bring evidence-based practice to real practice. With the results of the current study and supporting results from the other Saudi study by Omer (2012), it is clear that education is an important recommendation of this study including planning and implementation initiatives to improve evidence-based nursing practice in Saudi Arabia.

7.17. Supportive administration

A supportive administration was the least frequent item agreed by nurses in the current study however, creating a supportive administration might foster the evidence-based practice through utilisation research. Other studies have found that a supportive administration was the most important issue to encourage nurses to conduct and apply research in their practice. For example, for the Chinese study of Cline et al. (2017) beside the lack of time and lack of authority, they also concluded that nurses should be given the authority and support from administration and colleagues, and found by allowing nurses enough time for research findings appraisal and implementation this aided them in their use of research. Similarly, Pagoto et al. (2007) reported facilitators

which were also opposite to those barriers in the study, of these were creation of supportive policies to treat organisational barriers, provision of training opportunities mainly to the newly employed practitioners to treat lack of knowledge, and sufficient and applicable evidence base resources.

7.18. Critique of the Theoretical Framework

The theoretical framework underpinning this study is based on the Linkage Theory which is founded on the work of Havelock (1969) and the work of Horsley et al. (1983). This theory is concerned with the knowledge exchange between users and resource systems. The three models are: the Research, Development and Diffusion Model; the Social Interaction Model; and the Problem Solving Model (Anaele, 2008). The integration process could be done by linking agencies that have resources for users, and connect them with more remote resource agents. One of the strengths of the linkage model is that it draws upon the strengths of the other three models and tries to overcome their weaknesses. This linkage model was expected to be useful and convenient for this study. The model is composed of four main components including: user system which refers to individuals (nurses) willingness to use resources in their practice; resource systems comprised of researchers who generate new knowledge; mechanisms for interaction between the users and the resource system; and mechanism to transform and disseminate the new knowledge to the user system (Jones, 2000).

In the current study Linkage theory was considered and adapted combining both the work of Havelock (1969) and Horsley et al. (1983) to form a new conceptual framework for research utilisation in the different clinical settings in Saudi Arabia hospitals (see Figure 5.1). The advantages and disadvantages of the model can be drawn from its aims and steps of preparing and disseminating knowledge to its destination.
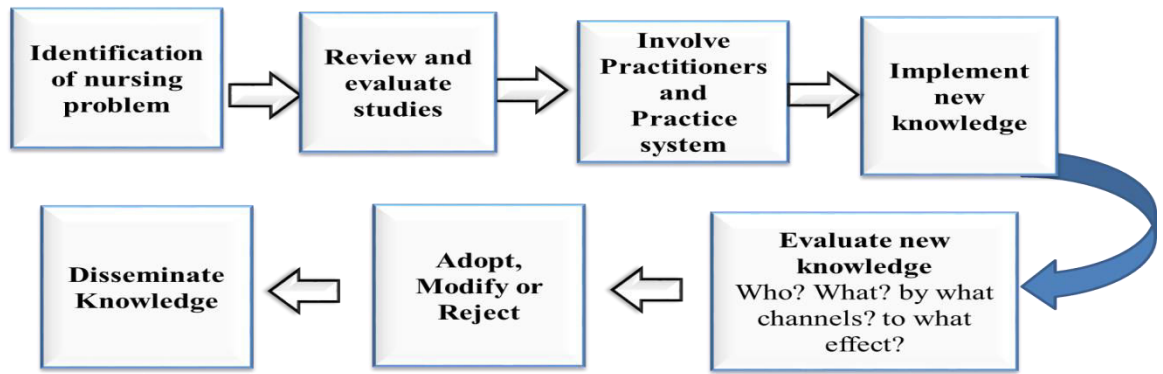
Figure 7.1. Adaptation of Linkage Model for research utilisation.

As can be seen from Figure 7.1, this model appears as a systematic flow for transferring knowledge through a series of well organised and easy-to-understand steps for researchers and practitioners to follow. The first step begins with identification of the nursing problem that needs to be solved in the clinical area. This step requires active communication between the nurses in their clinical areas to be able to assess and identify the problem and set well focused solutions. During this step, the value of communication and interaction between the nursing staff was highlighted as well as the need for research and development to inform and provide solutions, practices, and innovations. Communication channels between nurses and researchers are seen as key, not only to inform the innovation development process, but also as a means to enhance meeting the needs of the nurses and the institution, as well as enhancing nurses' own problem solving abilities (Havelock et al., 1971). From the perspective of the researcher, although the end of this step requires a thorough needs assessment and forms a solid foundation to a robust plan for solutions, the communication process with key informants might require their availability and readiness to provide information (nurses, educators, and managers in the clinical settings). As was clear in the current study, total Barrier and Facilitator Scores were significantly different across hospitals and one of the possible reasons was the different demographics of the nurses between the hospitals who were qualified to introduce change. The differences in demographics

between the hospitals provide a clearer picture as to why there are differences in the barriers and facilitators between these hospitals. This has, therefore, clearly identified the problem.

In the second step of the model, the researcher, who acts as a link, reviews the research findings related to the problem and evaluates its relevancy. Nurses in the current study believed that a variety of barriers would limit their ability to read and understand research such as time, authority, and more. Prior to applying this step, therefore, it was important to provide nurses with continuous and regular information to enable them to evaluate research relevancy for practice. Having identified the differences in demographics and related this to the barriers and facilitators between the hospitals, helps provide a clearer picture to enable a solution to be found.

The third and fourth steps require the researcher to involve resource systems such as practitioners and administrators to share with the decision making in implementing the solution or the new knowledge. In this current study, it was clear that nurses did not have time and lacked authority to implement new ideas. These are organisational factors related to workforce issues and culture which requires a solution at the administrative level as well as education of practitioners to work around these issues. Adding the relationship of the demographics to the barriers and facilitators provides possible strategies to address this.

In the fifth step, the researcher and the source systems evaluate the new knowledge which also needs a network of communication to decide and agree on the knowledge before the process of transferring and dissemination. This will lead to the final phase (steps six and seven) which involves the final decision in adopting, modifying or rejecting the new knowledge, and if adopted, the dissemination will take place. The implications of these research results and recommendations provide the solution to the problem.

It is clear from this therefore, that efforts should be placed in developing a foundation of systematic integration and create a collaborative and trusted linkage between researchers, practitioners, and managers to ensure that utilised knowledge is relevant and useful (Estabrooks et al., 2006). The researcher believed that preparing this foundation for applying any model will take time to address the issues identified, such as facilitating a research culture, educating nurses, providing support to attend education sessions, increasing the workforce and changing the culture to encourage nurses to be more autonomous. The linkage model was, therefore, chosen for its strengths to guide the study with its role in utilising the new knowledge in nurses' work settings.

It was argued in Chapter 2 of this thesis that the linkage model encompasses a knowledge flow system, where knowledge moves in a system involving individuals, groups, institutions with shared values and problems. The model also involves knowledge transfer process which relies on the interaction between the user and the resource system. This model has, therefore, guided and enriched the understanding of the correlations and enabled the researcher to follow a psychological map to draw the associated variables related to the current study, while maximising the researcher's understanding of complex phenomena. This theoretical framework has, therefore, proved very useful in developing recommendations from reviewing the research results.

In preparing and conducting the study, the theoretical framework used allowed a rich discussion with participants as it connected and linked the necessary parts to utilise research, nurses, resource system, mechanism of interaction, and mechanism to transform and disseminate the new knowledge to the user system. This provided a platform generating further questions and led to an in depth justification. For example, in the present study the lack of time and authority were influencing nurses' abilities to apply research. Thus, most of the participating nurses' reasoning, when asked, indicated factors related to work place regulations, policies or limitations. This has led to the

conclusion that hospitals, as work place settings, have an overriding influence on the nurses' ability to read and apply research and consequently their behaviours to work according to the resources provided. Undertaking research in a different cultural setting may create added cultural dimensions that are not able to be incorporated into a theoretical framework. In this study, however, the actual framework incorporates culture as part of Step one and two and therefore was not identified as an issue with this model. How effectively the problem identification is undertaken, however, depends on the research questions and detail of the survey tools used. More specifically and for this study, the demographics and analysis process. More information could always be gathered. There is therefore the need for a process to ensure that all possible data is gathered. This model does not provide that process. The theoretical framework could be enhanced by the use of something like soft systems methodology (Checkland & Schole, 2001).

Other research in this area of exploring barriers to research utilisation has used mainly Rogers Diffusion of Innovations theory as their theoretical framework (Solomons & Spross, 2011). Most of the studies undertaken on this topic have not reported using any theoretical framework to guide this research.

7.19. Summary of the chapter

This chapter discussed the study results alongside existing evidence towards constructing the meaning from these results surrounding nurses' experiences in utilising research findings and applying evidence-based practice in health care settings in Saudi Arabia. The main barriers identified in this study included that nurses did not have the time or authority to implement research findings which are organisational issues and point towards the need for cultural change and workforce review. It was clear, however, that some nurses had positive attitudes to read, implement research in their daily care and that hospitals had a research culture to support this.

To conclude, this study confirmed that evidence-based practice and research utilisation was not documented and varied across hospitals with a variety of demographics between the hospitals that had various influences on the barriers to and facilitators of research utilisation. The final chapter takes the key results forward to suggest and recommend various strategies towards applying research findings and developing evidence-based practice across hospitals, in addition to enhancing nurse education and the nurses' role in providing in-sessional courses locally in each of these hospitals.

Chapter 8: Conclusion and Recommendations

8.1. Introduction

The previous chapter presented a synthesis of the research results from this study which was used as a catalyst to explore the study insights in terms of the literature. These results provided a unique nursing perspective on utilising research in nursing practice in Saudi Arabia by situating this within the literature. However, this research has uncovered the barriers and facilitators, and nurses have disclosed their opinions providing a clear picture on which the researcher was able to build a robust plan to introduce the change and convince nurses in all positions to encourage this change process starting from identifying needs to applying the research findings.

8.2. Strengths of the study

The quantitative study methodology used in this study was one of the most important strengths which facilitated measurement of nurses' responses more accurately and thereby assisted in achieving the aim of this study. This together with sample size contributed to a solid data set. In addition, the reliability of the questionnaire used had been tested by other researchers.

One of the greatest strengths of the study was the sample size (1824) and the fact that this accounted for 86% of the total eligible nurses (2650). In addition, recruiting nurses from five general hospitals was another strength. This is especially the case when comparing this to the sample size (413), response rate (34%) and site (National Guard Health Affairs Hospital) that was achieved with the other similar research undertaken in Saudi Arabia (Omer, 2012). This indeed resulted in a more comprehensive sample size that was then used to extrapolate the variables and gave a more realistic perspective of nurses' barriers and facilitators to research utilisation. The fact that there were diverse groupings within the data set permitted an investigation of the demographic effects on

barriers and facilitators to research utilisation. This then gave a much more detailed explanation of the effects of demographics on barriers and facilitators to research utilisation. In addition, this contributed much to filling the gap that existed in the literature on its own merit.

Another strength was the fact that the researcher provided his personal contact details so that nurses were able to ring and ask about any questions before giving answers. This was a very important step taken to make sure that nurses' responses reflected their true meaning. This part of the study with the rigorous pilot testing was effective to gather more reliable and rich data, and avoid any misunderstanding of the responses because of the misinterpretation of such items. This indeed was necessary to facilitate and encourage participation of nurses and consequently increasing the response rate.

8.5. Limitations

Even with all these advantages and strengths, the study faced some limitations which were influential to the original design and scope of what the researcher initially anticipated. The variation of cultures within nursing society in Saudi Arabia with their different qualifying countries potentially affects the way they work in their settings and ultimately the way they answered the questions.

In addition, the fact that there were a number of different groupings that were used in the analysis of the data may have diluted the results somewhat. Some of these groups in the demographics had only a small sample size which may have influenced the outcome of the analysis and interpretation of the results.

Understanding the questions has also been identified as a limitation. The group of nurses that participated in this research predominantly had English as their second language. Their understanding of the English language may have varied somewhat. This in turn may have affected their understanding of what the questions in the survey were

asking. It could also be argued that some of the items in this questionnaire were unclear and potentially ambiguous. This may have affected their understanding and therefore response to the items. It could be assumed from the results, for instance, that some of the participants may have responded with the same opinion to all items rather than questioning each individually. This in turn may have affected the results.

It may have been useful to have also collected in the demographic part of this research how much research education the participants had received in their nursing education program. This would have added a deeper understanding of the different qualifications received. Alternatively, documentary analysis on the nursing curricula regarding the amount of research content taught in the different universities could have been undertaken. In an attempt to address this, all nursing schools in Saudi Arabia were contacted and followed up by the researcher to obtain the required data with. None of the university provided the necessary information to make this assessment.

Another limitation is the use of a convenience sample which limits the generalisation of the findings to other populations outside the study therefore the results may not be representative for all nurses in Saudi Arabia. However, the sample size was large compared to other studies conducted in Saudi Arabia (Aboshaiqah et al., 2014; Omer, 2012). Other limitations may include the use of a self-reported questionnaire as it is often difficult to assess or avoid response biases due to poor understanding of the questionnaire items, or participants' answers as per perceived socially desirable responses. However, for this study for both the barriers and facilitators survey items the frequency of 'no opinion' results compared with results for the 'moderate to great extent' were low. A further limitation was the fact that the questionnaires were only distributed to hospitals is one city in Saudi Arabia. This may not therefore be representative of other areas in Saudi Arabia.

8.6. Implications for practice

It is acknowledged in the literature that a definitive solution to how best to implement and sustain research utilisation remains to be found (Akerjordet, Lode & Severinsson, 2012). Building of nursing research capacity is acknowledged as a means of overcoming barriers and promoting use of research in practice (Fink et al., 2005). Other suggestions in the literature have been strong and visible leadership, organisational requirements and supportive infrastructure for building research capacity (Newhouse, 2007; O'Byrne & Smith, 2011).

The study informs and offers an evidence base for nursing education in Saudi Arabia, identifying the aspects about barriers or facilitators to conduct and apply research in nursing practice as well as the need to improve research and reading skills to facilitate interpreting research. This could be achieved through a number of strategies such as through regular in-service sessions that specifically apply research evidence to practice through case studies. These sessions could also include discussion of research methodology, research results, and debates on topics using research findings. Promote research culture by distributing research articles and research summaries that provide evidence to guide clinical problems, and journal clubs. Other strategies include encouraging nurses to attend conferences by providing them with financial incentives to attend. Another strategy is organising conferences that presents evidence in the hospitals. Other approaches to facilitate research application in nursing practice include updating policies and procedures used by nurses based on best available evidence so that they are research based. Similarly, encouraging staff within hospitals to undertake research through links with universities, such as joint appointments and providing financial incentives to undertake research with recognition of this research (Almalki et al., 2011a). In addition, encouraging nurses to be part of this research will assist in the application of research in nursing practice.

The other big issue identified in this research was nurses not having the time to implement new ideas. This can only be addressed by increasing the workforce and changing the nurse patient ratio to enable nurses to have more time, not only while on the ward but also to facilitate in-service and conference attendance. Increasing the workforce sounds easy enough but in reality is more difficult to achieve. Recruiting nurses locally and more from the Western region with masters' qualifications may assist with developing a research culture and encouraging research utilisation. Certainly ensuring that the managers in the hospital at every level have a Masters qualification will help provide the necessary leadership to facilitate a research culture. Furthermore, having a research culture should be part of the mission statement of the hospital to further encourage this cultural shift.

Authority to make changes was identified as a major barrier by the nurses who participated in this research. To change this would require a major cultural shift not only with nurses but also with doctors and within the organisation. This would require extensive education locally and within nursing and medical curricula as well as changes in the policy and procedures within the hospital to support this.

8.7. Implication for nursing education

Making available research results together with improving nurses' skills to understand these findings need to be reinforced throughout nursing education programs and within individual organisations as a cornerstone of best practice. Appropriate education of nurses and health care professionals to better prepare the workforce to nurses' needs to apply evidence practice in their settings is crucial. This could be achieved by providing research education that specifically develops nurses' abilities and skills to read, understand, and interpret research. Universities and other institutions that educate nurses need to ensure that this research education is in their curricula. This could be addressed by ensuring that the accreditation standards for these nursing

programs specify this. Nursing Boards and Colleges of Nursing need to be informed of the need to implement such standards. This could be achieved by ensuring that the results from this research are disseminated through publications and conference presentations, locally and internationally. This education of nurses on research utilisation would then be continued at the hospital level through the measures identified previously.

8.8. Implications for future research

Strategies to build nursing research capacity, like those identified above, need to be researched for effectiveness in increasing research utilisation of nurses. In the short term, therefore, an intervention study could be undertaken that would include many of the factors identified under practice implications above. A follow up questionnaire could then be undertaken to assess if this had made any differences in research utilisation.

Further research is also essential to completely comprehend the issues raised from this research study. For instance undertaking a more in-depth study in order to explore nurses' perceptions of the barriers to research utilisation and strategies they believe would help. This would be through focus group interviews with nurses from all levels of practice.

Correspondingly, a thorough evaluation of curricula content for research through document audit or questionnaire sent to nursing program coordinators is another important study to be undertaken to understand some of the issues raised from this research study. This could be followed by a report of the results from this study that highlights the need for education on research to assist nurses.

8.9. Conclusion

Evidence-based practice is considered an important factor in improving the quality of nursing care. The practice of EBP is influenced by a number of factors

including the source of evidence, the practitioner's experience and the desires and expectations of those being served and cared for. Research utilisation and application are essential in promoting and providing a comprehensive database of EBP for all fields, including nursing. As EBP continues to develop it demands more responsibility from nurses to include it in their everyday practice. There is only one previous study from Saudi Arabia that has explored the barriers and facilitators to research utilisation.

The aim of this study was to examine the perceived barriers to and facilitators of research utilisation among nurses in five hospitals in the Riyadh region of Saudi Arabia.

This study used a cross sectional descriptive design using a combination of questionnaires, including demographics, barriers and facilitators scales. All nurses from five hospitals were recruited. A total of 1,824 nurses completed the questionnaires.

The results indicated that the majority of the participants were female, with an average age of 20 to 40 years, with a Bachelor qualification, 6 to 10 years of experience, expatriate mainly from the Philippines and clinical nurses. There was a difference in the demographics between the five hospitals. The major barriers identified were insufficient time to implement new ideas, lack of authority, unclear practice implications and not having time to read. These are predominantly organisational factors. There was a difference in barriers scores between the five different hospitals. Nurses who had a Masters and were nurse educators had the highest barrier scores.

The major facilitators identified were advanced education, providing colleague support, conducting more clinically relevant research and employing nurses with research skills. Nurses who had a Masters qualification, were nurse educators, had more experience and came from Western region had the highest facilitator scores. There were differences in facilitators to research utilisation between the five different hospitals.

Lastly, the majority of the nurses believed that there was a research culture in their hospital, subscribed to journals and read articles. All hospitals undertook in-service

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education sessions for their nurses with varying ability of nurses to attend between the hospitals. There was also a difference between the different hospitals in relation to research activities.

Much of the literature confers with the demographics. These results however extend much of the literature regarding correlating the demographics with the barriers and facilitators to research utilisation. There is also little in the literature on such a detailed analysis of the facilitators. This study had a large dataset with which to undertake numerous correlations with which has not been undertaken before to the extent that this study did.

The results from this study point to the need for a range of strategies to assist nurses overcome the barriers and use the facilitators for research utilisation. In addition, there is a need to foster more of a research culture in hospitals, increase the workforce and autonomy of nurses to implement research findings. Further research to assess these interventions would be useful to assess their effectiveness.

The limitations of this study could be viewed as the fact that there were a number of different groupings which may have diluted the results. Understanding the questions could also be identified as a limitation as the group of nurses that participated in this study predominantly had English as their second language. This may have affected their understanding of what the questions in the survey were asking.

This study indeed was one of the first studies conducted in Saudi Arabia that provided nurses' views on their experience in utilising research in their practice. Nurses are an important part of the healthcare workforce. The study has uncovered the barriers to applying research providing a solid ground for approaching the other parties and developing strategies to introduce evidence-based practice and make it workable in Saudi Arabia health care institutions. It became obvious that research and evidence-based nursing could be enhanced by providing more education to nurses and preparation

with institutional agreements to offer suitable environments to develop and apply
evidence- based best practice in Saudi Arabia.

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Appendix A. The Socio-demographic Survey

1. Age:

( ) 20-30 years ( ) 31-40 years ( ) 41-50 years ( ) 51-64 years

2. Sex:

( ) Male ( ) Female

3. Nationality:

( ) Saudi ( ) Philippines (   ) India   (   ) South Africa (   ) Jordan ( ) Pakistani ( ) Egypt

(   ) Australia   (   ) US   (   ) Canada (   ) Malaysia   (   ) Lebanon   (   ) UK

( ) other ……………………………………..

4. Hospital name:

( ) Alyammah Hospital

( ) Prince Mohammed bin Abdulaziz Hospital

( ) King Fahad Medical City

( ) King Sulman Hospital

( ) King Faisal Specialist Hospital & Research Centre

5. How many years have you been a nurse?

( ) 2-5 years ( ) 6-10 years ( ) 11-15 years( ) 16-20 years ( ) 20- and over

6. **Of these years of nursing experience, how many have you spent practicing in Saudi Arabia?**
( ) 2-5 years ( ) 6-10 years ( ) 11-15 years ( ) 16-20 years ( ) 20- and over

7. **What nursing qualifications do you hold?**

( ) Diploma   ( ) Bachelor ( ) Master.

8. From which country do you hold the qualifications?

( ) Saudi ( ) Philippines (   ) India   (   ) South Africa (   ) Jordan ( ) Pakistani ( ) Egypt

(   ) Australia   (   ) US   (   ) Canada (   ) Malaysia   (   ) Lebanon   (   ) UK

8. In the last 12 months have you participated in any education concerning research utilization?

Yes ( ) No ( ) If yes please estimate how many hours education you have received in

Research………………..

What was the nature of this education?

…………………………………………………………………..

9. Does your hospital have a research culture Yes （) No ( )

10. Do you read any nursing journal?   Yes ( ) No ( )

11. Do you read any nursing articles? Yes ( )   No ( )

12. Have you participated in any journal clubs? Yes ( ) No ( )

13. Have you undertaken or participated in any research projects? Yes ( ) No ( )

14. Does your ward/unit have regular inservice education sessions?   Yes ( ) No ( )

15. Are you able to attend these sessions? Yes ( ) No ( )

If not, why

………………………………………………………………………………………………

16. Do you have to undertake any mandatory competencies, eg CPR Yes （   ) No (   )

What are they

………………………………………………………………………………….

17. Have you attended any conferences? Yes ( ) No ( )

18. Are you provided with any financial support to attend these? Yes (   ) No ( )

19. Are you provided with any leave support to attend these? Yes (   ) No ( )

20. What is your current position in Saudi Arabia

(   ) clinical nurse   (   ) Nurse manager   (   ) Nurse educator

21. How many years' experience have you had in this position within the current hospital?

(   ) < one year   (   ) 1-2 years   (   ) 3-5 years   (   ) 6-7 years   (   ) 8-10 years   (   ) > 10 years

Thank you for taking the time to complete this survey

Appendix B. Permission to Use the Barriers Scale

FROM: Sandra G. Funk, PhD.

                       Professor and Associate Dean for Research

                       School of Nursing

                       University of North Carolina at Chapel Hill

                       sfunk@email.unc.edu

RE: Use of the BARRIERS Scale

You are free to download and use the BARRIERS Research Utilization Scale for your research. The instrument is copyrighted (c. 1987, Funk, Champagne, Tornquist & Weise) and may not be duplicated or copied without first submitting a signed copy of this permission form to Dr. Funk. Requests for any changes or alterations to the instrument should be made in writing to Dr. Funk. As with all revisions, the copyright will be retained by Funk, Champagne, Weise and Tornquist and must appear on the printed copies of the instrument.

By filling in your name, address, phone number, and e-mail address and signing the agreement use below and mailing it to Dr. Funk, you are hereby given permission to use the BARRIERS Scale for your research. The permission is valid only for the study named below.

Dr. Funk requests that you send back the following information:

- your raw BARRIERS data in ASCII format for our reliability and validity bank
- copies of any changes or translations of the scale
- copies of any publications citing the use of the scale

When using the BARRIERS Scale you need to use the following reference:

Funk, S. G., Champagne, M.T., Wiese, R.A., & Tornquist, E.M. (1991). BARRIERS: The barriers to research utilization scale. Applied Nursing Research, 4(1), 39-45.

.

AGREEMENT TO USE THE BARRIERS SCALE

I agree to the above conditions for using the BARRIERS Scale

Name: Mohammed Saleh Almalki

Title: Nursing PhD Candidate at RMIT University

E-mail: S3415593@student.rmit.edu.au

Address: unit 2/22 knight street clayton south melbourn

Vic 3169

Academic/business affiliation: RMIT University

Phone Number: +61411643665 , +9966555206355

Study Title: Barriers to and facilitators of research utilisation among nursing in Saudi Arabia

Signature   Date : 15/12/2014

Please keep a copy of this form in your files. For students, signing this form and mailing it to me should serve as permission to use this scale for your research report, thesis or dissertation.

Mail to:

Sandra G. Funk, PhD

School of Nursing

Carrington Hall, CB# 7460

University of North Carolina – Chapel Hill

Chapel Hill, NC 27599-7460

Appendix C. Barriers and Facilitators to Using Research in Practice

Articles in nursing journals indicate that nurses in practice do not use the results of research to help guide their practice. There are a number of reasons why this might be. We would like to know the extent to which *you* think each of the following situations is a barrier to nurses' use of research to alter/enhance their practice.

If you currently hold a position in a clinical site, *please answer the questions in relation to your current work setting*. If you do not currently practice, *you may refer to your last clinical experience or provide your general perceptions*

For each item, circle the number of the response that best represents your view. Thank you for sharing your views with us.

THIS BARRIER

	To no extent	To a little extent	To a moderate extent	To a great extent	No opinion
1. Research reports/articles are not readily available	1	2	3	4	5
2. Implications for practice are not made clear	1	2	3	4	5
3. Statistical analyses are not understandable	1	2	3	4	5
4. The research is not relevant to the nurse's practice	1	2	3	4	5
5. The nurse is unaware of the research	1	2	3	4	5
6. The facilities are inadequate for implementation	1	2	3	4	5
7. The nurse does not have time to read research	1	2	3	4	5
8. The research has not been replicated	1	2	3	4	5
9. The nurse feels the benefits of changing practice will be minimal	1	2	3	4	5
10. The nurse is uncertain whether to believe the results of the research	1	2	3	4	5
11. The research has methodological inadequacies	1	2	3	4	5
12. The relevant literature is not compiled in one place	1	2	3	4	5
13. The nurse does not feel she/he has enough authority to change patient care procedures	1	2	3	4	5
14. The nurse feels results are not generalizable to own setting	1	2	3	4	5
15. The nurse is isolated from knowledgeable colleagues with whom to discuss the research	1	2	3	4	5
16. The nurse sees little benefit for self	1	2	3	4	5
17. Research reports/articles are not published fast enough	1	2	3	4	5
18. Physicians will not cooperate with implementation	1	2	3	4	5
19. Administration will not allow implementation	1	2	3	4	5
20. The nurse does not see the value of research for practice	1	2	3	4	5
21. There is not a documented need to change practice	1	2	3	4	5

	To no extent	To a little extent	To a moderate extent	To a great extent	No opinion
22. The conclusions drawn from the research are not justified	1	2	3	4	5
23. The literature reports conflicting results	1	2	3	4	5
24. The research is not reported clearly and readably	1	2	3	4	5
25. Other staff are not supportive of implementation	1	2	3	4	5
26. The nurse is unwilling to change/try new ideas	1	2	3	4	5
27. The amount of research information is overwhelming	1	2	3	4	5
28. The nurse does not feel capable of evaluating the quality of the research	1	2	3	4	5
29. There is insufficient time on the job to implement new ideas	1	2	3	4	5

Are there other things you think are barriers to research utilization?

If so, please list and rate each on the scale:

30. _____	1	2	3	4	5
31. _____	1	2	3	4	5
32. _____	1	2	3	4	5
33. _____	1	2	3	4	5

34. Which of the above items do you feel are the *three greatest barriers* to nurses' use of research?
    Greatest Barrier _____Item #:

    Second Greatest Barrier ....Item #:_____

    Third Greatest Barrier ....Item #:_____

35. What are the things you think *facilitate* research utilization?

_____

_____

_____

_____

Appendix D. Facilitators to Research Utilisation

1. For each item, circle the number of the response that best represents your view.

Facilitator item	To no extent	To a little extent	To a moderate extent	To a great extent	No option
1. Increasing the time available for reviewing and implementing research findings	1	2	3	4	5
2. Conducting more clinically focused and relevant research	1	2	3	4	5
3. Providing colleague support network/mechanisms	1	2	3	4	5
4. Advanced education to increase your research knowledge base	1	2	3	4	5
5. Enhancing managerial support and encouragement of research implementation	1	2	3	4	5
6. Improving availability and accessibility of research reports	1	2	3	4	5
7. Improving the understandability of research reports	1	2	3	4	5
8. Employing nurses with research skills to serve as role models	1	2	3	4	5

2. Which of the above items do you feel are the three greatest facilitators of research

utilisation?

- Greatest Barrier _____   Item #:_____

- Second Greatest Barrier _____   Item #: _____

- Third Greatest Barrier _____   Item #: _____

Rajasekar S. Philominathan, P. Chinnathambi V. (2013). Research Methodology. Retrived on 9/1/2016 from http://arxiv.org/pdf/physics/0601009.pdf

Appendix E. Research approval from CHEAN

RMIT
UNIVERSITY

23rd December 2014

Linda Jones
Building 201 Level 6, Room 9
School of Health Sciences
RMIT University

Dear Linda

**BSEHAPP 38-14 JONES-ALMALKI Barriers to and facilitators of research
utilization among nurses in Saudi Arabia**

Thank you for submitting your amended application for review.

I am pleased to inform you that the CHEAN has approved your application for a period
of **15 Months** from the date of this letter to **23rd March 2016** and your research may
now proceed.

The CHEAN would like to remind you that:

All data should be stored on University Network systems. These systems provide high
levels of manageable security and data integrity, can provide secure remote access, are
backed up on a regular basis and can provide Disaster Recover processes should a large
scale incident occur. The use of portable devices such as CDs and memory sticks is
valid for archiving; data transport where necessary and for some works in progress.
The authoritative copy of all current data should reside on appropriate network systems;
and the Principal Investigator is responsible for the retention and storage of the original
data pertaining to the project for a minimum period of five years.

Please Note: Annual reports are due on the anniversary of the commencement date for all
research projects that have been approved by the CHEAN. Ongoing approval is
conditional upon the submission of annual reports failure to provide an annual report may
result in Ethics approval being withdrawn.

Final reports are due within six months of the project expiring or as soon as possible after
your research project has concluded.

The annual/final reports forms can be found at:
www.rmit.edu.au/staff/research/human-research-ethics

Yours faithfully,

**Dr Falk Scholer
Deputy Chair, Science Engineering & Health
College Human Ethics Advisory Network**

Cc   Student Investigator/s: Mohammed Saleh S Almalki s3415596 School of Health Sciences RMIT University
        Other Investigator/s: Amanda Kimpton School of Health Sciences RMIT University

Appendix F. Permission from Institutional Review Board (IRB)

Kingdom of Saudi Arabia
Ministry of Health
King Fahad Medical City
(162)

المملكة العربية السعودية
وزارة الصحة
مدينه الملك فهد الطبية
(١٦٢)

IRB Registration Number with KACST, KSA: H-01-R-012
IRB Registration Number with OHRP/NIH, USA: IRB00008644
Approval Number Federal Wide Assurance NIH, USA: FWA00018774

January 5, 2015
IRB Log Number: 14-364E
Department: External
Category of Approval: EXEMPT

Dear Mohammed AlMalki:

I am pleased to inform you that your submission dated December 30, 2014 for the study titled **'Barriers to and facilitators of research utilisation among nurses in Saudi Arabia'** was reviewed and was approved. Please note that this approval is from the research ethics perspective only. You will still need to get permission from the head of department or unit in KFMC or an external institution to commence data collection.

We wish you well as you proceed with the study and request you to keep the IRB informed of the progress on a regular basis, using the IRB log number shown above.

If you have any further questions feel free to contact me.

Sincerely yours,

Prof. Omar H. Kasule
Chairman Institutional Review Board--IRB.
King Fahd Medical City, Riyadh, KSA.
Tel: + 966 1 288 9999 Ext. 17540
E-mail: okasule@kfmc.med.sa

Appendix G. Permission from office of Research Affairs at King

Faisal Research Centre

مستشفى الملك فيصل التخصصي ومركز الأبحاث
King Faisal Specialist Hospital & Research Centre
Gen. Org. مؤسسة عامة

OFFICE OF RESEARCH AFFAIRS
MBC ⊠ 03, Fax 🖷 27894, Ext ☎ 32907

INTERNAL MEMO

TO:	Marinha Sofia Macedo, RN, BSN, PG, MSc EBHC © Nursing Research Senior Specialist Nursing Development Saudization Department	DATE:	24 Sha'ban 1436 11 June 2015
	Mohammed Almalki, PhD candidate S3415593@student.rmit.edu.au		
THRU:	Ammar Al Kawi, MD Acting Chairman, Research Ethics Committee Office of Research Affairs	REF:	ORA/0669/36
FROM:	Rana Moslimany, Pharm D, CCRP Member, Research Ethics Committee Office of Research Affairs		
SUBJECT:	Project # 2151 107 Barriers to and Facilitators of Research Utilisation Among Nurses in SA		

The above-referenced proposal was reviewed expediently by the Research Ethics Committee (REC) on 09 June 2015. It is my pleasure to inform you that the REC has recommended the proposal for approval as submitted; and I would like to take this opportunity to congratulate you on behalf of the Research Advisory Council.

Please be informed that in conducting this proposal, the Investigators are required to abide by the rules and regulations of the Government of Saudi Arabia, KFSH&RC, and the RAC. Further, you are required to submit a Progress/ Final Report by 09 May 2016; so it can be reviewed by the REC without lapse of approval. The approval of this proposal will automatically be suspended 09 June 2016, pending the acceptance of the Report. You also need to notify the ORA as soon as possible in the case of any amendments to the project, termination of the study, any event or new information that may affect the benefit/risk ratio of the proposal. Further, the Committee would like to remind you that the process of obtaining the Verbal Consent should be documented in the Investigator file of enrolled subjects. This should clearly specify:

1. The research subject' acceptance to participate in the study;
2. The project's RAC number;
3. The date the verbal consent was obtained;
4. The name and signature of the principal investigator/ delegate.

RAI/AK/GH
ORA
Form 11 (Rev. 09-27)   I.C. 202028   0669 2151 107 Mr. Mohammed Al Malki REC Approval   Printed by Reprographics KFSH&RC
                                                                                                    E. Mail: ora@kfshrc.edu.sa

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Appendix H. Project Information Statement

RMIT University

INVITATION TO PARTICIPATE IN A RESEARCH PROJECT

PARTICIPANT INFORMATION

Project Title Barriers to and facilitators of research utilization among nurses in Saudi Arabia

Investigators:	**Supervisors:**
Mr Mohammed Almalki (Nursing PhD Candidate) School of Health Sciences, RMIT University, Melbourne, Australia. Email:S3415593@student.rmit.edu.au	Dr Linda Jones, Senior Lecturer School of Health Sciences, RMIT University Melbourne, Australia Email: linda.jones@rmit.edu.au Dr Amanda Kimpton, Senior Lecturer, Chiropractic School of Health Sciences, RMIT University, Melbourne, Australia Email: amanda.kimpton@rmit.edu.au

Dear Participant,

You are invited to participate in a research project being conducted by RMIT University, Melbourne Australia. This information sheet describes the project in straightforward language, or 'plain English'. Please read this sheet carefully and be confident that you understand its contents before deciding whether to participate. If you have any questions about the project, please ask one of the investigators.

Who is involved in this research project? Why is it being conducted?

You are invited to participate in the above research project, which is being conducted by Mr Mohammed Almalki (PhD Candidate) of the Discipline of Nursing at RMIT University Melbourne, Australia. This project will form part of Mr Mohammed Almalki PhD thesis, and is being conducted under the supervision of Dr Linda Jones and Dr Amanda Kimpton.

Permission has been obtained from Riyadh Region Health Affairs Directorate (MOH) to conduct the research. The research has been approved by RMIT University Human Ethics Committee, Melbourne, Australia.

Why have you been approached?

As a professional nurse, you are invited to take part in a research study on Barriers to and facilitators of research utilisation among nurses in Saudi Arabia.

What is the project about? What are the questions being addressed?

This project aims will be to examine the perceived barriers to and facilitators of research utilisation among nurses in Saudi Arabia. The overall objectives of this research study are: to explain barriers and facilitators to research utilisation as perceived by nurses in Saudi Arabia, to explain the barriers and facilitators to research utilisation as experienced by nurses when involved in a research utilization implementation project and assess whether differences in demographics and role of the nurse influence the perception or experience of barriers and facilitators of research utilisation. The project will Demographic data will be collected and information about your qualifications .The questionnaire will take 15 to 20 minutes to complete. Contribute to promoting an awareness of the importance of an understanding of research utilisation among nursing staff in order to provide more effective and improved healthcare outcomes for patients in the Riyadh region of Saudi Arabia.

Some examples of questions include:

- ❖ What are barriers to nurse's use of research?
- ❖ What do you think may facilitate research utilisation?
- ❖ Is research information readily available?

You will have an opportunity to review the questionnaires prior to consenting to take part in the study. It is important to note that participation in this study or not will not impact on your employment at the hospital.

If I agree to participate, what will I be required to do?

Should you agree to participate, you would be asked to complete a questionnaire. Once completed kindly use the prepaid envelope provided with the letter and drop it in the return box located at nursing office. If you are currently on leave and received this letter by mail, kindly use the prepaid attached envelope and drop it to your nearest mailbox/office. Informed consent is implied by submission of the survey. You are encouraged to examine or browse through the questionnaire as it may aid in your decision to participate in the study.

What are the possible risks or disadvantages?

There is minimal risk associated with While your participation in the study, if you feel concerned about your responses to any of the questionnaire items or if you find participating in the project distressing in any way, you should contact Mr Mohammed Almalki as soon as convenient. Mr Mohammed Almalki will discuss your concerns with you confidentially and suggest appropriate follow- up if necessary.

What are the benefits associated with participation?

While there are no direct benefits for participating in this study, your participation will assist improved health outcomes by maximising research utilisation amongst nurses in Saudi Arabia and hence contributing to patient care and safety.

What will happen to the information I provide?

All information you provide and collected from the study will be retained confidentially. When recording data your privacy will be protected as any details of your identity are not released. Hardcopies of your information is kept securely in a locked filing cabinet in the researcher's office in Saudi Arabia and electronic data will be stored anonymously on the RMIT University database. Any information that you provide can be disclosed if (1) it is to protect you or other from harm (2) a court order is produced, or (3) you provide the researchers with written permission.The only individuals with access to the information you provide are the primary investigator and the project supervisors. The findings from this study may be presented at conferences or published in scientific journals. If this does occur, only aggregate data will be presented and under no circumstances will individual scores be reported.

You can gain access to information you provide by requesting this information from the researchers. The research data will be kept securely at RMIT University for a period of 5 years before being destroyed.

What are my rights as a participant?

At any time you have:

- The right to withdraw from participation at any time
- The right to have any unprocessed data withdrawn and destroyed, provided it can be reliably identified, and provided that so doing does not increase the risk for the participant.
- The right to have any questions answered at any time.

Whom should I contact if I have any questions?

If you have any questions, Please contact the researcher Mr Mohammed Almalki (PhD Candidate-Nursing and midwifery, School of Health sciences, RMIT university, S3415593@student.rmit.edu.au

Or supervisors at the following addresses Dr Linda Jones (linda.jones@rmit.edu.au) and Dr Amanda Kimpton (amanda.kimpton@rmit.edu.au)

What other issues should I be aware of before deciding whether to participate?

All issues have been outlined above and there are no others that you are required to be aware of.

Yours sincerely

Mr Mohammed Almalki

PhD Candidate Nursing and Midwifery, School of Health sciences, RMIT university S3415593@student.rmit.edu.au

If you have any concerns about your participation in this project, which you do not wish to discuss with the researchers, then you can contact the Ethics Officer, Research Integrity, Governance and Systems, RMIT University, GPO Box 2476V VIC 3001. Tel: (03) 9925 2251 or email human.ethics@rmit.edu.au