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Jordanian paediatric nurses' views on compliance with Standard Precautions: a qualitative study

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ABSTRACT

INTRODUCTION

Compliance with evidence-based Standard Precautions Guidelines (SPGs) among healthcare practitioners is essential to combat Healthcare Associated Infections (HCAI). However, it is widely understood that non-compliance with these precautions remains a common problem in paediatric nursing practice. Most existing studies into this problem have used quantitative methods. However, these studies have failed to explain noncompliant behaviour or address the issues that are specific to paediatric clinical areas.

AIM

This study is designed to investigate paediatric nurses' perceptions and experiences of infection control measures and to achieve a better understanding of the factors that influence nurses' compliance with SPGs.

METHODS

This qualitative study used an adapted constructivist grounded theory approach. The study was conducted in five Jordanian hospitals. Thirty one (n=31) qualified paediatric nurses from different paediatric areas were reccruited to the study. Data were gathered using face-to-face semi-structured audio-taped interviews, which were transcribed and coded through constant comparative analysis.

RESULTS

This study identified causes of enduring failure by nurses to comply fully with SPGs. Four themes emerged (Children are different; Nurses are human first; Limited professional status; The challenges of the working environment). Paediatric nurses claim to be willing to comply with SPGs, but sometimes fail to achieve this. Risk of exposure to microorganisms was perceived as a major factor in compliance. Paediatric nursing practice was seen as different to adult practice and nurses construed the need for SPGs differently.

DISCUSSION

A key issue is the fact that nurses were reluctant to see themselves as change-agents to improve practice. This resulted in problems with SPGs being well understood but not acted on. Nurse's prioritised compliance with the nursing culture in their specific clinical area, over more general principles of care, such as SPGs. Nurses did appreciate that compliance with SPGs was suboptimal and did sometimes criticise this situation. However, most nurses had a value system, which militated against the proper use of Standard Precautions and which served to diminish the influence of them.

IMPLICATION

The chief implication of this study is that infection control is unlikely to improve further until nurses feel empowered to initiate change. Nursing in this area of the world is essentially semi-professional in nature. Nursing needs to develop to become fully professional in its orientation so that nurses take full responsibility for their actions. Only when nurses see their actions and behaviour as fully their responsibility, will nursing issues such as this be properly addressed. Until this occurs, the imposition of rules and guidelines, documentation and policies, will not be sufficient to progress care in this important area of practice.

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ABBREVIATIONS

AIDS   Acquired Immune Deficiency Syndrome

CASP   Critical Appraisal Skills Programme

CDC   Centre for Disease Control and Prevention

C. difficile   Clostridium difficile

CIA   Central Intelligence Agency

CINAHL   Cumulative Index to Nursing and Allied Health Literature

DH   Department of Health

DHSSS   Duke Health and Safety Surveillance System Study

ECDC   European Centre for Disease Prevention and Control

EHKJ   Embassy of the Hashemite Kingdom of Jordan

GNRD   Global Network for Rights and Development

HBM   Health Belief Model

HAI   Healthcare Associated Infections

HCAI   Healthcare Associated Infections

HCWs   Health Care Workers

HH   Hand Hygiene

HIV   Human Immunodeficiency Virus

ICU   Intensive Care Unit

JCIA   Joint Commission International Accreditation

JNC	Jordanian Nursing Council
JNMC	Jordanian Nurses and Midwives Council
MoH	Ministry of Health
MRSA	Methicillin-Resistant Staphylococcus Aureus
NAO	National Audit Office
NHS	National Health Service
NICE	National Institute for Health and Care Excellence
NIs	Nosocomial Infections
PICU	Paediatric Intensive Care Unit
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
RCT	Randomised Clinical Trials
SPGs	Standard Precautions Guidelines
UK	United Kingdom
USA	United States of America
WHO	World Health Organization

CHAPTER One: INTRODUCTION

1.1 Introduction

Nursing care can sometimes cause unintentional harm to patients, for example, by causing exposure to Healthcare Associated Infections (HCAI). These infections are problematic in hospital environments worldwide, resulting in increased patient morbidity and mortality. According to the World Health Organization (2011:p. 22), "*Of every 100 hospitalised patients at any given time, 7 and 10 of them will acquire an HCAI in developed and developing countries, respectively*".

Compliance with evidence-based Standard Precautions Guidelines (SPGs) among healthcare practitioners is an important practice to combat HCAI. However, it is commonly understood that non-compliance with these precautions remains and negatively impacts on paediatric patients by increasing their hospital stay and exposing them to the complications of infections.

Many studies (Cutter & Jordan, 2004; Berhe et al., 2005; Golan et al., 2006; Darawad et al., 2012; Randle et al., 2013) conducted in this area have focused on compliance rates and predicting the factors that influence compliance with SPGs. These factors have provided valuable information on infection prevention and control; however, they still have not tackled the actual cause of non-compliance, nor have they explained the behaviour of Health Care Workers (HCWs) who continue to act in a non-compliant manner. There is a paucity of studies researching HCWs views on non-compliance.

Infection prevention in paediatric clinical areas is an important intervention aimed at protecting children from unintentional harm. The literature suggests that infection prevention programmes should consider the peculiarities of paediatric practice rather than assuming that enough commonality exists between adult and paediatric practice to

justify ignoring the differences. It is well understood that it can be difficult to secure compliance from children and sometimes also their parents Children may dislike being separated from others and be scared and fearful of professional wearing gowns and masks (Flinkman & Salanterä, 2004), as they fail to make the association between nurses' uniform and professionalism (Wocial et al., 2010). Children are also more active and their play can expose them and others to body fluids (Riet et al., 2014). Children do not understand the danger of micro-organisms and their parents may also be ill-informed on the dangers. This is important as parents play a more central role in the hospitalised child's care than visitors of adult patients. Given these clear differences, it is surprising that very few studies on SPGs compliance have been conducted in paediatric clinical areas.

1.2 Background

Generally, HCAIs are caused by the dissemination of microorganisms by health care professionals via their hands or via equipment (Oliveira et al., 2009). Therefore, HCWs, such as, physicians and nurses, can acquire infections by exposure to blood and body fluids during clinical practice; and can also transmit these infections to patients by poor hygiene practice.

The National Audit Office in England (NAO) (2009) outlined the most common microorganisms causing HCAI as being Methicillin Resistant Staphylococcus Aureus (MRSA) which causes bacteraemia, Clostridium difficile (C. difficile) causing severe diarrhoea and other intestinal pathology and Noroviruses which are easily spread and commonly cause gastroenteritis. The nosocomial pathogens reported among children are different from those reported in adults, as children, especially the young, are more susceptible to viruses and viral infections such as the respiratory syncytial virus which causes respiratory tract infections, notably bronchiolitis, and Rotavirus, which is the most common cause of gastroenteritis among infants and young children (Posfay-Barbe et al., 2008).

Healthcare associated infection is a major problem among paediatric patients in all departments and there is a higher rate of infection amongst those who require care in neonatal and Paediatric Intensive Care Units (PICU) (Sarvikivi, 2008). Staff in intensive care units such as PICU can acquire and pass on micro-organisms as a direct result of the invasive nature of their work (Grant, 2001; Vosylius et al., 2003). It is clear that compliance with infection control precautions such as hand hygiene and the use of protective barriers is vital in reducing the risks of cross infection (Fendler et al., 2002).

Healthcare professionals play a major role in the prevention and control of HCAI by following a set of evidence-based guidelines developed by the Centre for Disease

Control and Prevention (CDC). These guidelines were revised from the previous 'Universal Precautions' to Standard Precautions in 1996 (Siegel et al., 2007).

These Standard Precautions are designed to reduce the risk of contact with patients' blood and body fluids, in order to protect both patients and healthcare professionals. These precautions include hand hygiene, either by hand washing or alcohol hand rub, and the use of personal protective barriers such as (gloves, gown, mask and eye protection). They also include: respiratory hygiene (measures to decrease the transmission of respiratory illness, such as cough etiquette); the prevention of skin and mucous membrane exposure while handling patients' care equipment; environmental cleaning and disinfection; appropriate discarding of sharp instruments; and care of intravenous lines (Siegel et al., 2007).

The literature suggests that implementation of Standard Precautions may prevent around 30% of HCAI (NAO, 2009). Among the several components of Standard Precautions, hand hygiene is considered to be the most effective way of preventing HCAI (Abd Elaziz & Bakr, 2009). However, this does not mean that other precautions such as personal protective barriers (gloves, gown, mask, and eye protection) are not important. However, even though standards are in place to reduce the risk of cross infection (Siegel et al., 2007), health care providers worldwide do not always properly comply with them (Ward, 2010).

Historical evidence of compliance was outlined as the degree of personal adherence to standards (Haynes et al., 1979) and further studies worldwide have examined SPGs by healthcare professionals and reported low levels of compliance (Golan et al., 2006; Parmeggiani et al., 2010; Ward, 2010). Most of the existing studies have focussed on hand-washing compliance (Creedon, 2006; Abd Elaziz & Bakr, 2009; Randle et al., 2013), whilst others examined compliance in relation to the use of personal protective barriers such as gloves and gowns (Hinkin et al., 2008; Neo et al., 2012).

The reasons for non-compliance reported in the literature include: insufficient time (Ferguson et al., 2004; Sax et al., 2005); lack of protective equipment (Cutter & Jordan, 2004; Luo et al., 2010), lack of hand washing agents (Whitby & McLaws, 2004; Creedon, 2005); lack of knowledge (Ji et al., 2005; Kermode et al., 2005); lack of sufficient personnel (Nderitu et al., 2015); psychological factors (e.g. embarrassment associated with following the guidelines (Efstathiou et al., 2011a), and problems associated with not wanting to wear masks and gowns (Luo et al., 2010).

There is some evidence, that culturally derived belief systems can represent a barrier to the proper implementation of infection control standards. For example, the belief that children are too innocent and pure to be capable of transmitting a serious infection (Efstathiou et al., 2011a).

It is argued here that developing standards for infection control is not enough. Rather, it is necessary to develop an understanding of those factors that cause practitioners to choose not to comply with the standards. In this way an understanding and appreciation of what is required to achieve full compliance can be obtained.

There is some evidence to suggest that compliance with infection control measures is even more of an issue in paediatric practice (Randle et al., 2013). For example, Kirkland (2011) suggests that nurses may be reluctant to wear protective clothing for fear of making the child feel anxious or because of the belief that children are less likely to carry and transmit dangerous pathogens.

Gould and Ream (1994) outlined strategies to enhance compliance with SPGs, for example, improving nurses' awareness of infection control policy and reducing hand washing complications such as skin irritation. Ward (2006) recommended education and training of healthcare professionals, providing the required facilities to use protective barriers and hand washing, whilst, Hessels et al. (2016) highlighted the need to hire enough health care personnel for safe and effective care to be achievable. Despite these

insights it is widely accepted that compliance with Standard Precautions remains an issue.

To conclude, it is known that one third of HCAIs could have been prevented if Standard Precautions had been fully employed (NAO, 2009). It is clear that healthcare professionals' compliance with SPGs is the cornerstone of reducing HCAI.

Although Standard Precautions are effective in preventing infection, health care professionals do not always comply properly with these precautions (Giard et al., 2016). There may be purported arguments why staff are not always compliant, such as being too busy (Hessels et al., 2016) or having sufficient equipment available (Ferrer et al., 2009). However, these arguments should only be accepted as a last resort. It is necessary to understand why health care staff, particularly nurses, do not always strive to deal with the problems and issues that frustrate their attempt to provide quality care. Nevertheless, does this mean HCWs are making 'excuses' for poor practice or does the problem go much deeper than it appears to do? Nurses are essentially caring people (Ouzouni & Nakakis, 2012) and clarity is needed on why and how they put their patients at risk without becoming anxious or angry. It is clear that nurses who fail to comply with infection control practices, are not anxious or angry and appear satisfied with being able to blame poor care on others (Morrow et al., 2011). However, there is another problem here, for nurses are not just supposed to be caring, they are supposed to be 'professional' as well (Nursing and Midwifery Council, 2015). The professions are characterised by the acceptance of responsibility and accountability (Henderson, 1960; Ministry of Health, 1972; International Council of Nurses, 2002; Royal College of Nursing, 2003). It is hard, then, to accept nurses could be comfortable blaming others for the lack of soap, sinks, masks, etc. A professional nurse should insist on having the necessary equipment to carry out quality care rather than becoming angry and anxious (Monrouxe et al., 2014). However, are there other hidden reasons that have not yet been

note as otherwise non-compliance makes little sense when considering the available knowledge in this area?

The literature reports many factors that may affect compliance, and at the same time suggests strategies to improve compliance (Efstathiou et al., 2011b). Yet HCAI remains a serious problem worldwide and prevention strategies within healthcare settings need to be understood and given priority in order to ensure safe care provision (Ward, 2012).

1.3 Jordanian context

This section introduces the context in which this current work is based, including the historical background of Jordan, the current Jordanian healthcare system, nursing education and nursing practice in Jordan. It also describes some of the challenges to nursing practice in Jordan at the time of this study.

1.3.1   Historical background

The Hashemite Kingdom of Jordan (Jordan) is a small Arabian country in the Middle East. It is bordered by Saudi Arabia at the East and South, Iraq at the East, Syria at the North, and Israel-Palestine to the West CIA (2015). It is considered an upper middle-income country and covers a total area of 89,342 square kilometres (The World The World Bank, 2014). Jordan has an important geographic and political position in the Middle East. Despite political instability and even war in the neighbouring countries (e.g. Syria, Palestine and Iraq), Jordan is a relatively safe country (Foreign and Commonwealth Office (UK), 2016) and claims to offer a friendly and welcoming environment for international visitors (Kelly, 1998).

The total population of Jordan was estimated to be 9.531 million in 2015, the number of Jordanians was estimated to be 6.613 million, while the number of non-Jordanian was around 2.918 million (half of whom were refugees from Syria) (Jordan Population and Housing Census, 2015). The country is divided into 12 governorates. The capital is Amman city, in which live approximately 40% of the population. Other important cities are Zarqa, which is the second largest city and Irbid in the North. More than half of the population are under 24 years old, and around 34% are between 25 and 54 years old (Jordan Population and Housing Census, 2015).

In 1946, Jordan became an independent state, after gaining sovereignty from the UK. Jordan has been governed by a constitutional monarch since 1946 (currently King Abdullah Bin Al-Hussein) and its population is of 98% Arabic descent, 1% Armenian and 1% Circassian. Arabic is the official language; however, English is used as a second language and a language of instruction for many courses in Jordanian universities. The official religion in Jordan is Islam: 92% of the population are Sunni Muslims, and 1% Sufi or Shia. Christians make up 6% of the total population, and other religions make up the remaining 1% of the population (EHKJ, 2008). Religious practices in Jordan are conservative but relaxed (Kjeilen, 2009). Followers of other religions have the right to practise their faith and religion with a reasonable degree of freedom (EHKJ, 2008). The extended family unit is dominant in Jordanian culture; the elderly are highly respected, and family members are expected to support each other. This family structure is viewed as a cornerstone of the stability of Jordanian culture.

Jordan has limited natural resources and depends on being able to import crude oil, gas and refined products (Jaber et al., 2004), mostly from Saudi Arabia, Iraq and Egypt.

The Jordanian people value education, and the country has a number of respected universities. Jordan also has several distinguished scholars and experts in different fields (Zahran, 2010; Huneidi, 2014).

Tourism is an important factor in Jordan's economy, and the country possesses several important historical sites, including Petra, Jerash and Ajlun. Jordan is distinguished by having the lowest terrestrial area on earth, the Dead Sea. These sites attract many tourists from all over the world.

1.3.2   Healthcare system in Jordan

Jordan is well known for medical tourism and the excellent health facilities in the region (Editorial, 2016). Despite this, Jordan, like other developing countries, suffers from a

lack of hospital infrastructure related to its poor economic status. Nonetheless, Jordan has a good medical reputation and an excellent healthcare system in Middle East terms.

The quality of healthcare services in Jordan has improved dramatically during the last few years. For example, many modern private hospitals and clinics have been opened with high quality facilities and highly qualified staff (Oweis, 2005). In addition, many hospitals participate in national and international accreditation programmes to enhance the quality of patient care.

The Jordanian healthcare system consists of four major sectors: public, private, educational and military (Al-Hassan & Hweidi, 2004). The public sector includes 27 hospitals and many primary health care centres and provides the majority of Jordanian with healthcare at low cost (Mrayyan, 2005). There are two large teaching hospitals, which support the role of the public sector by providing healthcare to people from different geographical areas at a slightly higher cost than is available within the public sector. The private sector includes 56 hospitals and provides healthcare services for Jordanian and non-Jordanian people (Mrayyan, 2005). The military sector includes 11 hospitals and provides healthcare services for officers and other members of the Jordanian armed and the security services. Military hospitals can also provide care for civilians where it is seen fit to transfer them from the public sector; such hospitals also accept self-paying patients.

The Ministry of Health is the regulatory body for all Jordanian healthcare sectors. These sectors follow the general laws and regulations of the Ministry of Health. The Ministry of Health also develops policies and regulations that must be adhered to by all health care sectors in Jordan. The Ministry of Health in Jordan often designs policies and guidelines based on existing international policies developed by organisations such as the WHO. In pursuance of this, the Ministry of Health ensures that international policies

and guidelines are implemented in a form that is compliant with the cultural context and scarcity of resources in Jordan.

Health insurance covers approximately 70% of the Jordanian population. It is not totally free and service users pay monthly participation fees (Global Network for Rights and Development (GNRD)(2014). Jordanians may pay part of their treatment based on the level of insurance and the type of the healthcare sector they belong to. Patients who are insured in the public sector suffer from two main problems: hospital overcrowding and long waiting times for an appointment. In other sectors, service-users may face problems with the cost of treatment.

1.3.3   Nursing practice and education in Jordan

Until the beginning of the 1970s, nursing education in Jordan was at Diploma level, with courses were very clinically orientated. Physicians who were involved in designing the nursing curriculum and conducting the classroom sessions mainly led nursing education. Physicians also dominated the Jordanian Ministry of Health committees until the end of the 1990s and influenced many decisions concerning nursing practice at this time.

The first bachelor in nursing science degree was established in 1972 at the University of Jordan (AbuGharbieh & Suliman, 1992). By the mid-seventies, nurses qualified to bachelor level started to join the nursing workforce and nursing witnessed rapid development in education and practice (Zahran, 2010). However nurse education remained largely within the realms of the medical model until the 1990s (Shuriquie et al., 2007). After the closure of diploma programmes in 1998, entry to the nursing profession became limited to two programmes: the four-year Bachelor degree in the nursing science programme, graduates from which gained employment as qualified nurses, and the two-year Associate degree programme, graduates from which worked as

practical nurses. Many BSc graduates either became nurse leaders in clinical practice or continued their education through involvement in nurse education.

The first Jordanian Master's degree in Nursing was established in 1986. MSc Nursing programmes have continued to offer routes to specialization in nursing practice (Zahran, 2012). However, master's preparation for advanced roles is still 'informal' as there is no license arrangement for these roles in Jordan, much as is the case in the UK. However, graduate nurses in Jordan are free to pursue a career in teaching or in academia. While Jordan has only one doctoral programme in nursing (from 2005), many Jordanian graduates have pursued doctorial study outside Jordan.

Two professional bodies organise and regulate nursing practice and education in Jordan, the Jordanian Nurses and Midwives Council (JNMC) and the Jordanian Nursing Council (JNC). The JNMC represents nurses and midwives, and it issues nurses with the required license to practise. The JNMC also develops nursing standards to improve professional practice (Zahran, 2010).

The JNC was established to offer leadership at national level. The JNC develops strategies to regulate and enhance the nursing profession and designs policies to support education and practice development (JNC, 2015). An additional aim of the JNC is to regulate and promote nursing specialization and certification.

There are many challenges to improving nursing practice standards in Jordan. For example, nurses do not need to pass a national examination to work as registered nurses; they need only to be registered with the JNMC and registration is granted automatically on payment of the required fees. Applicants for registration do not need to have completed a course of study accredited by the JNMC. Consequently, many nurses' and administrators within hospitals and within the regulatory bodies are not highly educated. Furthermore, many qualified nurses migrate to Gulf and Western countries in search of improved working conditions, a higher salary, or to continue their graduate studies

(Zahran, 2010). The rationale offered by nurses migrating elsewhere revolves around poor working conditions in Jordan which are characterised by understaffing, long working hours, limited autonomy, conflicts with other HCWs, low pay, dissatisfaction with standards and high rates of burnout and turnover (Mrayyan & Acorn, 2004; Mrayyan, 2005; Oweis, 2005; Hamaideh et al., 2009). Furthermore, if nurses remain within Jordan they will tend to view their career prospects as limited, as even experienced nurses are viewed as only having slightly more status than that of new graduates (Mrayyan, 2007).

Nursing care for children in Jordanian hospitals suffers from a severe shortage of specialised paediatric nurses (Al-Ma'aitah & Gharaibeh, 2000). Nursing education in Jordan does not offer specialised training for paediatric nurses although the general nursing programme in Jordan does contain a theretical and practical component in paediatric nursing. Following registration, nurses obtain experience in paediatric nursing. After a few years experience, nurses may find a higher paid position, either inside or outside the country and so leave practice (Petro-Nustas et al., 2001).

Most paediatric nurses in Jordan are female, additionally mothers in Jordan always stay with their children when they are hospitalised. Jordanian culture largely considers taking care of children to be a female role, and it is culturally discordant for male nurses to be working on paediatric wards and this limits male nurses' opportunities within paediatric nursing (Zahran, 2010).

1.4 Statement of the research problem

It is accepted that the reliable use of Standard Precautions can prevent the transmission of HCAI and improve patient safety (Siegel et al., 2007). It follows that if there is poor adherence to Standard Precautions, the average length of inpatient care and the complication rate will be increased, and the cost of care will be increased (Sarvikivi, 2008). The generally understood causes of non-compliance with standard precautions are insufficient time, lack of protective equipment and hand-washing agents, lack of knowledge (Gould & Ream, 1994), and lack of enough personnel and psychological factors, such as the belief that children are too innocent to carry serious infections (Efstathiou et al., 2011a). Perhaps because of these barriers and even though the guidelines are simple to understand, compliance remains low in many clinical areas (Ward, 2012).

It is important to ensure that hospitalised children are protected from acquiring HCAI caused by non-compliance with SPGs by healthcare professionals (Purssell, 1996). However, the factors that could facilitate or inhibit such compliance among paediatric nurses are not well understood and are insufficiently identified in the research literature (Foster & Sabella, 2011). There is a need for a qualitative study that could enable a better understanding of the factors that affect nurses' compliance with SPGs in paediatric departments. Ultimately this study could help to address the question of why paediatric nurses sometimes choose to place sick children at risk and why they fail to strive for the necessary resources to implement standard precautions more uniformly. Nursing is widely regarded as a 'caring' role and the incongruity between this and nurses' choice to sometimes disregard standard precautions needs to be further explored.

1.5 Purpose of the study

The overall purpose of this study is to investigate how the experience of nursing children affected paediatric nurses' decision-making regarding compliance with SPGs. To do this it explores paediatric nurses' personal belief systems regarding compliance with standard precautions and how this relates to the nature and culture of nursing in Jordan.

1.6 Research question

The main research question to be addressed in this study is:

'Why do paediatric nurses sometimes fail to comply with SPGs, and how do they explain their behaviour?'

1.7 Thesis overview

This thesis is presented in six chapters. This current chapter outlined the study background, the relevance of the study and briefly described the Jordanian context. This chapter also presented the problem statement, the study purpose, and the research question.

In chapter two, a comprehensive review of the current literature is undertaken to identify the current understanding of the topic. The discussion identifies the gaps in the research literature and what still needs to be researched. Chapter three discusses the design and methods used for the study and the philosophical assumptions that underpinning it. The data collection and analysis procedures are also discussed along with ethical and trustworthiness considerations. Chapter four presents the results of the qualitative data analysis which identify the factors that influenced the paediatric nurse

participants' compliance with SPGs. Chapter five discusses the main key findings and compares them to those in the existing literature. Chapter six discusses the main implications of this study. Chapter seven presents a summary of the thesis and provides an overview of its contributions and limitations, and offers recommendations for practice and future research.

CHAPTER Two: LITERATURE REVIEW

It is widely accepted that paediatric nurses' compliance with the standard precaution guidelines is an important aspect of care and that the level of compliance continues to be a matter of concern. The purpose of this chapter is to critically review existing research on compliance with standard precautions and to identify areas where further study is needed.

The first part of this chapter is a background review of healthcare associated infections and the issues around minimising the incidence and impact of acquired infection in clinical areas. This section will discuss current infection control practice and the development of standard precautions guidelines.

The second part of this chapter is a systematic review of the literature. This reviews studies, which have addressed the question of why it is that paediatric nurses sometimes fail to comply properly with the standard precautions guidelines.

The literature is discussed in three sections as follows:

- Compliance with standard precautions guidelines;
- Factors that influence the compliance of nurses with SPGs;
- Methods used and areas where further study is needed.

2.1 Background review

This section offers a background review of healthcare associated infections and the impact these have. Infection control practice and development of SPGs will be discussed as the chief way in which the issue of healthcare associated infections is addressed in clinical practice.

2.1.1 Healthcare-associated infections and their impact

Healthcare Associated Infections (HCAI) are a major issue in clinical practice today. Healthcare associated infections increase patient morbidity and mortality and hence, are a major issue in every hospital in every country of the world (Ward, 2010).

HCAI definition and terminology

The Centre for Disease Control and Prevention (CDC) (2010), healthcare-associated infection refers to infections caused by a variety of both common and unusual microbes such as; bacteria, fungi, and viruses, which patients acquire while receiving medical care. The WHO (2011) refers to healthcare-associated infections as 'hospital'[1] or 'nosocomial' infection and which occurred in patients at a health care facility, and which were acquired during the in-patient period.

The CDC (USA) uses 'HAI' as the abbreviation of 'Healthcare Associated Infections'; this term is used instead of 'Nosocomial Infections' (NIs). Nosocomial Infections are defined as infections that develop in a hospital as a result of healthcare treatment and which occur within 48 hours of the patient's admission (WHO, 2011). There are many publications that use the same abbreviation, HAI, to describe healthcare associated infections, e.g. Istenes et al. (2013) and Flanagan et al. (2011). 'HCAI' is also used to describe Healthcare-associated infections and hospital-acquired infections (HAI) to describe Nosocomial Acquired Infections (or nosocomial infections). In the United Kingdom (UK), the Department of Health (2006) defined healthcare-associated infection as any infection acquired by a person as a result of medical treatment regardless of the infectious agent. The Department of Health (UK) additionally defines HCAI as infection acquired either in community or hospital settings, and as a result of

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[1] It is understood that nosocomial or health associated infections can occur in health facilities other than hospitals. However, for reasons of clarity, only 'hospital' will be referred to here unless it is necessary to refer specifically to other types of health care facility.

medical intervention. According to WHO (2011), HCAI is a general term that includes infections that affect patients either within the hospital setting or in any other care setting.

Researchers in Jordan still use 'nosocomial infections' [2] and 'hospital-acquired infections' interchangeably in their publications, but without the abbreviations HCAI or HAI (see Hassan et al.(2009) and Darawad et al. (2012)). According to Hassan et al., (2009), Hospital-Acquired Infections include those diseases that are contracted by patients while undergoing treatment for minor or major illnesses. Such infections are known to lengthen the stay of patients in hospitals in Jordan and have led to an increase in the cost of treatment in Jordan (Darawad et al., 2012).

Trends, and Patterns

Healthcare-associated infections are a serious, worldwide problem that affects patients, HCWs, and hospital services negatively. However, there is no clear indication of how many patients acquire HCAI. The CDC (2010) states that approximately one out of 20 hospitalized patients is affected by a HCAI. According to WHO (2011, p.22), "*Of every 100 hospitalised patients at any given time, 7 and 10 of them will acquire an HCAI in developed and developing countries, respectively*". The hospital-wide prevalence rate of HCAI worldwide is variously described as being about 3.0–20.7%, and the incidence rate is around 5–10% (Samuel et al., 2010). The high number of patients who acquire HCAI in hospital has been linked to the reluctance by the nurses to comply with the stipulated guidelines on infection control (Luo et al., 2010).

In the European Union, approximately 4.1 million patients acquire HCAI every year (ECDC, 2007), while in the United Kingdom alone, around 300,000 patients annually,

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[2] Nosocomia: from the Greek Nosos, meaning disease, and Komion (Komos), meaning 'to care for' or 'person caring'. The word 'Nosocomium' came to be used for 'hospital' in the mid nineteenth century. Strictly, however, the word 'nosocomia' is not limited to hospitals but to wherever and by whomsoever ill people receive care.

are affected with HCAI; this costs the National Health Service around £1 billion (NICE, 2013). In the USA, a multistate point prevalence survey was undertaken by Magill et al. (2014). The study found that in 2011, the number of HCAIs was 722,000 and which resulted in 75,000 deaths. This cost the US health service $5.7 billion each year (Cherry et al., 2012). In Africa, the prevalence of HCAI is estimated to be between 2.5% to 14.8% (Sethi et al., 2012).

According to a technical paper published by the WHO in 2010, the prevalence rate of HCAI in the period between 2004 and 2008 in some Eastern Mediterranean Region countries such as; Morocco, Jordan, and Tunisia, was between 12% and 18%.

As with other developing countries, the availability of data about HCAI or nosocomial infections is limited in Jordan, and there is no clear HCAI surveillance (WHO, 2011). A Jordanian surveillance-based study conducted by Khuri-Bulos et al. in 1999, measured the quality of care provided to patients within an intensive care unit, and compared nosocomial infection rates with the national rates of nosocomial infection in ICUs. This study was conducted in different intensive care units such as medical/surgical intensive care, neurosurgical intensive care, and an intensive care neonatal unit in one teaching hospital in Jordan. Khuri-Bulos et al. conducted a study over three years (1993-1995) and found that total infection rates ranged from 14.2 to 18.5 per 100 patients in neurosurgical ICU unit and 15.7 to 17.2 per 100 patients in medical/ surgical ICU unit, while the high risk nursery had a higher rate that ranged from 13.4 to 73.5 per 100 patients. Ventilator associated pneumonia and bloodstream infections were higher than 90th percentile for national rates in the high-risk nursery unit, while urinary tract infection was higher than 90th percentile in both neurosurgical and medical/ surgical ICU units. However, this was a single study and included only one teaching hospital, and so care should be taken in generalising the results to other hospitals in Jordan. In addition, the study is now rather old (1993 to 1995).

The National Audit Office in England (NAO) (2009), identified the most common microorganisms that cause HCAI as Meticillin-Resistant Staphylococcus Aureus (MRSA) and Clostridium difficile. MRSA causes bacteraemia (Pastagia et al., 2012), and Clostridium difficile (C. difficile) causes severe diarrhoea and other intestinal pathology (Guastalegname et al., 2014). These organisms are transmitted via direct contact either as a result of contact between patients, from fomites (faeco-oral route) or contact between patients and HCWs (Gould, 2011; Warrack et al., 2014)

According to Wichaikull (2011), MRSA is recognised as a serious problem worldwide, as is the main cause of antibiotic-resistant bacteria. C. difficile is a harmful bacterium transmitted by spores, and which causes severe diarrhoea. C. difficile is considered to be a major cause of morbidity and mortality. The spores spread very easily, and can survive outside the human body for long periods of time.

In the paediatric arena, viruses are a major cause of infections. Examples of such viruses include the respiratory syncytial virus, which results in bronchiolitis (Smyth & Openshaw, 2006); also Rotavirus, which is the main cause of gastroenteritis among infants and young children and which can cause severe diarrhoea (Posfay-Barbe et al., 2008).

The most commonly acquired types of HCAI are urinary tract infections (including those which are catheter-associated), surgical site infections (including MRSA), blood infections (related to using intravascular devices) and pneumonia (mostly ventilator-associated pneumonia) (WHO, 2011). Generally, HCAI originates from the dissemination of microorganisms by professionals via their hands or equipment (Oliveira et al., 2009). Healthcare workers, such as physicians and nurses, can acquire infections by exposure to blood and body fluids during clinical practices and can also transmit these infections to patients through poor hygiene practice. For example, HCAI can be transmitted from the surface of the professional's hands to susceptible patients,

during care such as bathing or dressing. According to the WHO, (2011), 50% of the cases of HCAI were acquired through dressing and bathing.

It is widely accepted that HCAI is a major problem that threatens the safety of patients and affects a significant number of patients worldwide. The impact of this problem can result in prolonged confinement to hospital, long-term disability, increased resistance of microorganisms to antibiotics, additional financial costs of treatment and mortality (WHO, 2011).

The highest risk of infection among patients and staff is reported to be in intensive care departments. This is due to the invasive nature of procedures, and the aggressive medical and surgical interventions undertaken there, such as bone marrow aspiration (Grant, 2001; Vosylius et al., 2003). Grant (2001) argued that more than 10% of infection cases are due to surgical procedures, while 20% are associated with aggressive medical procedures. Therefore, the risk of HAI was found to be directly related to the nature of the procedures that were used during care and the associated seriousness of the patient's condition.

HCAI is a major problem among paediatric patients in all departments, with a higher rate amongst those who require care in neonatal and paediatric intensive care units (Sarvikivi, 2008). According to Jelly and Tjale (2003), the higher number of HCAI in paediatric wards is mainly because many children are completely dependent on HCWs for their care, including the provision of meals, and are exposed to health-care staff for prolonged periods. This can translate to higher exposure to microorganisms when poor infection control practice does occur. It follows that compliance with procedures designed to reduce the risk of HCAI, such as hand hygiene and the use of protective barriers, is important in the fight to reduce the incidence of cross infection (Fendler et al., 2002).

2.1.2 Infection control practice and the development of Standard Precaution guidelines

Healthcare professionals play a major role in the prevention and control of HCAI by following a set of evidence-based guidelines. These guidelines have been developed and updated many times by the CDC in an attempt to prevent the transmission of pathogens in clinical settings. These guidelines were revised in 1996 when the term Universal Precautions was dropped in favour of Standard Precautions (Siegel et al., 2007). These guidelines are considered the foundation of infection prevention and control practice and are designed to reduce healthcare associated infections.

It is widely accepted that infection control practice is a critical issue and is required to reduce the incidence of pathogens being transmitted from patients to HCWs and vice-versa. Patient health and safety are a priority in healthcare settings; patients and staff should not be exposed to infection through poor practice from HCWs. According to NAO (2009), the implementation of what is already known in the area of infection control practice can reduce at least 30% of HCAI. In addition to the Standard Precautions, which can be considered to be general principles, there are many more specific guidelines available, which have been developed by different organizations around the world to improve infection control practice. Examples of organizations that have issued guidance are WHO, CDC, The National Institute for Health and Care Excellence (NICE), and the Department of Health (DH) in England. Examples of such guidelines include; WHO publications such as *Prevention of hospital acquired infections, a practical guide* (WHO, 2002), I*nfection control standard precautions in health care* (WHO, 2006), and *WHO guidelines on hand hygiene in healthcare* (WHO, 2009). Other guidelines include the 2007 *Guideline for Isolation Precautions: Preventing Transmission of Infectious*, published by Siegel et al. (2007) on behalf of the CDC. Furthermore, NICE (2003 and with later updates) has published clinical guidelines on the prevention of healthcare associated infection in primary and

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community care. Also, Pratt et al. (2001) has published national evidence-based guidelines for preventing healthcare associated infections. These guidelines were commissioned by the DH and were developed by a nurse-led multi-professional team, and are updated on a regular basis.

The principles of infection control are the same for adults and children, and there is no specific infection control protocol outlined for paediatric patients (Wichaikull, 2011). Despite this, the causative agents of HCAI in paediatric practice differ from those seen in adult care settings. There are also differences related to children having a less well developed immune system. Children also tend to have a different vaccination status and have different developmental, behavioural and emotional needs (Posfay-Barbe et al., 2008). These last have implications for the kind of interventions that are appropriate, for example, young children can be traumatized by being 'isolated' from their family (Jolley & Shields, 2009). These factors pose a challenge when trying to minimise the transmission of infection in paediatric settings. Children are not adults and their developmental and psychological needs should be considered whenever infection prevention and control policies are developed. A failure to do this may lead to difficulties in implementing policies in paediatric settings and to non-compliance.

The first set of CDC guidelines was introduced in 1970. These guidelines were published in a manual entitled 'isolation techniques for use in hospitals to assist general hospitals with isolation precautions', and were revised in 1983 (Garner, 1996). In 1987, a new version of these guidelines called 'Universal Precautions' was released by CDC, which suggested that HCWs should see every patient as potentially infectious. New isolation procedures were advocated, including Body Substance Isolation, which is based on the isolation of all potentially infectious body substances such as blood, faeces, urine, sputum and other body fluids from patients, whatever the infectious status of patients, and the use of gloves (Garner, 1996).

The guidelines were revised again in 1996 from Universal Precautions to Standard Precautions, and HCWs were advised to implement these guidelines regardless of patient diagnosis, in order to protect themselves and their patients from the risk of transmission of microorganisms from either recognised or unrecognised source of infection. These guidelines were to be applied where there was the potential for exposure to blood or other body fluids (except sweat) and whenever there was non-intact skin or mucous membranes (Siegel et al., 2007).

The Standard Precautions are designed to reduce the risk of contact with blood and body fluids of patients and to protect both patients and healthcare professionals. The standards include hand hygiene either by hand washing or rubbing one's hands with alcohol, and the use of personal protective barriers such as gloves, gown, mask and eye protection. They also include: respiratory hygiene (such as cough etiquette), the prevention of exposure to skin and mucous membrane while handling patients' care equipment; environmental cleaning and disinfection, the appropriate discarding of sharp instruments and care of intravenous lines (Siegel et al., 2007).

It is important that healthcare professionals implement all components of the Standard Precautions during their clinical practice, in order to avoid exposure to pathogens and transmission of pathogens to their patients. Among these precautions, hand hygiene and personal protective equipment are considered to be the most effective forms of intervention. For example, hand hygiene has been identified as the most important infection control precaution (WHO, 2009), while using personal protective barriers has been viewed as a fundamental tool to protect HCWs from exposure to blood and body fluids and reduce transmission of infections within healthcare environment (Neves et al., 2011).

It is widely accepted that hand hygiene is important to improve health care practice and reduce HCAI in healthcare facilities. The World Health Organization defined the five

key care moments when HCWs should use hand hygiene. These are; prior to touching a patient, after blood or body fluids exposure, after touching a patient, after touching the patient's surroundings, and the use of an aseptic procedures where appropriate (WHO, 2009).

Personal protective equipment such as gloves or gowns protects not only HCWs but also patients (CDC, 2011). These barriers should be used either alone or in combination to prevent contact with an infectious agent, blood, or body fluids that may contain infectious agents. Personal protective barriers include gloves for hand protection, gowns for the protection of both skin and clothes, masks to protect the mouth and the airway, and face shield and goggles for face and eye protection (Siegel et al., 2007).

2.1.3 Summary

At first sight, the problem of infection control in hospitals would seem to be solved. The problem has been identified and a solution found (the use of Standard Precautions). The solution would seem to be reasonably easy, and reasonably inexpensive to implement. This solution is relatively 'low-tech' and is intuitive, especially for doctors and nurses who are well-educated and able to learn. It is surprising then, that HCAI continues to be a problem in both developed and developing health care facilities around the world. At the same time, compliance with Standard Precautions remains suboptimal and the research literature is replete with concern for the association between lack of compliance and the prevalence of HCAI.

HCAI is an important problem for which there exists a simple solution. This solution is not just in the patients' interest but is as much in the interest of healthcare staff who are particularly vulnerable to these same infections because of their proximity to them.

It is clear that healthcare workers often fail to implement Standard Precautions, either fully or in part and that they often select which elements of Standard Precautions they

will implement, even though this puts their own health and the health of their own immediate family in jeopardy. Despite much research in this area, this issue remains perplexing and worthy of further study.

2.2 Systematic literature review

The systematic review is framed from the widely adopted work of Galvan (2006) and Bettany-Saltikov (2012). This systematic literature review explores and critically analyses existing studies on paediatric nurses' compliance with standard precautions. Existing material from the research literature is reviewed. The search utilised electronic databases, including: Cumulative Index to Nursing and Allied Health Literature (CINAHL), PsycINFO, Academic Search Premier, Medline via EBSCO, and Cochrane Database of Systematic Reviews.

The literature review is organised into the following sections:

- Compliance rates with standard precaution guidelines;
- Factors influencing nurses' standard precaution compliance;

There is also included, a discussion of the methods used and areas where further research is needed.

The focus here is on paediatric nurses working in Jordan. However, because there is very little research specifically on paediatric nurses or nurses in Jordan, the scope of the search was widened to include health care workers in Jordan and elsewhere – where such research was relevant to the focus of the study.

2.2.1 Description of the main Elements of the Systematic Review[3]

This briefly describes the process followed for the systematic review.

Framing of the Question for the Review

The question to be reviewed was framed in an explicit way so as to present structured, unambiguous, and clear questions prior to the commencement of the review process. The review question was clearly formulated and relevant studies identified. Explicit methodology was applied to summarize the relevant evidence and appraise the quality of the studies.

Identifying the Relevant Work

The relevant work on compliance with standard precautions by paediatric nurses was identified through extensive search of the research literature and from peer reviewed articles published between 2000 and 2016. The search strategy was confined to articles published in English. The identification of exclusion and inclusion criteria was undertaken with the provision of an appropriate rationale.

Assessment of the Quality of the Studies

The quality of selected studies was assessed by the use of a quality checklist and a critical appraisal guide. The suitability of studies was assessed in terms of the identified research problem and for the studies' potential to be useful in the making of informed decisions. Gaps in the research literature were noted.

The Critical Appraisal Skills Programme (CASP) checklists were used to evaluate the studies that met the search criteria. Specific CASP tools were used where appropriate (systematic review, qualitative studies). The Milton Keynes checklist (2002) was

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[3] The format for this section is taken from Galvan (2006)

employed according to the type of research involved, for example, mixed methods and cross sectional quantitative studies (see quality appraisal tables 2.5-2.7 in section 2.4.2).

Summary of the Evidence

A narrative summary was used to present the evidence. Meta-analysis was not employed because the reviewed studies were too methodologically heterogeneous.

Interpretation of the Findings

As the last step of the systematic review process, the key findings of the reviewed studies were discussed and explored in relation to their usefulness with regard to the research question and the degree to which the findings informed the present study, including its purpose, design and methods.

2.2.2 Systematic Review Objective

The objective here was to identify and review suitably robust studies that had focussed on the reasons why health care staff sometimes knowingly elect to be non-compliant with standard precaution guidelines. The focus was on paediatric areas but studies in other areas were reviewed where appropriate.

The review of the literature was purposed to guide the focus, design, and methods adopted in the research study described later in this document. The review identified where further study was required.

The review was 'systematic' in that it was presented in an auditable manner, with a fully transparent search and selection strategy.

2.2.3 Systematic Review Question

The review question was developed using the PICO framework, where:

P   represented 'population', consisting of Jordanian qualified paediatric nurses;[4]
I   represented 'focus of interest', the reasons why paediatric nurses sometimes chose non-compliance with standard precautions;
C   represented 'comparison', not used in this systematic review;
O   represented the 'outcome or evaluation', which was the achievement of compliance with standard precautions.

To be clear, the literature review sought to answer the question: 'why do paediatric nurses fail to comply properly with standard precaution guidelines, and how do they explain their decision to practice in ways which leave themselves and others open to the risk of infection?'

The initial search found that in all countries there were only a few studies conducted in paediatric areas. It is not surprising therefore, that no Jordanian paediatric studies were found. It was therefore necessary to open the search to identify studies conducted in non-paediatric areas and outside Jordan. These studies were used where it was thought that they were applicable or relevant to paediatric infection control practice.

2.3 Literature Review Search Strategy

A systematic search strategy was employed. The literature was searched using a step-by-step approach. The search process was documented (see below) in a manner that would allow another researcher to obtain the same results.

The literature search was carried out between January 2013 and July 2016. Studies published from 2000 were included in the search.

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[4] The focus here is on paediatric nurses working in Jordan. However, because there is very little research specifically on paediatric nurses or nurses in Jordan, the scope of the search was widened to include health care workers in Jordan and elsewhere – where such research was relevant to the focus of the study.

2.3.1   Searches for Previous Systematic Reviews

As recommended by Galvan (2006), a search of existing systematic reviews was conducted prior to the search for individual studies in order to ascertain whether reviews had already been conducted. This was done to avoid unnecessarily repeating work undertaken by other researchers. It was found that there were no systematic reviews on Jordanian paediatric SPGs compliance. However, systematic reviews which focused on non-paediatric areas were found to exist. These were reviewed (see below) even though caution needed to be taken because of differences that may exist between adult (for example) and paediatric clinical areas in relation to compliance with SPGs.

The following systematic reviews are discussed in the literature review:

Erasmus et al. (2010), Gammon and Gould (2005) and Gammon et al. (2008) are discussed in the 'compliance with SPGs' section;

Loveday et al. (2006), Naikoba and Hayward (2001), Ward (2011), Neo et al. (2012) and Smiddy et al. (2015) are discussed in the 'factors that influence compliance' section.

2.3.2   Electronic databases and other resources

The following electronic databases of health-care literature were used - (CINAHL, PsycINFO, Academic Search Premier, Medline via EBSCO, and Cochrane Database of Systematic Reviews). A manual search was made of the studies included in the retrieved articles.

The following websites were used – The National Audit Office (NAO) website: www.nao.org.uk, The Centre for Disease Control and Prevention (CDC) website:

www.cdc.gov, The World Health Organization (WHO) website:
http://www.who.int/countries/gbr/en/).

Unpublished studies were located by writing to experts in the field. Published and unpublished theses and dissertations were retrieved from the EThOS website.**Search parameters and techniques**

Aveyard (2014) argued that the appropriate selection and use of primary words, which would ensure the right articles are retrieved ought to be used with critical consideration of the review question. The search strategy was developed using the following key words: "infection control measures", "standard precautions", "universal precautions", "hand hygiene", "hand washing", "hand disinfection", "personal protective equipment", compliance, non-compliance, barriers, facilitators, paediatric nurses, paediatric ward, "nosocomial infection", "healthcare associated infections".

The key words were based on the components of the review question. The reviewer identified synonyms to provide a comprehensive search that covered the different concepts derived from the literature. Truncation was used by adding an asterisk (*) after the key words. For example: nurs* would retrieve: nurse, nursing, nursery. Also, Wildcards were used to search for terms with more than one spelling (for example in English and US spelling). In this way, p#ediatric would retrieve: paediatric or pediatric. To widen the search results OR in combination was used, and to narrow the results AND was used.

Search strategy one

Combination of the main concepts in the review question:

Concept one "standard precaution*" OR "universal precaution*" OR "infection control" OR "infection prevention" OR "hand hygiene" OR "hand washing" OR "washing

hands" OR "hand disinfection" OR "protective equipment" OR "protective barrier*" OR PPE

AND

Concept two "healthcare associated infection*" OR "hospital acquired infection*" OR "cross infection*" OR "cross-infection" OR "nosocomial infection*" OR HCAI* OR HAI*

AND

Concept three compliance OR compliant OR adherence OR noncompliance OR non-compliance OR noncompliant OR adopt*

AND

Concept four nurs* OR "healthcare worker*" OR "health care worker" OR HCW* OR "healthcare professional*" OR "healthcare provider*" OR physician* OR doctor* OR resident

AND

Concept five barrier* OR factor* OR lever* OR facilitator* OR inhibitor* OR predictor* OR understand* OR perception or perceive OR belie* OR attitude* OR behavio#r* OR knowledge

These key terms are outlined in the **Table 2.1.**

Search strategy two

The search was widened to find more studies in paediatric clinical areas (only four concepts were used)

Concept one "standard precaution*" OR "universal precaution*" OR "infection control" OR "infection prevention" OR "hand hygiene" OR "hand washing" OR "washing hands" OR "hand disinfection" OR "protective equipment" OR "protective barrier*" OR PPE

AND

Concept two "healthcare associated infection*" OR "hospital acquired infection*" OR "cross infection*" OR cross-infection OR "nosocomial infection* OR HCAI* OR HAI*

AND

Concept three "p#ediatric nursing" OR "p#ediatric ward" OR "p#ediatric department" OR "p#ediatric intensive care unit" OR PICU OR "child* ward" or "child* department"

AND

Concept four compliance OR compliant OR adherence OR noncompliance OR non-compliance OR noncompliant OR adopt*

These key terms are outlined in the **Table 2.2.**

Table 2-1 Key terms search strategy one

	Key terms	OR	OR	OR	OR	OR	OR	OR	OR
	(1) "standard precaution*"	"universal precaution*"	"infection control"	"infection prevention"	"hand hygiene"	"hand washing" OR "washing hands"	"hand disinfection"	"protective equipment"	"protective barrier*" OR PPE
AND	**(2)** "healthcare associated infection*"	"hospital acquired infection*"	"cross infection*"	cross-infection	"nosocomial infection*"	HCAI*	HAI*		
AND	**(3)** Compliance	Compliant	adherence	noncompliance	non-compliance	noncompliant	adopt*		
AND	**(4)** nurs*	"health care worker*"	"health care worker"	HCWs	"healthcare professional*"	"healthcare provider*"	Physician*	Doctor*	resident
AND	**(5)** Barrier* OR factor*	lever* or facilitator*	inhibitor* or predictor*	Understand*	Perception OR Perceive	Bahavio#r*	belie* OR attitude*	knowledge	

Table 2-2 Key terms search strategy two

	Key terms	OR	OR	OR	OR	OR	OR	OR	OR
	(1) "standard precaution*"	"universal precaution*"	"infection control"	"infection prevention"	"hand hygiene"	"hand washing" OR "washing hands"	"hand disinfection"	"protective equipment"	"protective barrier*" OR PPE
AND	(2) "healthcare associated infection*"	"hospital acquired infection*"	"cross infection*"	cross-infection	"nosocomial infection*"	HCAI*	HAI*		
AND	(3) "p#ediatric nursing"	"p#ediatric ward"	"p#ediatric department"	"p#ediatric intensive care unit"	PICU	"child" ward"	"child* department		
AND	(4) Compliance	Compliant	adherence	noncompliance	non-compliance	noncompliant	adopt*		

Inclusion/ exclusion and selection procedure:

Papers were selected for inclusion in the review if they met the following criteria:

- Articles written and published in English between 2000 and 2016;
- Articles published in peer-reviewed journals;
- Research articles, literature review articles, theses, dissertations and organisational reports;
- Studies of compliance with infection control precautions among HCWs in a hospital setting.

The exclusion criteria were:

- Articles not written and published in English, or published before 2000;
- Non-relevant papers such as articles that did not focus on infection control measures;
- Papers relating to other healthcare workers such as dentists and anaesthetists (because the job nature of their work is different).

First, the selection criteria were applied to the titles through a careful screening based on the focus of the literature review. After that, all abstracts retrieved from the literature search were read and checked to see if they met the inclusion criteria. Then full texts were obtained for those studies that met the inclusion criteria.[5]

2.3.4   Literature review search results

Search strategy one

The following results were obtained; CINHAL = 455, PsycINFO = 39, Academic Search Premier = 205, Medline via EBSCO = 567. A combination of these databases = 1266, after

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[5] See Appendix 1 for a Summary of the articles retrieved.

refinement based on time limiter (2000-2016) n=1178, further refinement (peer-reviewed articles published in English) n= 593. Removal of exact duplicates n= 568.

To widen the search and find other articles in paediatric clinical areas **search strategy two** was conducted. 32 articles were identified; just 4 of them were related to the topic of interest.

To find other Jordanian articles, the reviewer searched the reference lists for two articles found in the search strategies. Finally, eight articles were added to the review.

2.3.5   Article Screening Results

Articles were identified through database searching (search 1) (n=1266). Only peer-reviewed articles published from 2000-2016 and written in English were reviewed, reducing the number of articles to 593. Duplicates were also removed resulting in a total of 568. Reviewing the titles of these articles helped in these being reduced to 247. After reviewing the abstracts, the eligible articles numbered 118. The inclusion and exclusion criteria excluded 85 articles and left 35 articles that met the inclusion criteria. Added to this were another four articles retrieved by using "p#ediatric ward" as a key term. In addition, a manual search of the bibliographies of articles added another 8 articles. The Aforementioned was summed as follows; (35+ 4+ 8), leading to a total of 47.

See **Table 2.3** for an overview of results (number of articles retrieved, included and excluded), and **Table 2.4** for examples of those included and excluded.

Table 2-3 Overview of search results

Databases	Articles Retrieved	Included	Excluded
Search 1 (adult and paediatric)			
CINAHL and PsychINFO and Medline and Academic research premier	118	35	83
Cochrane database for systematic review	4	0	4
Search 2 ("p#ediatric ward")			
CINAHL and PsychINFO and Medline and Academic research premier	32	4	28
Cochrane database for systematic review	1	0	1
Manual research from articles bibliography	30	8	22
Total	185	47	138

Table 2-4 Example of decisions to include and exclude articles

Article	Reasons for Inclusion
(Efstathiou et al., 2011a)	- Factors influencing nurses' compliance with SPGsto avoid occupational exposure to microorganisms: A focus group study (this a qualitative study was designed to explore the factors that influence nurses' compliance with SPGs; it is very close to the topic of interest, and it addresses the study research question)
(Gammon et al., 2008)	- A review of the evidence for suboptimal compliance of healthcare practitioners to standard/universal infection control precautions. (Close to the topic of interest and it can address the study research question).
(Loveday *et al.,* 2006)	- Provides a systematic review report of the evidence of interventions for the prevention and control of methicillin-resistant Staphylococcus aureus, a microorganism in the hospital setting.
(Naikoba and Hayward, 2001)	-Provides a systematic review on the effectiveness of hand washing as one of the critical intervention measures that are used in the control of hospital infection.
Article	**Reasons for Exclusion**
(Hu et al., 2012)	- Self-Reported Use of Personal Protective Equipment among Chinese Critical Care Clinicians during 2009 H1N1 Influenza Pandemic. (The focus of this study is mainly on H1N1 pandemic, and studies one part of standard

	precautions).
(Canning et al., 2009)	- Use of digital photography and image analysis techniques to quantify erythema in HCWs (The focus of this study is mainly on erythema that is an adverse event of hand hygiene and it did not discuss compliance with SPGs or hand hygiene).

2.3.6   Search Summary

The (PRISMA)[6] tools were used to describe the different phases of the review (see Figure 2.1).

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[6] PRISMA is a set of items at its minimum that is based on evidence and is used to report meta-analyses and systematic reviews, which consists of a 27-item checklist and a four-phase flow diagram) (http://www.prisma-statement.org/index.htm).

Figure 2-1 Prisma flow diagram (adapted from Moher et al. (2009))

Identification

Records identified through database searching
(n = 593)

Records after duplicates removed
(n = 568)

Screening

Records screened
(n = 247)

Records excluded
(n = 129)

Additional records identified through other sources
(Ref lists= 30), (Search strategy two= 32)
(Cochrane database= 5)

Eligibility

Full-text articles assessed for eligibility
(All n=185)

Full-text articles excluded, with reasons
(n = 138)

Included

Studies included in systematic literature review
(n = 47)
Qualitative studies (n= 10)
Quantitative studies (n=27)
Systematic review studies (n=8)
Mixed methods studies (n=2)

2.3.7 Overview of the Included Studies

It was not possible to perform meta-analysis due to the heterogeneity in study design.

A summary of the 47 articles that met the inclusion criteria can be seen in Appendix 1.

These 47 articles have been reviewed in depth because they are closely relevant to the proposed topic of study, compliance with SPGs. It was found that 27 articles used quantitative research methods; 10 used qualitative methods (mainly semi-structured interviews and focus groups); two used mixed methods; and 8 used a systematic literature review. Approximately half of the studies were focused on one aspect of standard precautions, hand hygiene. In general, the retrieved articles focused on the occupational exposure of healthcare professionals to blood and bodily fluids rather than on actual patient safety. Only four studies were conducted predominantly in the paediatric area, and none of these made use of qualitative methods. Eight studies were conducted in the Jordanian context, and all of these used quantitative methods. Three of these studies were conducted on student nurses to understand their knowledge, attitude, and beliefs toward infection control practice (One focused on HH, and Two on SPGs). Three studies reported the compliance of Jordanian registered nurses with infection control guidelines, and two focussed on HCWs (one on HH, and one on infection control precautions).

2.4 Critical Appraisal of the Literature

The quality of the research studies reviewed here did vary even though the search criteria had attempted to limit the search to good-quality studies.

2.4.1 Critical Appraisal for Journals of Publication

Only good-quality, peer-reviewed journals were used in the search for studies.

The forty-five articles were obtained from twenty-seven separate peer reviewed journals (in addition to two PhD thesis studies). The process of reviewing the articles was critical and involved transparency and quality assessment. According to Galvan (2006), the identified studies ought to be clearly capable of contributing to the systematic review. Articles concerning the nurses' views on compliance with SPGs were found in a wide range of peer-reviewed journals, including:

- American Journal of Infection Control (n=7)
- Journal of Clinical Nursing (n=5)
- Infection Control and Hospital Epidemiology (n=3)
- Journal of Hospital Infection (n=3)
- Nurse Education Today (n=3)
- International Journal of Nursing Studies (n=2)
- Journal of Advanced Nursing (n=2)
- ACORN: The Journal of Perioperative Nursing in Australia (n=1)
- American Journal of Infectious Diseases (n=1)
- BMC Infectious Diseases (n=1)
- BMC Nursing (n=1)
- BMJ Quality & Safety (n=1)
- British Journal of Infection Control (n=1)
- Clinical Governance: An International Journal (n=1)
- Clinical infectious diseases (n=1)
- Curationis (n=1)
- Eastern Mediterranian Health Journal (n=1)
- Health (n=1)
- Healthcare Infection (n=1)
- Infectious Diseases in Clinical Practice (n=1)
- Journal of Infection Prevention (n=1)
- Journal of Research in Nursing (n=1)

- Journal of the Association of Nurses in AIDS Care (n=1)

- Nursing and Health Science (n=1)

- Nursing in Critical Care (n=1)

- Revista Latino-Americana de Enfermagem (n=1)

- The Southeast Asian journal of tropical medicine and public health (n=1)

2.4.2 Critical Appraisal of the Articles included in the Systematic Review

The critique of the literature was facilitated by the use of tools such as the Critical Appraisal Skills Programme (CASP). CASP checklists were used to help with the evaluation of the quality of the studies and to ensure this process was systematic (Aveyard, 2014). The reviewer used the relevant CASP tools for systematic reviews and for qualitative studies. For the appraisal of the cross-sectional studies, the Milton Keynes checklist (2002) was employed according to the type of research involved, for example, mixed methods and cross sectional quantitative studies. (See tables 2.5-2.7).

Table 2-5 Appraisal of the cross-sectional studies- Milton Keynes checklist (2002)

Cross Sectional Study Checklist Author/ date	1. Did the study address a clearly focussed issue?	2. Did the authors use an appropriate method to answer their question?	3. Were the subjects recruited in an acceptable way?	4. Were the measures accurately measured to reduce bias?	5. Were the data collected in a way that addressed the research issue?	6. Did the study have enough participants to minimise the play of chance?	7. Are the results presented clearly?	8. Was the data analysis sufficiently rigorous?	9. Is there a clear statement of findings?	10. Can the results be applied to the local population?	11. Is the research valuable?	Total appraisal score from 10
Alex-Hart and Opara (2014)	Yes	Yes	Yes	Can't tell	Yes	Can't tell	Yes	Can't tell	Yes	Yes	Valuable	7/10
Al-Hussami et al. (2011)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Valuable	10/10
Al-Khawaldeh et al. (2015)	Yes	Yes	Yes	Yes	Yes	Can't tell	Yes	Yes	Yes	Yes	Valuable	9/10
Al-Rawajfah et al. (2013)	Yes	Yes	Yes	Yes	Yes	Can't tell	Yes	Can't tell	Yes	Yes	Valuable	8/10
Al-Rawajfah and Tubaishat (2015)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Valuable	10/10

Al-Rawajfah (2016)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Valuable	10/10
Askarian et al. (2005)	Yes	Yes	Can't tell	No	Yes	Yes	Yes	Can't tell	Yes	Yes	Valuable	7/10
Berhe et al. (2005)	Yes	Yes	Yes	Can't tell	Yes	Can't tell	Yes	No	Yes	Yes	Valuable	7/10
Chan et al. (2002)	Yes	Yes	Can't tell	Yes	Yes	Can't tell	Yes	Yes	Yes	Yes	Valuable	8/10
Creedon (2006)	Yes	Yes	Can't tell	Can't tell	Yes	Yes	Yes	Can't tell	Yes	Yes	Valuable	7/10
Cutter and Jordan (2004)	Yes	Yes	Yes	Yes	Yes	Can't tell	Yes	Yes	Yes	Yes	Valuable	9/10
Cutter and Jordan (2012)	Yes	Yes	Yes	Yes	Can't tell	Yes	Yes	Yes	Yes	Yes	Valuable	9/10
Darawad et al. (2012)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Can't tell	Valuable	9/10
Darawad and Al-Hussami	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Can't	Valua	8/10

(2013)									tell		ble	
Dyson et al. (2011)	Yes	Yes	Can't tell	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Valuable	9/10
Efstathiou et al. (2011b)	Yes	Yes	Can't tell	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Valuable	9/10
Golan et al. (2006)	Yes	Yes	Yes	Can't tell	Yes	Yes	Yes	Can't tell	Yes	Yes	Valuable	8/10
Hassan et al. (2009)	Yes	Yes	Yes	Can't tell	Yes	Yes	Yes	Yes	Yes	Yes	Valuable	9/10
Jelly and Tjale (2003)	Yes	Yes	Yes	Can't tell	Yes	Yes	Yes	Can't tell	Yes	Yes	Valuable	8/10
Kermode et al. (2005)	Yes	Yes	Can't tell	No	Yes	Yes	Yes	Yes	Can't tell	Yes	Valuable	7/10
Kirkland (2011)	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Valuable	9/10
Naing et al. (2001)	Yes	Yes	Yes	Can't tell	Yes	Can't tell	Yes	Can't tell	Yes	Yes	Valuable	7/10
Oliveira et al. (2009)	Yes	Yes	Yes	Can't	Yes	Yes	Yes	Can't	Yes	Yes	Valuab	8/10

			tell				tell			le	
Osborne (2003)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Can't tell	Yes	Yes	Valuable	9/10
Parmeggiani et al. (2010)	Yes	Yes	Yes	Yes	Yes	Can't tell	Yes	Can't tell	Yes	Yes	Valuable	8/10
Randle et al. (2013)	Yes	Yes	Yes	Can't tell	Yes	Can't tell	Yes	Can't tell	Yes	Yes	Valuable	7/10
Scheithauer et al. (2011)	Yes	Yes	Can't tell	Can't tell	Yes	Yes	Yes	Can't tell	Yes	Yes	Valuable	7/10
Sreedharan et al. (2011)	Yes	Yes	Can't tell	Yes	Can't tell	Yes	Yes	No	Can't tell	Yes	Valuable	6/10
Whitby and McLaws (2004)	Yes	Yes	Can't tell	No	Yes	No	Yes	Can't tell	Yes	Yes	Valuable	6/10

Table 2-6 Appraisal of the systematic reviews (CASP systematic review checklist)

| Systematic Review Checklist

Author/ date	1 Did the review address a clearly focussed question?	2 Did the authors look for the appropriate sort of papers?	3 Do you think the important, relevant studies were included?	4 Did the review's authors do enough to assess the quality of the included studies?	5 If the results of the review have been combined, was it reasonable to do so?	6 Are the overall results of the reviews clear?	7 How precise are the results?	8 Can the results be applied to the local population?	9 Were all important outcomes considered?	10 Are the benefits worth the harms and costs?	Quality appraisal score from 10
Erasmus et al. (2010)	Yes	Yes	Yes	Can't tell	Yes	Yes	Precise	Yes	Yes	Yes	9/10
Gammon and Gould (2005)	Yes	Yes	Can't tell	No	Yes	Yes	Precise	Yes	Can't tell	Yes	7/10
Gammon et al. (2008)	Yes	Yes	Yes	Yes	Can't tell	Yes	Can' tell	Yes	Yes	Yes	8/10
Naikoba and Hayward (2001)	Yes	Yes	Yes	Can't tell	Yes	Yes	Precise	Yes	Can't tell	Yes	8/10
Neo et al. (2012)	Yes	Yes	Can't tell	No	Yes	Yes	Precise	Yes	Can't tell	Yes	7/10
Smiddy et al. (2015)	Yes	Yes	Yes	Yes	Can't tell	Yes	Precise	Yes	Yes	Yes	9/10

Ward (2011)	Yes	Yes	Yes	Can't tell	Can't tell	Yes	Precise	Yes	Yes	Yes	8/10
Loveday et al. (2006)	Yes	Yes	Yes	Yes	Can't tell	Yes	Precise	Yes	Yes	Yes	9/10

Table 2-7 Appraisal of the qualitative studies (CASP qualitative study checklist)

Qualitative Study Checklist Author/date	1 Was there a clear statement of the aims of the research?	2 Is a qualitative methodology appropriate?	3 Was the research design appropriate to address the aims of the research?	4 Was the recruitment strategy appropriate to the aims of the research?	5 Was the data collected in a way that addressed the research issue?	6 Has the relationship between researcher and participants been adequately considered?	7 Have ethical issues been taken into consideration?	8 Was the data analysis sufficiently rigorous?	9 Is there a clear statement of findings?	10 Is the research valuable?	Quality appraisal score from 10
Barrett and Randle (2008)	Yes	Yes	Yes	Yes	Yes	No	Can't tell	Can't tell	Yes	Yes	7/10
Efstathiou et al. (2011a)	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	9/10
Erasmus et al. (2009)	Yes	Yes	Yes	Yes	Yes	No	Can't tell	Can't tell	Yes	Yes	7/10
Lymer et al. (2003)	Yes	Yes	Yes	Yes	Yes	No	Yes	Can't tell	Yes	Yes	8/10
Lymer et al. (2004)	Yes	Yes	Yes	Yes	Yes	No	Yes	Can't tell	Yes	Yes	8/10
Nderitu et al. (2015)	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	9/10

Nichols and Badger (2008)	Yes	Yes	Yes	Can't tell	Yes	Yes	Can't tell	Yes	Yes	Yes	8/10
Ward (2010)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	10/10
Ward (2012)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	10/10
Wichaikull (2011)	Yes	Yes	Yes	Yes	Yes	Can't tell	Yes	Yes	Yes	Yes	9/10

Assessing the strengths was a critical task. Whilst some weaknesses were found, the studies in general are robust overall.

2.5 Systematic Review

Themes related to the study topic were evident in the literature. All the themes were identified based on the study question. The following discussion is formatted according to the themes identified from the literature.

The systematic review is organised into the following two themes:

- Compliance rates with standard precaution guidelines;
- Factors influencing nurses Standard Precautions compliance;

The discussion of the literature around these themes is followed by a discussion of the methods used in the identified studies, and areas where further research is needed.

Theme One   Compliance rates with Standard Precaution guidelines

This section discusses the literature related to compliance rates with SPGs. Compliance is defined as the degree of personal adherence to recommendations or of acting in accordance with regulations to guide behaviour (Haynes et al., 1979). Twenty one studies were identified as assessing the degree of compliance with infection prevention and control measures. The studies consisted of 17 quantitative, three systematic literature reviews, and one mixed methods (quantitative and qualitative). These studies reflect a worldwide concern about compliance to SPGs, with the studies originating from the USA, UK, Australia, Canada, Italy, India, and eight studies from Jordan.

There was found to be a paucity of Jordanian studies on SPGs (n= 8), and these studies did not focus on practice in paediatric clinical areas. Worldwide only four studies were found to focus on compliance with SPGs in paediatric departments.

In all the reviewed studies, the compliance rate was related to the number of HCWs who adhered to SPGs, specifically HH and PPEs, with a few studies looking at compliance in relation to other SPGs components (e.g. management of sharp instruments).

It is perhaps worth recalling, that adherence to SPGs increases the level of protection against HCAI and reduces the risk of cross infection. In this way, compliance with SPGs contributes to the safety of nurses and patients. The National Audit Office (2009) asserted that the implementation of Standard Precautions might prevent around 30% of HCAIs. The WHO (2009) highlighted that HH is a major concern, with HH being the most effective way of preventing HCAI. Washing of hands or using alcohol hand-rub on every occasion after handling infectious substances is widely regarded as being essential in removing bacteria and preventing cross-infection (NAO, 2000). The CDC (2010) guidelines reiterate that compliance with SPGs improves staff and patients' safety and protects them from exposure to diseases and infection. Therefore, it is imperative that nurses follow SPGs to prevent unnecessary harm and to protect themselves and their patients. In addition to HH, other precautions are also necessary, such as personal protective barriers, including: gloves, gowns, masks, and eye protection when undertaking any clinical care procedures where there is risk of exposure to blood and bodily fluids.

A systematic review by Erasmus et al. (2010) examined the observed and self-reported compliance rate with HH guidelines among HCWs in hospital settings. The review included 96 studies, most of which (65) used from intensive care units. Only 12 studies examined the behavioural determinants of compliance with HH. Erasmus et al. (2010) looked at compliance rates identified in studies of specific settings such as ICU and other departments. They found the overall median compliance rate to be 40% (30-40% in ICUs, and a 50-60% rate in other settings). Interestingly, 48% of nurses were compliant to HH whilst only 32% of physicians' were compliant. This is interesting because nurses must find it hard to comply when working with other health care practitioners who routinely fail to comply with SPGs.

In addition, Erasmus' systematic review demonstrated differences in compliance rates before and after patient care; HCWs rates of compliance with HH before patient contact were 21% whilst after contact it was 47%. Similar results were noted for nurses and physicians. However, this review included only studies conducted on populations in industrialized countries; the situation in developing countries such as Jordan might be different due to the lack of resources and inferior working conditions. Additionally, this review only examined HH aspects of SPGs and paediatric department staff rates were not identified. Another limitation was that a meta-analysis was not possible due to the lack of the studies' homogeneity and important methodological differences between the studies. Furthermore, the studies were of varying methodological quality, with some studies being less robust or possessing a lack of detail regarding the design and method. Only a minority of studies (17) reported on reliability testing such as whether Cronbach alpha was used.

Golan et al. (2006) conducted a cross-over, interventional study in two ICUs (one medical and one surgical) at a 421 bedded USA New England Medical Centre, testing the rate of gown use and HH compliance rates. This research focussed on eliminating the use of the gown requirement from the contact precautions protocol in surgical, then medical ICU respectively (the patients were infected or colonised with MRSA or vancomycin resistant enterococci). Researchers observed hand-washing behaviour for a total of 170 hours over a 14-month period (1619 HH opportunities among 100 HCWs) and discovered that compliance with HH before care was 10% whilst after care compliance raised to 36%. Nurses' compliance with HH after the care procedure was 40% compared to physicians 38%. The overall compliance for gown and glove use was 63% and 62%, respectively, while HH compliance with and without the use of gowns was 37% and 34% respectively. In relation to patient contact precautions, the findings for HH with and without using a gown was 11% versus 10% (p= 0.85) respectively before contact with patients, and 45% versus 39% after patient contact (p= 0.09). It can be seen that there was only a small and non-significant increase in HH compliance with gown use.

The relevance of Golan et al's longitudinal study was that it measured the interaction between gown use and HH compliance, and that the results counter the argument that gown use encourages HH. The study used a large sample of HCWs who were working in intensive care settings. The study provided data on the role of the gown as a barrier precaution and its relationship with HH[7]. The large sample meant that statistical significance could be achieved and the results of the study can therefore be considered generalisable. However, care needs to be taken in generalising the results to paediatric critical care areas, as these were not included in the study. This observational study raised some questions regarding the Hawthorne effect especially on how staff might change their behaviour when being observed. However, the study was conducted over 14 months and HCWs became familiar with observers. This last probably reduced the effect of observation on practice performance.

It is clear from the Golan et al study that the HH compliance rate after a care procedure is better than the before-care compliance rate. This is significant as the SPGs state HH should be applied consistently, both before and after contact with patients and in all five moments of HH[8]. Golan et al's argument highlights inconsistencies in belief system employed by nurses and other healthcare professionals about before and after care HH procedures. An explanation of this result could be that nurses are focusing on personal safety (self-protection) rather than patient safety. Indeed, the systematic review by Erasmus et al. (2009), demonstrated a higher rate of HH after patient contact, thus indicating that the motivation for HH was self-centred rather than patient-centred, or perhaps that the nurses felt less clean after performing care. Perhaps nurses are less aware of the need to wash their hands when they have not 'done' anything.

A quantitative survey by Berhe et al. (2005) assessed healthcare professionals' perceptions of compliance with infection control guidelines and measured motivational

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[7] It is suggested here that gowns may sometimes be used to encourage the use of HH and where gowns in themselves are not expected to have any useful effect.

[8] (1) Before contact with patient, (2) Before clean or aseptic procedures, (3) After body fluid exposure or risk of exposure, (3) After contact with patient, and (5) After contact with patient surroundings.

factors for compliance. The survey was conducted in nine ICUs in a Tertiary Hospital (820-bed) in the USA and data was collected via ten multiple choice questions, six assessing SPGs compliance and four assessing motivational factors and knowledge. The survey achieved a 40% (324/820) response rate, and showed a high compliance rate, with 69% of HCWs claiming hand hygiene performance as 80% before and after patient contact. The compliance rate with gloves and gown was reported by 65% of participants showing an 80% rate of compliance, with 80% of participants also reporting 80% compliance of airborne precautions. It is interesting that claimed compliance rates were quite high in this study. In practice, however, self-reported compliance rates may be higher than the actual practice demonstrated by observational studies (Erasmus et al., 2010). Berhe et al also found that registered nurses (n=118) reported a higher level of compliance than resident and attending physicians (n=99, n=33), and physicians were better than other HCWs (n= 74). Although this study presented important information on nurses' claims about compliance with infection-control guidelines in intensive care settings, the study offers no discussion on the reliability of the instrument used in the data collection, or of the sampling process.

In a cross-sectional survey, Efstathiou et al. (2011b) examined the extent to which Cypriot nurses in five main hospitals complied with SPGs. Researchers used a 10 item, self-completed questionnaire, distributed to a convenience sample of 668 nurses; the study had a 89.37% response rate. The questionnaire was created by the researchers, with both face and content validity being tested (Cronbach alpha score of 0.713). The study found a low SPGs compliance rate with only 9.1% of participants reporting themselves as being fully compliant with SPGs. In gender terms, 17.3% of male nurses reported full SPGs compliance compared to 8% of female nurses (p<0.01). Interestingly, nurses who had not been previously exposed to pathogens reported better compliance with SPGs compared to those who had been exposed. The researchers suggested that this difference might be related to the adoption of a more risk-taking attitude among nurses who had been previously exposed. The study also found that years of experience and the level of education had a significant and positive influence on nurses' compliance with SPGs (p<0.01). However, the Efstathiou study found that the nurses implemented only selected aspects of Standard Precautions in a compliant

manner, and this placed them (and their patients) at risk of exposure from organisms found in blood and body fluids.

The use of a self-completed questionnaire in the Efstathiou study is problematic as it only tells us what the participants wanted to report; we do not know to what degree their reported compliance fits with their actual practice. Importantly, the study fails to inform us about the reasons the participants sometimes chose not to comply with SPGs.

Cutter and Jordan (2012) carried out a multisite mixed method study in six UK NHS trusts (nine hospitals) to examine the inter-professional variability in compliance with SPGs. The study was based in operating theatres and was purposed to identify strategies to reduce the risks of exposure to bloodborne infections during exposure to blood and other bodily fluids. This study employed a postal survey, sent to all surgeons and scrub nurses (response rate was 51.5%, 315/612), followed by semi-structured interviews with selected participants (eight surgeons and eight nurses) and telephone interviews with senior infection control nurses in each participating hospital. The findings highlighted the existence of selective adoption of compliance with SPGs. For example, 70.4% of surgeons (n=126), and 41.8% of nurses (n=56) adopted compliant practice only when they deemed patients to be at a high risk of having an infection (based on lifestyle or nationality).

Other aspects of Standard Precautions such as wearing eye protection and recapping needles were examined by Kermode et al. (2005) using a cross-sectional survey to examine compliance with SPGs among HCWs in rural north India. The sample consisted of 266 HCWs (response rate, 87%) from seven rural health care settings. Researchers found that compliance with SPGs was suboptimal, with only 32% of staff wearing eye protection, and 40% recapped needles. Kermode's study showed Indian nurses had a low compliance rate with SPGs. Indeed, the actual rate of compliance may have been even lower than reported because of the tendency for self-report studies to overestimate the rate of compliance (see Berhe et al. (2005), Erasmus et al. (2010)).

Gammon and Gould (2005) conducted a systematic review of studies published from 1990 to 2003 that evaluated knowledge and compliance with Universal Precautions (the

previous term for Standard Precautions) among healthcare professionals. The systematic review looked at 16 studies that had measured healthcare professionals' compliance and seven studies that evaluated the interventions to improve compliance with guidelines. All these studies used a quantitative design. Their findings demonstrated that many countries worldwide had a suboptimal SPGs compliance rate. Four studies showed a compliance rate of less than 38%, with the overall compliance rate for all studies ranged from 25%-67%. Glove compliance achieved the highest compliance rate with an average of 73%, while compliance with mask and gown had the lowest rates between 32% and 39%. Gammon and Gould's (2005) review did not report on the practice of HH. Their findings showed that compliance rates varied between individual components of Standard Precautions. The study shows health care staff being selective about which aspects of SPGs they wished to comply with. However, the study was limited, as it did not provide information about the compliance rate for individual work categories in nursing or medicine. Additionally, the study did not discuss the quality of the selected studies so it was difficult to assess their rigour.

In another systematic literature review, Gammon et al. (2008) reviewed studies published from 1994 to 2006 to evaluate the evidence of suboptimal compliance with SPGs, influential issues in compliance, and strategies to improve compliance among healthcare professionals. The studies used a variety of methods, including observation, and self-report; all of the studies were quantitative except one which used a qualitative analysis of online survey. This review showed that compliance varied between different components of Standard Precautions. For example, the compliance rate for sharp disposal guidelines was high at 90%, and the mean compliance rate for gown use was 62%. The review showed that the compliance rate for hand washing was low at 52% and the mean compliance rate for mask use was only 30%. The systematic review showed that healthcare workers valued the various types of SPGs practice (gown, mask etc.) differently. Gammon et al found that reasons for this included workload, perceived risk, availability of protective clothing and time. It is possible that the nurses were simply prioritising their care, for example, masks are not as useful as HH; this perhaps shows that nurses understood infection control principles and were prioritising appropriately.

In a cross sectional survey, Cutter and Jordan (2004) identified strategies to reduce HCWs risk of exposure to blood-borne infections during invasive procedures. They distributed postal questionnaires to all surgeons, scrub nurses, and midwives in general operating theatres, and delivery rooms in one UK National Health Service trust (n=276 in two hospitals). The questionnaire consisted of 12 closed questions and one open question. Content validity was determined. The response rate was 72.5% (90 surgeons, 52 scrub nurses, 58 midwives). On average, the HCWs complied with around half of the recommended guidelines. Around 63% of participants reported that their decision to comply with protective measures was influenced by subjective judgements related to the patients' nationality, life style, and sexuality (risk of carrying blood-borne infections). Only three respondents claimed to comply with all the required protective precautions all the time for all patients; the other respondents (n=197) were selective in their compliance with Standard Precautions. Standard Precaution compliance was influenced by profession and the type of activities in which they engaged. For example, surgeons were more likely to report that they were influenced by the fact that compliance with protective clothing affected their manual dexterity (p=0.012). This study provides useful information about the practice of infection control guidelines in operating theatres and delivery rooms. However, self-reported compliance may vary from actual behaviour. As has already been seen, respondents tend to overestimate their compliance to present their behaviour in a favourable light (Berhe et al., 2005; Erasmus et al., 2010). The study also highlights difficulties in using a postal questionnaire to gain firm data around noncompliant behaviour.

Compliance in paediatric clinical areas

Randle et al. (2013) noted that few studies have been conducted in paediatric settings. This is notable because children tend to play with their peers, have a less mature immune system and may be less aware of the importance of personal hygiene. These factors expose children to the risk of acquiring respiratory and gastrointestinal infections. In the same way, Jelly & Tjale (2003) argued that children are more susceptible to acquiring HCAI, because they are dependent on nurses for their care and

nurturing; this requires close contact and prolonged intervention from nurses. This can translate to higher exposure to microorganisms when poor hand hygiene does occur.

It is widely accepted that healthcare-associated infection is an issue in paediatric wards (Jelly & Tjale, 2003). However, only a small number of studies (n=4) have examined compliance with SPGs in paediatric clinical areas. These studies have focussed on HH and all of these studies used a quantitative approach. Jelly and Tjale (2003) carried out a quantitative observational study to determine the HH practices of HCWs in the paediatric wards of a teaching hospital in Johannesburg. Researchers observed HH practices of 66 professionals who were recruited through convenience sampling. An observation checklist was used. Content validity and reliability of the checklist were determined. The findings reported that only 16.6% of HCWs washed their hands prior to commencing work (p 0.001) and 34.80% washed their hands before contact with the child patients. HCWs were more likely to use HH guidelines (65.20%) following patient contact. It is suggested here that HCWs were more concerned about their own safety rather than patient safety, or it may simply be that HCWs felt less clean after a procedure. The results of a study by Jelly and Tjale (2003) are similar to those results reported in studies conducted in non-paediatric care settings (see Golan et al. (2006) and Erasmus et al. (2010)).

Alex-Hart and Opara (2014) carried out a cross-sectional observational study over 30 days to identify doctors' and nurses' hand-washing practice in two critical-care paediatric wards in a specialist hospital in Nigeria. They observed 86 doctors and 64 nurses on all shifts (early, late and night). The study found that doctors' hand washing practice was low before patient contact (17.4%) compared to 64.0% after patient contact. Nurses' compliance with hand-washing guidance during simple procedures (e.g. nasogastric tube feeding, drug administration, wound dressing) was on average 13.24% before procedures and 59.04% after procedures (p=0.00). While doctors' hand washing compliance rates before simple procedures (e.g. venepuncture, Lumber puncture, Urethral catheterisation) was on average 29.15% compared to 84.65% after the procedure (p=0.00). This difference in compliance rates between nurses and physicians might be related to the type of procedures, which in the doctors' case needed

an aseptic technique. However, both nurses and physicians showed lower compliance before contact with patients than after contact. This study raises an important point that nurses and others may discern risk associated with the procedure whereas studies may have regarded all procedures as equal. In other words, we may not know whether nurses practice good HH, for example, when the procedure is 'important' in some way.

Alex-Hart and Opara (2014) reported that both physicians' and nurses' hand-washing compliance rate before putting on gloves was low (12.5%, 14.8%, respectively) compared to after removing gloves (77.5%, 63.9%, respectively). They argued that nurses and doctors might consider simply that using gloves was a good substitute for hand washing especially when there were barriers to hand washing such as the lack of sufficient soap, few sinks, and the use of dirty towels.

Randle et al. (2013) measured compliance with HH among healthcare professionals, children and their visitors in two paediatric wards at a large teaching hospital in the UK. The study used an observation tool to measure the compliance of HH over an eight-hour period where HH facilities were readily available. Randle et al. (2013) found that the compliance rate for HH among the HCWs was high, ranging from 74%-84%. However, compliance varied according to the type of contact, with 90% compliance before child contact, 78% after child contact, 75% after body fluid exposure, and 36% after contact with the child's surroundings. This study reported a higher level of compliance than in many other studies (Golan et al., 2006; Erasmus et al., 2010). Unusually, the study found that nurses and other HCWs were less compliant with HH after contact with the patient's surroundings.

It should be noted that the study by Randle et al. (2013) was conducted in only two wards and for only eight hours, so care should be taken when interpreting the results. Using observation may create a Hawthorne effect (Holden, 2001) as practitioners may change their behaviour when someone is observing them. The observers stayed on the ward for eight hours in order to reduce the impact of their presence on practice but in practice, this might not have been long enough.

Scheithauer et al. (2011) carried out a prospective observational study in a paediatric and neonatal ICU (19 beds) at the University hospital in Aachen (Germany). The aim was to analyse HH behaviour in relation to profession, shift, the 5 moments of HH and the relationship with disinfectant usage. Hand hygiene activities (patient directed) in paediatric and neonatal ICU were observed over 96 hours, using a standardised observation record that was tested over six weeks. Compliance rate was calculated based on patient group (PICU/ NICU), profession (nurses, physicians and other), the 5 HH moments), and shifts (early, late, night). In addition, disinfectant usage was documented based on an average hand-rub exercise, using 3mL of disinfectant. It was found that daily HH opportunities were significantly higher in paediatric patients group (321/24 hours) compared to neonatal patients (194/ 24 hours) (p= 0.024). This large number of HH opportunities reflects the high number of activities and contact with paediatric patients. In relation to shift dependency, there was no difference in HH opportunities' in different shift patterns in the paediatric group, whilst in the neonatal group the HH opportunities decreased steadily from early, late to night shifts.

The study found a higher compliance rate (53%) than those reported in other clinical settings (Erasmus et al., 2010). Scheithauer et al. (2011) found that compliance rate in the neonatal patient group (61%) was significantly higher than paediatric patients group (53%, p=0.23). Furthermore, nurses' (57% in PICU, 66% in NICU) compliance was higher than physicians (29% in PICU, 52% in NICU) (p<0.001, P=0.017 respectively). In the neonatal units, the compliance rate was significantly higher during the night shift (78%) compared to the early (day) shift (54%, p= 0.003).

Interestingly, Scheithauer et al. (2011) found that compliance rates were significantly higher in NICU before patient contact and aseptic tasks (78%) compared to after contact with patient, body fluids and patients surroundings (57%, p<0.001). Also, in PICU the compliance rates were higher before patient contact and aseptic tasks (61%) compared to after patient contact, body fluids, and patients' surroundings (54%). However, these results were not statistically significant. Nevertheless, in commenting on these results, Scheithauer et al. (2011) suggested that there is a positive attitude in protecting infants and children, resulting in the highest compliance rates especially before contact with

patients and aseptic tasks. Efstathiou et al. (2011a) found that paediatric staff do not think they are at risk of acquiring infection from the child because of the way that children are regarded as 'innocent'. Because of this, paediatric staff may not always wash their hands after a procedure. This is an interesting contrast with the adult studies.

Compliance in Jordanian hospitals

In Jordan, like other developing countries, the availability of data about HCAI infection is limited, as there is no formal HCAI surveillance (WHO, 2011). Moreover, infection control programmes are not mandatory in hospitals. Only eight studies were found which focussed on the practice of infection control in Jordanian hospitals. All these studies used a quantitative approach. Three of the studies looked at registered nurses (two focused on HH, and one on infection control precautions), three were conducted on student nurses (one on HH, and two on infection control precautions), and two focussed on HCWs (one on HH, and one on infection control precautions).

Al-Rawajfah et al. (2013) conducted a cross-sectional national study using a self-report instrument to evaluate the compliance with infection control guidelines among Jordanian registered nurses. The study used proportional-multistage probability sampling to obtain a sample of 10% of all staff nurses working in 22 Jordanian hospitals (including all healthcare sectors). The total sample included 889 participating nurses from different practice areas. It was found that 65.0% of nurses reported 'high compliance', while 32.3% reported 'weak compliance', and 2.7% 'unsafe compliance'. Nurses who obtained infection prevention training demonstrated higher compliance compared to nurses who never received training (p<0.001). Nurses who worked in teaching hospitals reported higher compliance when compared with nurses who worked in other types of hospitals. This was a large-scale study in Jordanian hospitals and provides information about compliance with infection control guidelines in different healthcare sectors. However, using a self-report method might have overestimated the real compliance rate.

Al-Hussami et al. (2011) conducted a cross-sectional survey in Jordan to identify predictors of HH compliance among HCWs (physicians, nurses, and laboratory

technicians). The study took place in a large acute hospital in Amman (beds=930). Out of 400 questionnaires sent out, 349 participants returned the completed questionnaire (response Rate= 87.3%). Their study revealed that the overall mean claimed compliance rate with HH was 63.8% among HCWs, with nurses showing a higher degree of compliance compared to other HCWs (66%). The results showed that age and experience are significantly and positively correlated with self-reported hand washing compliance (p=0.002). This is interesting in that nursing tends to be a relatively 'young' workforce (Al-Rawajfah et al., 2013). The study revealed that HCWs were more likely to comply with infection control policies if they saw that their own health, or the health of their family was at risk.

The Al-Hussami et al. (2011) study provides important information about the HH compliance rate in Jordan, with a relatively large sample size from a variety of HCWs in several hospital departments. Note should be taken, however, that the study took place in only one hospital in Jordan and that it used a self-report approach to measure compliance.

The study by Hassan et al. (2009) was the only Jordanian study to use a guiding theoretical framework (theory of planned behaviour). This study focussed on Jordanian nurses' HH behaviour, attitudes, and beliefs toward HH. The study used a cross sectional survey with participants from two major public hospitals in Amman. One hundred and fifty nurses participated in the study (response rate 60%). The study found that younger nurses had a higher intention toward compliance with HH compared to older nurses (p=0.015). Hassan et al. argue that the performance of HH was better in wards in comparison with ICU (p<0.01). Nurses' intention to perform HH was associated with their beliefs about outcomes (e.g. compliance with HH protocol does not necessarily improve patient safety), social norms (e.g. to accept without question, the (HH) practices of doctors and senior figures) and perceived behavioural control (e.g. perception that following HH protocol is not within nurses control). Furthermore, factors that influenced compliance with HH included internal factors (e.g. skills, information, and abilities) and external factors (e.g. opportunity, resources, and time).

This study provided useful information about compliance with HH and suggested that using the theory of planned behaviour may be useful in developing an effective interventional HH programme to improve Jordanian nurses' compliance with HH guidelines. This study adds some insight to the limited body of research regarding Jordanian infection prevention and control practice. The reliability and validity measurements were reported (e.g. reliability testing of the instrument and construction validity), however, the response rate (60%) for the self-administered questionnaire was relatively low which might have increased the potential for bias and have threatened the study's validity. The participants were from two Jordanian institutions; therefore, the results might be generalised only to the same type of healthcare settings.

Darawad et al. (2012) conducted a cross sectional survey to examine Jordanian nurses' beliefs, attitude, compliance and predictors of their compliance with HH guidelines. Based on a clustered sampling, 280 registered and auxiliary nurses were selected from three government hospitals in three different regions. The response rate was 71% (198 returned the questionnaire). The claimed compliance rate with HH was 74.25% which is higher than that reported in Al-Hussami et al. (2011) study (compliance among Jordanian HCWs was reported as 63.8%) and higher than that reported in Erasmus et al. (2010) systematic review study (overall median compliance in all studies was 40%). The difference in compliance rate might be related to using a self-report method, which may provide an overestimate of the real compliance rate, while Erasmus et al. study was a systematic review of both self-reported and observational studies.

Darawad et al. (2012) found that the compliance rate was better after contact with patients' fluids or equipment and finishing patient care compared to before providing patient care, a finding that is similar to that reported by Al-Hussami et al. (2011). According to Darawad et al. (2012), these findings confirmed that Jordanian nurses care more about their personal safety than they do about patient safety or perhaps that they feel 'dirtier' after they have performed care. In addition, they reported that there is a strong association between the age, years of experience, and unit type and compliance with HH. For example, nurses who have less than two years of experience claimed a

higher compliance rate (p≤0.001), while nurses in medical/ surgical floors claimed a lower compliance rate (p≤0.001).

Darawad et al. reported that the strongest predictors of HH compliance were beliefs about outcomes, attitudes, and skin assessment. For example, if nurses believed that the benefits of HH compliance, included protection for themselves, as well as for their families and the patients, they were more likely to be compliant. Hence these concerns improved their compliance rate. However, if the HH caused skin damage or affected their abilities to do tasks, their compliance was lower.

Darawad et al. (2012) study contributes usefully to the Jordanian literature on infection control practice. However, using a self-report method may provide an overestimate of the real compliance rate. Also, this study did not discuss the compliance rate in paediatric clinical settings.

Al-Rawajfah (2016) carried out a cross sectional descriptive study (survey) to assess Jordanian registered nurses' compliance with infection-control guidelines in intensive care settings. Sampling was a stratified cluster random technique. Twenty-one hospitals from different health care sectors in a number of Jordanian regions[9] were targeted in this study. The sample included 247 registered nurses from 56 critical care units. A self-report instrument was employed in this study to evaluate nurses' infection control practice in critical care settings. The reliability coefficient of the Arabic version of the instrument was reported. The study found that 78.9% of nurses reported that they washed their hands each time before and after providing care to patients, and 63.2% always washed their hands before and after glove use. One fourth of nurses reported that they performed needle recapping all the time, and only one third of nurses reported that they complied properly with using eye protection when needed. Twenty five percent of the ICU nurses reported that they had never received training about infection control in their hospital and 85% of nurses reported not having received training outside their hospital. It was found that nurses who had had infection control training reported a

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[9] North, middle and south regions (all areas in Jordan) were covered by this study. A total of 21 hospitals participated in the study, of which, 8 were governmental, 7 military, 4 private and 2 university-affiliated.

greater degree of compliance compared to those who claimed that they had never had such training.

The results of the Al-Rawajfah (2016) study are concerning. For example, around 43% of nurses reported that they did not use or rarely used eye protection when it was needed. Only one third of the nurses ever performed recapping of used needles. Twenty-five participants claimed to always share equipment between patients without sterilisation. Although these results are concerning, they are not surprising, similar results have been reported by studies in other developing countries such as India (Kermode et al., 2005).

The Al-Rawajfah (2016) study is the only published Jordanian study that addresses the practice of infection control in Jordanian intensive care units. The study used a relatively large sample size from different regions in Jordan, which arguably makes the study generalisable, at least to Jordan. Again, however, it should be noted that self-report studies do not necessarily capture what is actually happening in practice. It does however highlight nurses' report a habitual failure to comply with standards even though these are well accepted and understood. Indeed, the self-report method might overestimate the compliance rate. Unfortunately, this study did not discuss the infection control practice in paediatric settings (e.g. paediatric ICU).

Three Jordanian studies examined the HH and infection control practice of student nurses. One of these studies was conducted by Al-Khawaldeh et al. (2015) who used a cross-sectional survey to examine nursing students' hand washing knowledge, attitudes, and beliefs and their self-reported compliance with hand washing practice. A nursing school in one Jordanian public university, which has more than 800 students, was used for the study. One hundred and fourteen self-administered questionnaires were returned out of 168 distributed questionnaires (response rate= 68%). The questionnaire consisted of three sections: demographic, knowledge test and HH assessment inventory. Reliability and validity were reported. The content of the knowledge test was examined by experts in the field and piloted on a group of students; also the reliability testing of

the HH assessment inventory was acceptable for each subscale (attitude= 0.64, beliefs= 0.66, self-reported compliance= 0.80).

Al-Khawaldeh et al. (2015) found that on average, the compliance rate was 78.93%, which is higher than that reported in other Jordanian studies such as Darawad et al. (2012) (74.25% of nurses) and Al-Hussami et al. (2011) (63.8% of HCWs). Al-Khawaldeh et al. (2015) reported that student nurses were more compliant with hand washing after direct contact with patients' fluids or equipment and after finishing a patient care task, while they were less compliant before providing care to patients. This result is similar to that reported by Al-Hussami et al. (2011) and Darawad et al. (2012) and indicates that Jordanian nurses comply better when the risk is high, in order to protect themselves rather their patients. Additionally, Al-Khawaldeh et al. (2015) found that there was a strong relationship between the level of knowledge, attitude and belief and compliance. It is possible that these students had been taught good HH techniques and had at this time, not been subsumed by nursing practice culture with its reduced emphasis on HH. The student nurses acknowledged that HH was beneficial and necessary, but they thought that it was not soothing or reassuring which negatively influenced their compliance with HH. Also, students appeared to comply properly only when they believed that the benefits of HH outweighed the risks (e.g. skin irritation).

Al-Khawaldeh et al. (2015) study provided a clear assessment of Jordanian nursing students' compliance with HH practice, but its generalisability is limited as it was only conducted in one public university in Jordan. Furthermore, it is difficult to assess its reliability because of the tendency of self-reporting participants to overstate compliance. Moreover, the study failed to explore other predictors of HH practice and the disconnect between why nurses with a good knowledge of, and positive attitude towards SPGs still failed to fully comply with the guidelines.

Another Jordanian study by Darawad and Al-Hussami (2013) used a cross-sectional survey to explore nursing students' knowledge, attitude and practice of infection control precautions, in the University of Jordan. Of the total 168 distributed questionnaires, 114 were returned and analysed (response rate= 68%). Students were found to have positive

attitudes toward infection control precautions (rate=89.8%). However, the students' knowledge was less than desirable with an average score of less than 50% for the questions asked in the questionnaire (49.64%). The students reported compliance rate was also concerning (rate=75.91%). The findings demonstrated that only a positive attitude toward SPGs was significantly correlated with the students' compliance with SPG practice (p=0.000). Interestingly, the study by Al-Khawaldeh et al. (2015) found that along with a positive attitude towards infection control, knowledge and beliefs were also significant predictors of nursing students' compliance.

The small sample size of 168 student nurses from one Jordanian University could arguably, limit the generalizability of the results from Darawad and Al-Hussami's study. Again, this was a study, which measured the degree of self-reported compliance, and this might not accurately reflect practice. Interestingly, however, this study indicates that simply instructing nurses on how to practice may not be effective. In this way, knowledge may not be enough; the nurses' attitudes and beliefs around practices may be key determinants of compliance behaviour. HH, appear to have a direct effect on their compliance and need, therefore to be appreciated and understood better. Nurses are not machines that we can programme with knowledge; they are people who practice in a social milieu and are subsumed by the culture of that micro-social environment. Therefore, it is important to explore other social and behavioural factors that influence compliance in order to achieve a better understanding of infection control practice among Jordanian nursing students.

Al-Rawajfah and Tubaishat (2015) used a web-based survey to assess Jordanian student nurses' knowledge of and practice with SPGs. This was a large study using ten universities; including six public universities. In the case of four of these universities, an electronic portal system was used to advertise the on-line questionnaire. For two universities, a poster with invitation cards was used. For the remaining four private universities, a poster invitation was used for two universities and an electronic portal system for the remaining two universities. In this last case, no replies were elicited; it is possible that students did not make much use of the portal. In total, six hundred nursing students agreed to participate in the web based survey (response rate= 35.3%) and only

five students out of 208 returned the survey by email after responding to the poster invitation (response rate= 2.4%). The researchers used a data collection tool that had been developed and validated by Chan et al. (2002) and which consisted of three parts: demographic information, knowledge assessment, and questions about practice. The internal consistency coefficient for the original tool was 0.72. Reliability in the Al-Rawajfah and Tubaishat (2015) study was 0.87 for the knowledge section and 0.84 for the practice section of the on-line questionnaire.

Al-Rawajfah and Tubaishat (2015) found that approximately half of the nursing students had 'excellent' knowledge of SPGs; this was similar to Darawad and Al-Hussami (2013) Jordanian findings. Additionally, Al-Rawajfah and Tubaishat (2015) found that 68.8% of the students practice could be described as 'competent'. Most students (73.6%) reported that they always washed their hands before providing care to patients, and 72.6% after using gloves. While, 35.7% of nursing students reported that they always performed needle recapping (unsafe practice), and less than half washed their hands before providing non-direct care to patients (e.g. medication administration). There was no significant relationship between the variables, gender, academic level, and years of experience and with knowledge and practice scores. However, students who reported that infection control issues were covered in their courses scored a higher mean for knowledge and practice. This last notwithstanding, the positive association between education on infection control and claimed practice should perhaps be accepted with considerable caution. It could be that students who were reporting practice that they knew was poor, wanted to blame this on their training (so reported that they had had no infection control training). This might not have been an issue for those who reported good practice. In this way, the reported association here between education on infection-control and claimed good practice might indeed be spurious. The findings of Al-Rawajfah and Tubaishat (2015) reported that there was only a very weakly positive relationship (not significant) between students' knowledge of guidelines and overall total score of practice (p= 0.032). This finding supports that of Darawad and Al-Hussami (2013) who found that knowledge was not a predictor of compliance with infection control precautions.

It is suggested here that most students and qualified nurses have had broadly the same nurse education background. Because of this, one would expect them to have the same knowledge about infection control. What students and newly qualified staff did not learn during their nurse training, they would surely learn from others in practice. Al-Rawajfah and Tubaishat (2015) argued that the clinical practices of staff nurses are often copied by student nurses without them subjecting such practices to reflection or analysis or making a judgement on safety implications. Clearly, clinical instructors and mentors have a key responsibility to be good role models in relation to compliance with SPGs (Al-Rawajfah & Tubaishat, 2015). Student nurses may blame their poor practice on their education but this position is less than tenable for the above reasons. Nurses know about infection and the usefulness of hand hygiene; what they do not know, they will learn from others in the clinical arena. Studies which introduce a short training course do make a short-term difference but it is probable that this is more about a perceived culture change (as in 'ah, this is what we are doing now') than it is about teaching nurses something they did not know.

Al-Rawajfah and Tubaishat (2015) was the first Jordanian study to use a web-based survey method to measure nursing students' knowledge and practice of infection control guidelines. However, this study had limitations, for example, using a self-reported method has been shown to allow HCWs to overstate their compliance. Furthermore, the web based survey approach achieved a low response, perhaps because the students did not habitually use the University portal.

Summary of theme one

Analysis of the existing literature outlines that compliance with SPGs is important to protect both healthcare professionals and patients from infection. However, the research reviewed here, shows that compliance is suboptimal. The studies reviewed have shown that compliance with guidelines after patient care is better than before patient care (Erasmus et al., 2010; Al-Hussami et al., 2011; Darawad et al., 2012; Al-Khawaldeh et al., 2015). This indicates that nurses and other HCWs may be keener to protect themselves than they are their patients, and their motivation to practice SPGs seems to

be self-centred rather than patient cantered. Also, it could be that the nurses simply feel 'dirtier' after a procedure which motivates them to wash their hands then. In the paediatric literature (n=4), two studies reported similar results (Jelly & Tjale, 2003; Alex-Hart & Opara, 2014), while interestingly, the other two studies (Scheithauer et al., 2011; Randle et al., 2013) found that nurses and physicians were more compliant with HH guidelines before contact with patients compared to after completion of the procedure. This may indicate that nurses and physicians are keener to protect child patients from infection. However, another explanation is that the staff do not think that they are at risk of acquiring infection from the 'innocent' child, so don't always wash their hands after the procedure. This is an interesting contrast with the adult studies.

The studies discussed here suggest that compliance with SPGs components is selective, and that nurses are more compliant with some components than others. For example, compliance rates for gloves use and HH was higher than for the use of masks or eye protection (Kermode et al., 2005; Gammon et al., 2008; Cutter & Jordan, 2012; Al-Rawajfah, 2016). It is perhaps the case that the nurses were simply prioritising their care, for example, masks and eye protection are not as useful as gloves and HH. Perhaps this shows that nurses are fully informed about infection risks and are using their judgement 'appropriately' or at least 'knowingly'. However, this selective use of SPGs components exposes nurses and other healthcare professionals to unnecessary risk.

The literature highlights that compliance is subjectively different between healthcare professions. For example, the literature reported that nurses were more compliant with infection control measures than physicians and other HCWs (Berhe et al., 2005; Golan et al., 2006; Erasmus et al., 2010; Al-Hussami et al., 2011; Scheithauer et al., 2011).

Few studies have been carried out to explore what causes nurses to comply or fail to comply with SPGs. It is clear from the research reviewed here that nurses are thinking for themselves and making their own decision regarding compliance. It is also clear that nurses exist in a social milieu, one which has its own cultural norms and which affects the degree to which nurses comply with SPGs. For example, the literature reported that nurses were more likely to adopt compliant practice when they considered patients at

risk of carrying blood-borne infections, this decision was influenced by subjective judgements related to the patients' nationality, life style, and sexuality (Cutter & Jordan, 2004; Cutter & Jordan, 2012). Also, nurses were more compliant when they perceived that the risk of acquiring infections or transmitting infections to their families was high (Gammon et al., 2008; Al-Hussami et al., 2011). However, the phenomenon is complex; one study found that nurses who had been previously exposed to pathogens may adopt a more risk-taking attitude toward SPGs and comply relatively less than nurses who had not been exposed with the guidelines (Efstathiou et al., 2011b).

There exists a paucity of studies that have sought an understanding of motivations behind specific SPGs behaviours or how HCWs reach compliance or non-compliance decisions. This situation is perhaps because most studies used quantitative methods, and hence have been limited in their ability to explain the behavioural selectivity of aspects of compliance.

Many of the quantitative studies reviewed here, used 'personal reports' (questionnaires) to gather data on compliance. While these results are interesting (especially when participants admit that they are not compliant), it cannot be assumed that claims made in these situations accurately reflect what actually happens in practice.

It is a not-uncommon finding that nurses blame deficiencies in their education for their failure to comply. It is argued here that these are probably little more than excuses for poor practice. Nurse education is reasonably uniform and in any case these nurses would learn from being in practice. It is argued here that nurses are actually quite knowledgeable. Nursing is a rich breeding ground for knowledge; where nurses have not learned about infection control from their classes and books, they are very likely to learn it from the clinical milieu in which they practice. This argument serves to refute the idea that providing further training will help. Instead, we need to know what nurses are thinking and what causes them to make the decision to be non-compliant.

In their qualitative study, Lymer et al.(2004) highlights the use of a quantitative method as a limitation in explaining HCWs actions and behaviours towards SPGs. This is because the use of a quantitative method does not promote 'rich data' to help provide a

deeper understanding of the decision-making processes or the reasons and motivations for some HCWs to comply in all practice circumstances (Neo et al., 2012).

In general, the reviewed literature highlights low compliance rates with SPGs, especially in the area of HH and the use of gloves. The research literature evidences that further exploration is required, using qualitative methods. Additionally, these studies focused on general practice and have not explored the views and perceptions of paediatric nurses about infection control practice, and the factors that affect their SPGs compliance.

Theme Two   Factors Influencing Nurses Standard Precaution Compliance

It is widely accepted that not all HCAI can be prevented, as certain factors such as invasive procedures, immunocompromised status, age (elderly, or infants), increase susceptibility to infection (NAO, 2000). Additionally, total compliance with Standard Precautions is unlikely. Nevertheless, the literature reviewed above, indicates that dissemination of guidelines on SPGs has met with only partial success. Therefore, to understand the reasons behind nurses' non-compliance with SPGs, it is important to gain further knowledge around whether or not nurses have the necessary time, support and equipment to implement SPGs. If nurses lack the necessary resources, they will be unable to implement the SPGs as well as they would wish.

According to Gammon et al. (2008), lack of equipment, workload pressures, lack of training, and insufficient time, all influence nurses' compliance with SPGs. Such behavioural inhibitors relate either to the physical environment (work environment) or to the nurses' attitude and knowledge of SPGs.

Twenty six studies identified factors influencing nurses' compliance with SPGs. These consisted of: ten quantitative; five systematic literature review, one mixed methods (quantitative and qualitative), and ten qualitative studies. These studies were undertaken in the USA, UK, Australia, Canada, Iran, the UAE, Uganda, Italy, Netherlands, China, and Jordan.

Discussion of these studies was guided by the constructs of the Health Belief Model (HBM) (perceived barriers and benefits, perceived susceptibility and severity, cues to actions and self-efficacy) (see Rosenstock, 2005). Only two studies (Osborne, 2003; Efstathiou et al., 2011a) formally investigated HBM constructs, the other 20 studies also held relevant HBM subheadings. Efstathiou et al. (2011a) argued that literature on infection prevention and control has lacked a theoretical framework to guide the research process. However, organizations and researchers use the HBM widely and advocate its usefulness as a health promotion and disease prevention tool (Roden, 2004). The HBM was developed in the 1950s by a group of social psychologists (Hochbaum, Rosenstock, Leventhal and Kegels) to explain why people did not participate in a free prevention and screening programme of tuberculosis (Hochbaum, 1956).

The HBM is a psychological model used to interpret health behaviour and attitudes (Kara & Acikel, 2009) and helps explain how individuals make decisions concerning health behaviours. Thus, the HBM has the ability to provide some insight into health practitioners' behaviours in relation to HCAI.

The Health Belief Model assumes that three main ideas can explain the behavioural change process:

- An individual recognises the threat of acquiring the disease, therefore, there is enough reason to perform the required behaviour. This threat incorporates perceived susceptibility and severity constructs;
- The behaviour change must be recognised as beneficial, and the benefits of that change needs to outweigh the barriers (perceived benefits and barriers);
- Individuals need a trigger and prompt to change their behaviour (cues to action), and need to feel confident and be able to adopt the required behaviour (self-efficacy).

Barriers

The discussion in this section focuses on the perceived barriers to compliance with Standard Precautions. Efstathiou et al. (2011a) undertook a qualitative study that used focus groups (nurses=30). The Health Belief Model was used as a theoretical framework. They found that nurses blamed barriers (e.g. not enough sinks) for their failure to fully implement SPGs. Such barriers can prevent the adoption of SPGs, and produce conflict in the decision-making process. Insufficient time, lack of gloves, lack of hand decontaminants and sharps boxes, high workload and poor availability of sinks, all affected the process of controlling and preventing infection (Erasmus et al., 2010; Efstathiou et al., 2011a; Nderitu et al., 2015).

The provision of infection-control equipment in the hospital setting plays a major role in enabling SPGs compliance by the nurses. Naikoba and Hayward (2001) undertook a systematic review of twenty one studies that focused on the effectiveness of interventions aimed at increasing handwashing by healthcare workers. Not surprisingly, the study found that the availability of the necessary equipment such as gloves and gowns, motivated the nurses to comply with SPGs.

The literature has identified a group of barriers affecting compliance with SPGs. Barriers related to the work environment such as those highlighted by (Efstathiou et al., 2011a; Cutter & Jordan, 2012; Nderitu et al., 2015) and barriers related to knowledge, beliefs and attitudes such as those outlined by (Oliveira et al., 2009; Parmeggiani et al., 2010; Ward, 2010; Ward, 2012). For example, Osborne (2003) undertook a descriptive correlation study using a self-report mail-out survey to collect data from peri-operative Australian nurses (n= 230). This study assessed attitudes, beliefs, and the level of compliance with SPGs. This looked at perceptions that influenced reporting of occupational blood and body fluids exposure using the HBM as a theoretical framework. According to Osborne (2003), the concepts of HBM are factors that motivate individuals to comply with the behaviour and factors that enable compliance behaviour. Those factors that motivate individuals to adopt compliance are perceptions of risk of exposure, severity of acquiring infection, and perceived benefits of

compliance with guidelines. Factors that enable compliance include previous exposure, and barriers to undertaking the behaviour and the interaction between these variables may predict compliance behaviour.

BARRIERS RELATED TO WORK ENVIRONMENT

Barriers related to the work environment such as inadequate equipment, understaffing, insufficient time, lack of hand decontaminants and excess workload were examined by several studies (Wichaikull, 2011; Efstathiou et al., 2011a; Nderitu et al., 2015).

Smiddy et al. (2015) provides a systematic review of qualitative studies reviewing factors that influence HCWs compliance with hand hygiene guidelines. Ten qualitative studies, published between 2000-2014 were reviewed. These studies were all undertaken in high-income countries: The United States, The Netherlands, Australia, Canada, and Taiwan. The authors excluded studies from low-income countries because of the lack of resources there. Data in the studies reviewed were collected by interviews (n=7), focus groups (n=2), and both interview and focus groups (n=1). Participants included nurses, doctors, social workers, and allied health professionals (total sample size= 415 HCWs). According to Smiddy et al. (2015), the work environment influences nurses' compliance. Relevant factors include resources (time, workload, availability of equipment, staffing), organisational culture, knowledge, and information. Often, problems arise that are outside nurses' realm of control, such as management provision of adequate staffing, the availability of appropriate resources, and on educational support. Despite this, nurses as professionals are expected to be able to influence decisions concerning patient care in the work environment by addressing these factors and maintaining healthcare standards.

The importance of the study by Smiddy et al. (2015) is that it highlighted the need to understand the issues that influence nurses and other HCWs compliance with hand hygiene guidelines from a qualitative perspective. The results demonstrated that compliant behaviour is a complex phenomenon influenced by many factors. Unfortunately, the study focussed mainly on compliance with hand hygiene guidelines

and failed to explore how nurses felt about barriers to compliance and consequently how decisions were reached around whether to comply or not.

In a qualitative thesis, Wichaikull (2011) used an ethnographic approach to explore and contrast the factors that contribute to the transmission of infections among children in a variety of paediatric wards in England (developed country) and Thailand (developing country). Twenty nurses were recruited through purposive sampling from six paediatric wards in three hospitals in both countries (ten from England, ten from Thailand). Data were collected through semi-structured interviews and nonparticipant observations and analysed through thematic content analysis. Wichaikull (2011) found that external factors contributing to non-compliance included understaffing, lack of gloves and hand washing facilities, and lack of appropriate hospital infrastructure, such as, ward design, and sink to bed ratio. Wichaikull argues that the problem of limited resources is not of great concern in developed countries such as the UK, where the National Health Service (NHS) fully support and provide these resources. Lack of an appropriate hospital infrastructure, however, is a greater problem in a developing country such as Jordan.

The literature suggests that institutions are responsible for providing the necessary resources to enhance compliance (Wichaikull, 2011). Clearly, however, developing countries may not necessarily have the funds to provide the equipment normally thought necessary to support full compliance with SPGs. In some cases, equipment is provided but not in a consistent manner (Cutter & Jordan, 2012).

A qualitative ethnographic study by Nderitu et al. (2015) explored Ugandan nurses' experiences of practicing standard precautions whilst caring for patients living with human immunodeficiency virus. Sixteen in-depth interviews were conducted at a large teaching hospital (medical, surgical, accidents and emergency units). Nderitu et al. (2015) found that nurses in resource-limited settings decide to comply with some aspects of Standard Precautions, using their experience to protect themselves and their patients. Although, it is accepted that compliance with all aspects of Standard Precautions is required to reduce HCAI; nevertheless, nurses may adopt less than optimal practices to deal with the lack of resources. This however has unintended

consequences as these less than optimal practices over time become the accepted 'norm' and are then viewed as 'normal' and 'acceptable', and therefore become ingrained into future practice.

A mixed methods study Dyson et al. (2011) utilised interviews (n= 25), focus groups (n=3), and questionnaires (response rate= 36.9%, 24 out of 65) to examine barriers and levers in relation to compliance with hand hygiene guidelines. The sample included nurses and other healthcare professionals from three NHS Trust hospitals. They reported many barriers related to the work environment, such as, understaffing, availability of resources and lack of time. The study found that nurses will sometimes avoid using certain types of soap or alcohol gel or latex gloves (Dyson et al., 2011) because these can cause skin irritation.

According to the literature, a lack of good supervision and leadership can affect the motivation of nurses to comply with guidelines. For example, Cutter and Jordan (2012) using a mixed methods study found that an unsupportive organizational environment and poor management and supervision were major barriers to full complaince with SPGs. Charge nurses are departmental leaders, responsible for initiating activities to enhance the safety culture, supervise and support staff and challenge inappropriate practices. However, these nurses need to be supportive of SPGs standards so they can positively influence those they are supervising.

A grounded theory study by Lymer et al. (2004) used interviews with nine registered nurses and six assistant nurses in Sweden to analyse the factors that promote compliance with SPGs. They established that charge nurses who are committed, knowledgeable, approachable, and able to organise people, can improve the safety culture and make other nurses more willing to comply with the recommended guidelines.

Some of the barriers discussed above can be outside the nurses' control such as limited resources. Compliance may improve if health agencies find a strategy to improve working conditions, provide supportive supervision and address the lack of resources. However, it is important to uncover the barriers linked to the physical environment in

order to understand some of the causes of non-compliance. It is necessary to identify if problems with a shortage of sinks, insufficient personnel, and the lack of equipment are primary causes for non compliance or whether nurses are blaming these instead of recognising they could work to overcome problems caused by poor resources. One would expect professional nurses to be frustrated by these barriers and be working to overcome the problems caused by them.

In a qualitative study by Efstathiou et al. (2011a), a group of 30 Cypriot nurses were asked about the factors that affect compliance with SPGs. The study used the health belief model as a framework to understand non-compliance behaviour. The data were collected using focus groups (n=4). The findings revealed that the lack of protective equipment (e.g. masks and gloves) and a lack of adequate time to deal with emergencies, all contributed to the lack of compliance. Problems related to the use of protective gear such as gloves (skin irritation from gloves, reducing practice skills such as venepuncture while wearing gloves). There was also a lack of sufficient nursing personnel leading to excess workload, and finally, there was a psychological issue noted around patient discomfort when masks or gowns were used.

According to Efstathiou et al. (2011a), although nurses acknowledge the value of SPGs compliance, barriers may affect their decision to comply, even when they are aware of the consequences of non-compliance on patient safety. Nderitu et al. (2015) suggests that nurses in developing countries are at a high risk of acquiring HCAI when not adhering to Standard Precautions, due to meagre resources and lack of staff.

Neo et al. (2012) conducted a systematic review of both qualitative and quantitative studies, on the use of personal protective equipment in the operating room. They suggest that failure to achieve compliance with infection prevention and control measures, is often justified by suggesting that this is a consequence of high workloads or other colleagues who fail to comply, for example, physicians. Efstathiou et al. (2011a) found that whilst nurses wanted to comply with SPGs, they were inhibited from doing so by the lack of equipment or by equipment being inaccessible (stored away from practice areas). This suggests that the level of SPGs compliance is affected by the

nurses' level of professional development and their willingness to employ problem-solving mechanisms to resolve difficulties.

Despite the long-time implementation and adoption of SPGs worldwide, nurses still blame poor compliance on the lack of equipment, heavy workload and poor working conditions. It is acknowledged that the procurement of appropriate equipment is an essential prerequisite for enhancing compliance. However, Whitby and McLaws (2004) carried out an observational quantitative study of nursing staff in Australia and found that despite the renovation of an old tertiary hospital where new sinks were located close to patients beds, compliance with hand hygiene did not improve over nine months of observation. It should also be noted that many hospitals in developed countries provide a sufficient amount of equipment and appropriate work conditions but their SPG compliance is still problematic (Wichaikull, 2011).

It is important to recognise whether the lack of resources is a genuine justification or whether it is an excuse by nurses when they fail to comply. Nurses may be eager to practice SPGs when barrier nursing, to protect themselves. However, in other scenarios, nurses sometimes seem to be unwilling to fight for more resources and instead, justify their noncompliance by blaming poor practice by senior doctors and not addressing these issues themselves (Neo et al., 2012). In addition, senior nurses with high levels of professional development should be able to recognise difficulties caused by the lack of resources (etc.) and be able to use problem-solving skills to overcome these. It is argued here that where nurses are operating at a semi-professional or sub-professional level, they are likely to blame this on the lack of resources rather than on their level of practice.

BARRIERS RELATED TO KNOWLEDGE, ATTITUDES AND BELIEFS

Nurses are the primary caregivers for patients and play a key role in clinical practice. The literature suggests that their knowledge, attitude and beliefs are important factors in infection control practice. For example, in a qualitative thesis Wichaikull (2011) found that HCWs' knowledge of HCAI is an important factor in motivating their decision to comply fully with SPGs and that this is a necessary prerequisite for change. At the same

time, the study found that insufficient knowledge and poor attitudes and values relating the SPG contributes to poor infection control practice. Other factors such as: social norms (e.g. that doctors should not be questioned) (Hassan et al., 2009); cultural and religious beliefs (e.g. some aspects of standard precautions contradict some religious practices such as being bare below the elbow) (Wichaikull, 2011). Dealing with these issues (providing disposable sleeves) could be useful.

Sreedharan et al. (2011) conducted a cross-sectional study to assess the level of knowledge and awareness of Standard Precautions among all nurses in a teaching hospital in the United Arab Emirates (101 agreed to participate out of 118). The study used a self-administered questionnaire consisting of 12 items, which were checked for face and content validity by public health experts. Their findings showed that despite the fact that 97% of nurses knew about SPGs, the nurses' knowledge about guidelines and their implementation was suboptimal. As a result of these findings, Sreedharan et al. (2011) suggested the need for a comprehensive education programme to improve knowledge on Standard Precautions. These findings concur with those of Chan et al. (2002) who conducted a cross sectional survey investigating nurses' knowledge and compliance with SPGs in an acute hospital in Hong Kong (response rate= 68%, n=306 out of n=450). Chan et al. (2002) determined that nurses' knowledge about Standard Precautions was less than adequate, and it was inappropriately applied. Interestingly, the findings reported that nurses were selective in using personal protective barriers, especially the use of such things as eye goggles and masks. This suggests that nurses make informed choices based on the knowledge they have.

Despite evidence showing that knowledge and education are important factors in preventing the transmission of infection, these are insufficient in themselves for creating adequate compliance. For example, Ward (2011) comprehensive review of published studies between 1995 to 2009 (n=39 studies) found that while education may increase infection control knowledge, there is limited evidence to suggest that infection control education improves SPGs compliance. The WHO (2009) states that it is evident that whilst education is important to change practice it is unlikely to be successful unless the issues around the barriers in practice are tackled. Other factors influence SPGs

compliance, such as self-protection (Nderitu et al., 2015) and the perception of risk, e.g. low compliance among nurses who were taking risks in their life (Efstathiou et al., 2011a). It is suggested here that behaviour regarding SPGs compliance is a complex phenomenon, and facilitating behavioural change requires examining other determinants as well as knowledge and education. This last concurs with earlier work by Pittet (2004) in an expert opinion article, who argued that behaviour change is a complex process that involves education, motivation and system change.

Understanding attitudes toward SPGs compliance is important when trying to change behaviour to prevent the transmission of HCAI. A quantitative study by Askarian et al (2005) researched the knowledge, attitude and practice among Iranian HCWs. The study used a questionnaire on a sample of HCWs (n=1048) including physicians, nurses, and dentists at eight hospitals. The findings showed that both attitudes and knowledge were important in enhancing infection control practice, but that these qualities were insufficient to prompt behavioural change. Moreover, they observed that poor knowledge might induce poor attitude and poor practice; nevertheless, these factors were not necessarily linked (Askarian et al., 2005). This suggests that people may have adequate knowledge, yet at the same time have a poor attitude toward Standard Precautions and that this can result in inappropriate practices. Conversely, nurses could have poor knowledge and yet have a positive attitude. Therefore, the complexity of understanding knowledge and attitudes towards determinants of compliant behaviour requires careful consideration if change is going to be successful.

Likewise, Wichaikull (2011) argued that although knowledge is important in preventing HCAI transmission in hospitals, it is not sufficient in itself to induce adequate compliance behaviour. Other factors are also important, for instance, attitude towards infection prevention and control (e.g. perceived importance of compliance with the five moments of hand hygiene). Therefore, as asserted earlier (see Chan et al., 2002) compliance should improve by increasing knowledge together with changing attitudes and considering other factors, such as conflict of interest and perception of risks.

Efstathiou et al. (2011a) noted that nurses' attitude towards SPGs affected their compliance; for example, some nurses considered children to be a low-risk group in relation to the transmission of infections, because children were seen as 'innocent' and unlikely to suffer from harmful infections. Because of this misconception, some nurses saw no need to adhere to strict preventive measures when nursing children.

Efstathiou et al (2011a) uncovered some vanity issues associated with female nurses who avoided wearing a mask or a gown because they perceived it as negatively affecting their appearance. Examples of this can be seen in female nurses' comments with one expressing how wearing a hair cap ruined her hairstyle, whilst another stated that the face mask ruined her lipstick and makeup.

According to results outlined by Efstathiou et al. (2011a), providing care for child patients was described as a major barrier to compliance, as some nurses sometimes chose not use protective barriers to avoid making children feeling anxious. In an unpublished quantitative thesis, Kirkland (2011) surveyed nurses (n= 95) who were members of the Massachusetts Nurses Association and provides evidence that nurses claim that children are less likely to suffer from HCAI than are adult patients. Naing et al. (2001) conducted a cross sectional questionnaire study to assess Malaysian nurses' (n=150) compliance with glove utilisation, and reasons for non-compliance. The results linked compliance with nurses' perception of risk in that they considered exposure to blood and other bodily fluids was low (Naing et al., 2001).

 Additional studies suggest that the attitudes of nurses influence SPGs compliance positively or negatively. Ward (2010) conducted a qualitative study on the experiences of nursing and midwifery students concerning infection control practice. Interviews were used to collect data from 40 students. It was discovered that nursing and midwifery students distinguished between good and bad infection control practices based on their knowledge background. Also, some students adopted practices they saw around them and then unconsciously lowered their standards of practice to the level used by the clinical staff. As a result, experienced healthcare professionals need to be

aware of the impact that their practice (good or bad) has on nursing and midwifery students (Ward, 2010).

Barrett and Randle (2008) carried out a qualitative interpretive study to examine the perceptions of nursing students regarding HH practice. Ten semi-structured interviews were conducted with preregistration students. The resulting transcripts were analysed thematically. Barret and Randle found that participants emphasised that they need to fit into the clinical area by following HCWs models especially in HH compliance. This means that the influence of role models in shaping infection control practice should not be underestimated.

Ward (2012) conducted a qualitative study in a northeren NHS Trust Hospital to explore perceptions and attitudes of nursing students (n=31) and their mentors (n=32). Mentors' negative attitude towards Standard Precautions was expressed by their declaring them time-consuming and inconvenient, and an additional burden rather than an integral part of their work. This is problematic as Mentors' duties include acting as a role model for students. This negative attitude is likely to be transferred to students and impact on their future practice.

Studies by Barrett and Randle (2008) and Ward (2010; 2012) showed how negative attitudes and negative role modelling affect infection control practices. In a review article, Pittet (2004) argued that knowledge, social pressure and role modelling are important factors in influencing infection control practices. It can be concluded that the impact of Mentors' negative role modelling is a major barrier to compliance.

Although knowledge and positive attitudes are key factors in preventing cross infection in hospitals, they are still inadequate in inducing proper SPG compliance (Askarian et al., 2005), as other factors also influence HCWs compliance. There is some evidence that nurses can sometimes fail to think for themselves, adopting instead, routinised behaviour. Oliveira et al. (2009) conducted a cross sectional questionnaire study on nurses' knowledge of SPGs in an ICU in a Brazilian general hospital (sample of n=102). The study found that SPGs knowledge was not always reflected in appropriate behavioural practices. Evidence revealed that some professionals acted mechanically

without undertaking their duties with due diligence or by using critical thinking mechanisms.

This is also reflected in a cross-sectional study of eight general hospitals in Caserta and Naples (Italy) by Parmeggiani et al. (2010). This study identified a dissonance between knowledge and compliance. The study used a self-administered questionnaire to assess knowledge and attitude to guidelines on HCWs in emergency departments. The study had a 55.8% response rate (out of 550 surveys 307 were returned). The study established that health care professionals in emergency departments have positive attitudes, a high level of perceived risk, and a high level of knowledge, but at the same time exhibit low compliance when it comes to Standard Precautions.

Nichols and Badger (2008) carried out a qualitative study to investigate the sources of HCW's knowledge that underpins their practice in infection prevention. The authors employed both semi-structured interviews and observation. The study took place (n= 14) in a renal unit within a district general hospital in the UK. Nichols and Badger found that self-reported compliance was higher than that observed in clinical practice. Also, they reported that tacit knowledge attained through practice experience is not always congruent with the quality standards of evidence-based practice.

The literature in this section identifies two groups of barriers influencing SPGs compliance, firstly, barriers related to the work environment (chiefly, resources), and secondly, barriers related to knowledge, beliefs, and attitudes. Some of the literature argues that in limited resources settings, nurses decide to comply with some aspects of Standard Precautions by using their experience to protect themselves and their patients (selectivity in compliance). Additionally, nurses sometimes adopt less than optimal practices as a norm and re-conceptualise noncompliance actions as acceptable behaviour.

How nurses perceive the benefits of complying with SPGs

The basic element of the HBM is that the likelihood that an action is rationally weighed up depends on the perceived benefits and barriers of the behaviour (Rosenstock, 2005).

In an optimal situation, HCWs would understand that being compliant with SPGs is beneficial to patients, HCWs, their families, and the hospital in which the clinical work takes place.

Sreedharan et al. (2011), in a cross-sectional survey, found that only approximately 50% of nurses agreed that the benefits of compliance with SPGs, protected healthcare staff and patients from transmission of infection and also protected healthcare staff from acquiring infections from patients. Moreover, just 25% agreed that Standard Precautions could protect healthcare staff from acquiring infections whilst handling infectious waste products. This would seem to highlight the need to provide nurses with more educational input regarding the need for compliance with SPGs; that these nurses are simply 'wrong' and need re-educating. However, such a conclusion would ignore the fact that nurses are well-educated in relation to infection control and that they work in a rich intellectual milieu with both other nurses and other professions, where ignorance stands little opportunity to survive for long. Rather, it might be more profitable to consider the nature of nurses' thinking and problem-solving where compliance with SPGs is concerned.

In their qualitative study Efstathiou et al. (2011a) found that nurses were aware of the benefits of SPG compliance; for example, that compliance protects patients, nurses, and their families from getting an infection. Additionally, compliance was understood to reduce nurses' anxiety because using barriers was seen to protect them from exposure to infective agents.

According to Cutter and Jordan (2012), to improve SPG compliance all training programmes should focus on perceived risks and awareness of benefits to both patients' and their own personal safety. By evaluating both benefits of and barriers to SPGs compliance, it may be possible to influence the behaviour of HCWs, because perceived benefits usually motivate individuals to do the right thing. Few studies have looked into the psychological factors at work here, for example, the perceived, rather than actual benefits of compliance.

Susceptibility (perceived risk)

If HCWs do not perceive that they are at risk of HCAI, they have no reason to change their behaviour. The main objective of HBM is to change individuals' perceptions on their vulnerability and in this way, facilitate behavioural change. Recognising the threat of acquiring HCAI is probably enough reason to do what is required. This perceived threat involves perceived susceptibility and severity constructs in HBM. Nurses' behaviour is influenced by their awareness of the risk of actually getting the infection. This awareness is a factor in motivating HCWs to comply correctly with Standard Precautions.

Using semi-structured interviews with 15 nurses (RN=9, NA=6) at three Swedish hospitals, Lymer et al. (2003) investigated factors that affected health care providers' actions when exposed to blood and other bodily fluids. The results demonstrated that HCWs were aware that clinical practice exposed them to significant infection risks, which could be transmitted to patients if SPGs were not adhered to. HCWs were also awareness that the risks of infection through non-compliance also affected patients, families, and visitors to the hospital.

Lymer et al.'s qualitative study used a grounded theory approach to explore the reasons behind HCWs non-compliance with SPGs. This study provides insight into the motivations behind HCWs decision-making processes on compliance. For example, Lymer et al. (2003) found that healthcare professionals in clinical practice might face conflict between performing SPGs fully and getting the workload done. Therefore, their line of action is influenced by balancing the needs and appropriateness of these demands against each other.

However, evidence from the literature indicates that HCWs behave hazardously in situations where there is exposure to blood and other bodily fluids (Lymer et al., 2003; Cutter & Jordan, 2012). This behaviour is attributed to subjective assessment made of the risk of blood and bodily fluids exposure (i.e. child's blood is 'innocent').

Cutter and Jordan (2012) mixed methods study found that perceived risk among health care professionals about occupational exposure to blood and other bodily fluids was an important factor in their motivation to comply or fail to comply with SPGs. However, they reported that many operating theatre professionals failed to follow the guidelines properly because they relied on their subjective judgements of the patients' infectious status and their own perception of risk (such as a patient is a low risk if they are cleanly dressed etc.). Using subjective judgement could expose professionals to infected blood and other bodily fluids from patients who they consider are in a low risk group.

Efstathiou et al. (2011a) in a qualitative study, found that nurses were aware that they might transmit an infection to their own families if they did not properly comply with SPGs. Furthermore, some nurses argued that they were more vulnerable to infection because they got sick easily. Nevertheless, nurses sometimes used their subjective (sometimes biased) judgements to determine whether or not to use Standard Precautions. For example, they were less likely to comply fully with Standard Precautions when dealing with 'clean and tidy' patients (patient appearance). Also they considered children as a low-risk group and, therefore, felt it unnecessary to use protective measures when dealing with children. This was the case, even though the staff were well aware that children were sometimes admitted with a serious infection.

The perception of risk therefore, needs consideration as a motivational factor, as it can clearly affect HCWs compliance behaviour. However, changing behaviour is complex, and to improve compliance it is necessary to understand these underlying determinants of HCWs behaviour.

Berhe et al. (2005) reported that HCWs SPGs compliance was motivated by personal safety rather than by patient safety. These finding were also confirmed in a later study by Al-Hussami et al. (2011) who conducted a cross-sectional survey in Jordan to identify predictors of hand hygiene compliance among HCWs (physicians, nurses, and laboratory technicians). Their study revealed that HCWs were more likely to comply with infection control policies if they saw that their own health or the health of their family was at risk.

In a qualitative study, Erasmus et al. (2009) conducted nine focus group interviews (n= 58 nurses) and seven individual interviews in Netherlands hospitals to identify HH compliance determinants. They found that HCWs often performed HH after procedures that they felt were 'dirty'. Physician's non-compliance with HH also influenced the nurses' adherence to SPGs policy.

To summarise, evidence suggests that HCWs recognise the rationale behind the use of SPGs, and are aware of their role in protecting themselves and their patients. Yet their decision to comply is affected by their emotional (non-rational) assessment of the risk of exposure and by their subjective assessment of at risk groups. Healthcare workers are aware of the risk of transmitting infection to their families. However, there is evidence of a lack of rationality in HCW's reasoning in respect of the well-recognised fact that patients who look well and with no visible symptoms may still carry dangerous pathogens. In the final analysis, even a well-educated and professional healthcare worker is still fundamentally 'human'.

Awareness of personal risk to self, HCW's families, and patients is an important motivator for staff SPGs compliance. Failure to comply may have its cause in nurses being busy or them lacking resources such as sinks or masks (see previous section). However, also at work here, is the fact that however 'professional' someone is, they are still 'human'. As such, nurses are susceptible to thoughts that are illogical in nature. It is possible, that these illogical or irrational arguments have as much 'presence' as the training and knowledge nurses have acquired. Certainly, the studies reviewed here, indicate that there is no single or simple explanation for non-compliance but that rather, compliance is a complex behavioural and perhaps emotional phenomenon. There is, therefore, a need to understand the way that nurses 'think through' the decision to comply or otherwise with SPGs. It is also clear, that looking at how much nurses 'know' will not be sufficient. Perhaps the research in this area to date may have failed to appreciate the 'human' element in health care practice and that fundamentally, we are all subject to think irrationally at times. It seems clear, that future research needs to focus on how nurses make their decision to comply or otherwise with SPGs and that studies

need to be designed to enable participants to discuss the way in which they make their decisions.

Severity (consequences of exposure)

The HBM helps to explain the impact of the perceived severity of acquired diseases, and on the resulting behaviour of the individual. It follows that healthcare workers' awareness of the serious outcomes of SPGs non-compliance is an important factor. The perceived threat of infection is likely to influence HCWs behaviour. However, this needs to be considered alongside other determinants of compliance. In some instances,(Pittet, 2004) compliance rates are high, for example, in cases where HCWs work with HIV or AIDS patients. As argued by Pittet (2004), the perceived severe consequences of non-compliance become the incentive for compliance.

In an expert opinion article, Cole (2009) asserted that one strategy to tackle non-compliance was through a storytelling technique, as by telling HCWs the stories of previous HCAI exposure they can begin to appreciate more fully the dangers of non-compliance. Cole argued that storytelling is an effective educational activity that stimulates thought processes, enhances learning experience, and can be used as a strategy to improve compliance with hand hygiene. It is also a method of disseminating accurate information about the risks of exposure and the consequences of non-compliance to staff and patients. In a later study, Dyson et al. (2011) reported that HCWs considered that the health risks and consequences of non-compliance with hand hygiene (e.g. causing serious infections for either patients or staff) as a facilitator of compliance. It is expected that the severity of these consequences should encourage staff to comply with Standard Precautions even in difficult situations of staff shortages and high workload. However, nurses sometimes fail to comply properly with SPGs even if they acknowledge the value of compliance with SPGs and know the consequences of non-compliance on their safety and that of their patients. The probable reason behind this is that nurses' decision to comply is influenced by other behavioural determinants (Efstathiou et al. (2011a). It is suggested that understanding compliant behaviour is a

complex process which requires understanding of behavioural, social and epidemiological sciences (Pittet, 2004).

It is acknowledged that the aim of Standard Precautions is to protect both patients and healthcare professionals. Therefore, compliance is required with all components of Standard Precautions at all times, especially, when there is risk of exposure to blood or other bodily fluids. It is common sense that behaviour that is influenced by both personal and patient safety, will motivate HCWs to comply with SPGs in order to protect themselves and their patients. However, compliance can be inhibited by hierarchical systems especially if physicians do not acknowledge the evidence base of SPGs. Furthermore, HCWs sometimes fail to comply properly, even when they perceive there is a high exposure risk of HCAI. This behaviour is unexplained and needs more exploration from the perspective of nurses. As previously stated, compliance is a complex behavioural phenomenon, and to understand it we need to study all the factors influencing this behaviour.

Cues to actions (strategies to trigger the compliant behaviour)

It is important to understand all the triggers of compliant behaviour. These triggers might be necessary to prompt nurses to engage in compliant behaviour. According to Pittet (2004), cues to actions are strategies that activate readiness to act and include internal reminders (e.g. personal experience) and external reminders (e.g., easy access to HH equipment). In the early stages, behavioural change is motivated by either complying with precautions or modifying current behaviour (Pittet, 2004). It is therefore pertinent to understand how these factors may work as triggers to improve compliant behaviour.

A mixed methods study by Dyson et al. (2011), utilised interviews, focus groups, and questionnaires to examine barriers and levers to compliance with hand hygiene guidelines. The study found that cues to action such as posters of hand hygiene, continuous education, audit and feedback from infection control and prevention experts did help HCWs to comply properly with HH guidelines. Those factors along with senior staff role models and mentoring junior staff are probably effective in enhancing standard

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precaution complaince. Participants in Dyson et al. study mentioned that easy access to infection prevention facilities was an important trigger to prompt their compliance.

However, Naikoba and Hayward (2001) systematic review showed that the effect of education on hand hygiene practices was short-lived. The study also found that reminding staff or asking patients to prompt staff to do HH had a modest but sustained effect. This study also found that feedback on performance and audit increased HH compliance if repeated on a regular basis. It was found that a multifaceted approach that combined education, reminders, and performance feedback has an increased chance of success in sustaining compliance (Naikoba & Hayward, 2001).

It is suggested here that the effect of a single intervention, such as feedback or education may not be sustained in the long-term, and there is a need to involve other interventions to maintain compliance improvement. For example, current successful hand-hygiene campaigns used at least three interventions such as education, audit and feedback, and continuous monitoring (Dyson et al., 2011).

Creedon (2006) conducted a quasi-experimental study using non-participant observation (n=314 opportunities') and survey methods (n= 62) to explore HCWs' compliance with hand hygiene from a behavioural aspect in an ICU in Ireland. He introduced a hand hygiene program for HCWs offering posters and education handouts, and provided feedback alongside provision of an alcoholic hand-rub, and as a result the HH compliance rate increased. The results demonstrated that the knowledge and 'attitudes' of HCWs had changed significantly regarding HH compliance and their practice improved. Creedon claimed that the improvement in compliance rate was related to using a multifaceted approach. It should be noted, however, that the study did not ptovide a long-term follow-up and so it is not known whether the appoach would be useful in the long-term.

Loveday et al. (2006) carried a systematic literature review of studies published between 1996-2004 to assess the evidence for interventions to combat the transmission of MRSA. They reviewed four systematic reviews studies, 24 non-clinical experimental studies, five economical evaluation studies and one international guideline. The results

revealed that implementation of a range of interventions on a frequent basis to combat the transmission of MRSA are effective (i.e. survillence feedback, monitoring, signs for contact precautions). However, this effect should be understood in terms of the argument here, that nurses already understand about infection and infection control. Continually having to remind nurses to do something, even if effective, does in fact indicate the existance of a continuing resistance to change. In this sense, the 'effect' seen in studies that repeat their intervention (nurse ducation) is not an effect at all but an indication that the problem is resistant to change.

Other cues that trigger compliance were identified by Efstathiou et al. (2011a) who found that nurses complied better with adult or foreign patients, because they considered these as high-risk groups. In contract, the study found that nurses considered children to be a low-risk group who were unlikely to suffer from infectious diseases.

Self-efficacy

Self-efficacy is related to the individual's perception of his/ her ability to adopt a certain behaviour. It is an important factor that facilitates both decision-making and behaviour change (Kretzer & Larson, 1998). Healthcare workers can change their compliant behaviour if they believe in their ability to do that. However, because behaviour is a complex phenomenon, which is subject to other circumstances and so compliance may not be sustained over long periods.

According to Kretzer and Larson (1998), self-efficacy is influenced by several factors:

- Previous successful performance of behaviour;
- Visualizing or observing the successful performance of others;
- Social persuasion (people may increase or decrease their individual sense of confidence and ability to change their behaviour);
- Physical response to change (e.g. stress, anxiety)

The study by Efstathiou et al. (2011a) found that nurses could not change their behaviour on infection control practice, even when they wanted to. In addition, the

study found that nurses were influenced by physicians' behaviour toward SPGs compliance. In this way, if doctors were non-compliant, nurses followed their example as it was seen as problematic to practice at variance to that of the medical staff. This can be explained in part, by the hierarchical structure existing within the healthcare system and which generally sees doctors as leading practice. Clearly, it should be possible for nurses to act professionally and to seek change to doctors' practice as well as their own, however, this can be challenging. Nurses in infection prevention and control positions, may not see themselves as being responsible for practice change in medicine, and hence, may fail to challenge the doctors' practice. It can be argued that there remains a perceived or actual power imbalance between doctors and nurses, where nurses view their position as inferior and act in a supporting role rather than as agents of change.

There is limited evidence on the effect of perceived self-efficacy on SPG compliance, or on nurses' 'professional' role in infection prevention and control, or on their work as agent of change in healthcare. However, it is likely that some nurses, fail to fully accept the 'professional' nature of their role but rather see their role as being fulfilled where they correctly follow orders or protocols. This 'semi-professional' identify may perpetuate poor practice because of the failure of nurses to work for change. This last is especially likely to be the case where the perceived 'senior' profession in health care (medicine) may not always prioritise compliance with SPGs.

Summary of theme two

To conclude, this part of the literature review examined several factors that may influence nurses' SPGs compliance. Most studies examined these aspects quantitatively by using self-administered questionnaire.

There is a notable limitation in using quantitative research to explain non-compliant behaviour as it does not take into account, or provide an understanding of why HCWs make decision regarding compliance. Using a self-completed questionnaire gives an incomplete picture of the problem area and cannot answer the rationale behind nurses' compliance.

Few studies examined factors influencing nurses' SPGs compliance in paediatric clinical areas, and how working with paediatric patients' challenges compliance. For example, nurses may not use protective barriers to avoid making children feel anxious, or some nurses' think children are less likely to suffer from HCAI (Kirkland, 2011).

The literature suggests that compliance or non-compliance with SPGs is affected by personal decision making, because some nurses comply properly even in difficult work conditions, for example, where there is understaffing and high workload. Also, the literature indicates that there is no single or simple explanation for non-compliance, and that therefore, compliance should be considered as a complex behavioural phenomenon. To achieve optimal compliance, there needs to be a better understanding of the underlying determinants of HCWs behaviour. It is again suggested, that future research needs to address HCWs preparedness to recognise inappropriate actions and incorrect assumptions so they have the ability to change their behaviour to meet SPGs requirements. However, it is also clear, that nursing sometimes claims a level of professionalism that is not always seen in practice. Nursing is not always seen as a process of effecting change but rather one of following protocols. A key problem occurs when the ward or unit culture possesses its own 'unwritten' protocols for infection control and where doctors fail to value SPGs.

Discussion of the methods used and the gap in literature

Most studies reviewed in this chapter used quantitative methods; these studies have contributed to improve our knowledge of complience and in turn to improve infection control practice (Chan et al., 2002; Berhe et al., 2005; Kermode et al., 2005; Golan et al., 2006; Parmeggiani et al., 2010; Efstathiou et al., 2011b; Randle et al., 2013). However, complience with SPGs is well known to remain sub-optimal. In addition, these quantitative studies do not tell us 'why' nurses sometimes fail to comply with SPGs and how nurses decide what aspects of SPGs they should comply with. Importantly, these studies fail to explain why knowledge of infection control and a positive attitude toward SPGs compliance do not always lead to good compliance.

Many quantitative studies used self-report questionnaires; these inevitably provide an incomplete picture of SPGs compliance. Such studies have failed to address the reasons nurses have for ignoring some aspects of SPGs. Importantly, these studies cannot tell us about what really happens in practice, self-reported compliance may not even relate clearly to what actually takes place in practice situations (Berhe et al., 2005). It is only when self-report studies report a failure in compliance that we can be reasonably sure that what is reported is probably reflected in practice. Even here, these studies have not been able to question 'why' it is that nurses knowingly decide to ignore SPGs.

According to Forman et al. (2008), there is a clear advantage in using qualitative research to explore actors' perceptions and understanding (of compliance behaviour). They argue that qualitative research uses open-ended techniques such as interviews to collect data, which gives participants an opportunity to express themselves in their own words. In this way, qualitative research can provide deep and rich data about individuals' experiences and the clinical decision they make. It follows that a qualitative approach is useful where the aim is to understand why nurses sometimes choose not to comply with SPGs even when they are very familiar with the rationale for their use and the consequences of failing to comply. It is here suggested that qualitative research is an appropriate approach to achieve a better understanding of the complexity of compliant behaviour. Previous literature indicates that there is no single or simple explanation for noncompliance but that rather, compliance should be considered a complex behavioural phenomenon (Lymer et al., 2003).

Ward (2010) argued for the value of using a qualitative approach for exploring healthcare professionals' experiences with infection control because of the way qualitative methods were able to elicit participants' views and perceptions.

Efstathiou et al. (2011a) employed a qualitative design using focus groups for data collection; they argued that most quantitative studies focus on factors that reduce nurses' compliance with guidelines, while using qualitative methods may provide richer data about the non-compliance phenomenon. Focus groups can be used to facilitate

participants to express their feelings toward infection control practice, and enable an exchange of ideas and experiences regarding infection control measures.

According to Mansour (2011), it is difficult in the clinical field to investigate a sensitive topic about practice failings, as participants may refuse or hesitate to express their views regarding practice. Mansour highlighted methodological and ethical challenges to investigating practice failings, and stated that it was necessary for the researcher to build a relationship of trust with participants. This can be achieved by respecting them as experts in their field, rather than approaching them as 'error-makers'. Mansour also highlights the importance of recruiting suitable participants who are willing to participate and provide an open and honest response during the interview.

According to Mansour (2011), previous studies have focused on the causation of errors rather than how to enhance safety. These researches identified the participants as 'error makers' (in this case, not following the safe medication administration practice), before seeking reasons behind their behaviour and perceptions. This approach may create a threatening atmosphere, and could impair participants' ability to provide an honest account of their experience. Rather than targeting nurses who had performed an unsafe drug administration, Mansour targeting nurses in general. The information sheet stressed that the study wished to encourage a general discussion with nurses as experts, about their views on safe medication administration. By doing this Mansour (2011) encourages researchers to create a safe atmosphere for open and honest discussion. It is suggested here that this approach could usefully be employed to further understand why nurses (generally) sometimes fail to implement the SPGs. The approach appears useful in terms of the key questions that existing research has failed to address, that is, what is nurses experience of SPGs implementation and what thought processes are employed in the decisions nurses make in determining their course of action in respect of compliance with SPGs.

2.6 Chapter summary

The existing literature has been examined to see what causes have been identified for the continuing failure of SPGs to be fully implemented. Where nurses have been asked this question (usually by self-report), the results are clear, that insufficient resources are responsible for the failure to implement SPGs in full. Clearly, it is difficult for nurses to wash their hands if there are no sinks available. In the same way, if nurses find their hands become sore through constant washing, we should not expect them to continue to wash their hands as regularly. This last is understood; however, the availability or otherwise of resources does not explain why SPGs fail to be implemented in full, even where resources are adequate. Furthermore, existing studies that find nurses blaming a lack of resources for failing to comply fully with SPGs are considered here to lack credibility. Nursing has been variously described as a semi-profession and as a full profession (Reed, 1993; Baizerman, 2013; Manzano-García & Ayala-Calvo, 2014), the difference largely being accounted for in the level of independence of nursing practice. This is not the place to debate the level of professionalism that nursing has achieved but only to note that nursing does claim to be a full profession (International Council of Nurses, 2002). Even if for the point of argument, we accept nursing as a semi-profession, we would still expect nurses to problem-solve and to strive for excellence. It is axiomatic then, that nurses would not be found criticising their poor practice on the lack of resources but would rather be found striving for the resources they need for good practice to be achievable.

The status of nursing as at least a semi-profession is a problem for those who argue that greater SPGs compliance requires further training of nurses or further monitoring of their practice. Indeed, studies that have measured the effect of additional training and monitoring, have on the whole, only found the intervention to have a short-term effect. Furthermore, any argument that nurses need regular educational intervention or monitoring of their work must rest dissonantly with any claim of professional or semi-professional status of the discipline of nursing. On a common-sense level, we all know that nurses are reasonably well trained, have good knowledge of the risks associated with infection and are generally motivated towards the patient's interest and the safety

of their working environment. It is the case that nurses continue to fail to fully implement SPGs. Nevertheless, it must be logically asserted that it would be fruitless to seek answers to this issue in ways that by definition, would challenge our basic assumption of the nature of nursing. There have been many studies that have taken the route of testing the effect of implementing training or monitoring (while other studies have used monitoring as a data collection method) but have found only a short-term impact on practice. Indeed, it can safely be concluded that training and monitoring of practices does have a short-term effect. Clearly, however, this effect is not what is needed where a long-term impact on practice is the only sensible aim.

At this point, it should be noted that some nurses comply properly and fully with SPGs and that some do so even in difficult work conditions, which include understaffing and high workload. Indeed, this presents some difficulty and begs the question, why is this level of practice not seen everywhere.

It is important to understand the real cause of non-compliance through further investigations, by examining the work environment for problems, for example by looking at issues such as insufficient personnel, or issues around whether nurses are simply finding excuses for their failure to comply.

The literature indicates that beliefs on the importance of self-protection are important reasons for compliance. There is consensus in the literature that knowledge and attitude are important factors in explaining nurses' compliance. Nurses' practice and decision-making should be reliant on the best available evidence. However, compliance is a complex phenomenon that is influenced by multi-dimensional factors, thus decision-making in these circumstances may be based on subjective and personal experiences as well as scientific evidence. According to Cole (2008), individuals in complex situations (e.g. emergency situations) make decisions based on simple reasoning (heuristics), which are rules that are acquired from personal experiences and that are used to solve problem regardless of their effectiveness. These decisions can lead to flawed judgements which, in this case may limit compliant behaviour and expose patients and HCWs to the risk of infection.

Compliance may be improved in the short term, by increasing knowledge and by changing attitudes. Other factors, such as nurses' conflict of interest, perception of risk, social pressure and role modelling may be considered. However, after many years of research, it is still not clear why and in what circumstances, nurses sometimes elect to comply fully whilst at other times do not comply with SPGs. It is clear that the matter is complex and is not, for example, simply a matter of poor resources or a need for further training. There is a need to get inside the head of nurses, and to look at the decision-making processes taking place. Quantitative research is not well placed to explain such a phenomenon, whereas qualitative research has the ability to probe deeper through exploring perceptions to achieve an improved understanding of issues around SPGs compliance.

There have already been many studies that have looked at SPGs compliance and other aspects of infection control in clinical areas. Importantly, however, existing studies have tended to use either non-participant observation or survey of nurses' claims regarding their degree of compliance with SPGs (self-report). Studies using one or other of these methods dominate the research literature of SPG compliance. It is perhaps unfortunate that these two data collection methods dominate the infection control literature because significant methodological difficulties rest with both these approaches. It is well understood that participant self-report will tend to yield results that are overly optimistic and that may not be reflected in clinical practice. There is a fundamental difficulty in asking a nurse to identify if there is anything wrong with his or her practice, even where anonymity is guaranteed. Indeed, in our I.T. dependent world, we all know that nothing can really guarantee that data will always remain hidden. In any case, there is nothing really 'confidential' about information being given to a researcher and his or her (probably unknown) supervisor or study group, especially where these individuals belong to the same profession. Self-report has been used in quantitative research perhaps because there are few other options, certainly not because of its propensity to generate valid data. It is suggested here that the use of this approach in so many infection control studies is a major problem in this field of research.

The second most common approach to data collection has been direct or non-participant observation. This approach nicely deals with the issues associated with self-report. In this data collection method, actual practice is observed directly and what is recorded is indeed, what actually happened. However, unfortunately, this approach too, is associated with a major concern. The Hawthorn effect[10] has been understood for many years but solutions to the problem of altered participant behaviour remain largely elusive. It can be argued that a lengthy period of observation may lead to participants gradually returning to their 'normal' practice. However, this last has never been demonstrated reliably and there is no known 'period' in which data collection has to continue before the results can be assumed to be reliable. In any case, such 'assumptions' are not generally considered to be the hallmark of robust research approaches.

It is suggested here that the 'dependence' of so much of the infection control and SPGs research on either self-report or non-participant observation is an important concern. Quantitative research has little alternative but to use one of these two methods but that does not make the use of either method a logical or sensible way forward. It is suggested here that it is now time to imagine a new way of researching SPGs compliance, based on a qualitative approach.

It is accepted that the use of Standard Precautions can prevent transmission of HCAI and improve patient and healthcare safety (Siegel et al., 2007). However, it is widely recognised that compliance among healthcare professionals is suboptimal (Parmeggiani et al., 2010; Ward, 2010). The literature reports many factors that can affect compliance positively or negatively, and at the same time suggests strategies to improve compliance. However, there is still a need to understand how nurses interpret practice concerning infection control. While there are blocks to compliance (for example lack of sinks and insufficient gloves), the expectation is that nurses' knowledge combined with their professionalism (to do no harm) will encourage them to try harder to achieve compliance.

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[10] Hawthorn effect: where the behaviour of observed participants changes as a direct effect of being observed.

Therefore, it is appropriate now to explore nurses' understanding of the causes of non-compliance (the factors that affect compliance either positively or negatively). This in turn will help explain nurses' experiences and behaviour with infection control measures. This is especially important as most studies regarding infection control practice have used a quantitative approach and identified barriers but have tended to concentrate on one aspect of Standard Precautions - hand hygiene. So even though some quantitative studies (Gershon et al., 1999; Chan et al., 2002) measured compliance rates with different parts of Standard Precautions among healthcare professionals these do not explain why and how those factors affect compliance.

There is a need for a study to focus on paediatric nurses because there are issues peculiar to this arena and few studies have focused on SPGs compliance in paediatric areas (Moore, 2001; Randle et al, 2013); it and it is time now, for this to be addressed. The factors that prevent SPG compliance among paediatric nurses are not well understood, despite a high risk of blood and body fluids exposure in paediatric units compared to other clinical areas (Dement et al., 2004), few studies have been conducted in paediatric clinical areas (Jelly & Tjale, 2003; Scheithauer et al., 2011). It has already been noted that children's play behaviour in healthcare settings (more physical contact with other children) contributes to cross infection (Randle et al., 2013). Of course, children are sometimes too sick to play interactively but in this case, they tend to need as much interventional care as do very sick adults and so have the same potential risk of infection (Kirkland, 2011). Even when children are nursed in intensive care situations, nurse remain conscious that they want to avoid frightening children by, for example, wearing gloves and mask. Children are not small adults and adult care cannot be applied to them without due consideration of the relevant developmental and psychological consequences. However, not wearing gloves, for example, means that nurses are not complying with SPGs. It is appropriate that paediatric infection control practice be subject to research so that issues specific to this area of practice can be properly explored. In particular, it is necessary to understand paediatric nurses' decision making in respect of compliance with SPGs in general and specially with respect to the specific characteristics of paediatric nursing.

Further qualitative research is needed to explore the perceptions of paediatric nurses. An appropriate method to undertake this is through the use in-depth interviews as a data collection method.

There is a need for a qualitative study designed to achieve a better understanding of the factors affecting compliance with infection control practice among paediatric nurses in Jordan. This study will address the question 'Why do paediatric nurses sometimes fail to comply properly with SPGs, and how do they explain their behaviour'.

Chapter Three: METHODOLOGY AND RESEARCH METHODS

3.1 Introduction

In this chapter, the research design, methods used, and philosophical assumptions underpinning the study are discussed. The ontological and epistemological positions and theoretical perspectives are included in this discussion. The rationale for using an adapted constructivist grounded theory approach is presented. The following will also be discussed in this chapter:

- The role of the researcher
- Ethical considerations
- Gaining access to data and the recruitment of participants
- The data collection method
- Data analysis
- The quality and trustworthiness of the study.

3.2 Research overview

Existing studies have evaluated compliance rates (Kermode et al., 2005; Golan et al., 2006; Efstathiou et al., 2011b; Randle et al., 2013). However, only a small number of studies (e.g. (Dyson et al., 2011; Efstathiou et al., 2011a; Nderitu et al., 2015)) have attempted to examine the factors that influence compliant behaviour in clinical areas. These studies have identified factors such as insufficient time, lack of protective equipment and lack of hand washing agents. However, these studies do not fully address the views and perceptions of nurses about infection control practice, and the factors that affect their compliance with SPGs. Few studies have investigated how nurses make decisions around compliance. Lastly, there have been very few studies that have considered these issues in relation to both paediatric nursing and nursing in Jordan. Understanding of this phenomenon is complex but there is a need to investigate the underlying experience-related, or 'psychological', determinants of nurses' behaviour. Therefore, the main research question in this study is:

'Why do paediatric nurses sometimes fail to comply properly with SPGs, and how do they explain their behaviour?'

This study aimed to investigate how the experience of nursing children, affected nurses' decision-making regarding compliance with SPGs. This study explored nurses' personal belief systems and the culture of child nursing practice and the way that these factors influenced the use of Standard Precautions.

This study used an adapted form of constructivist grounded theory, this being an inductive approach, characterised by the use of the constant comparative analysis of qualitative data as described by Strauss and Corbin (1990, 1998) and Charmaz (2006). This interpretative, qualitative study used semi-structured interviews to explore paediatric nurses' perceptions and experiences of compliance with SPGs. This approach was used because it offered both rich description and in-depth analysis of paediatric nurses' experiences.

The study was conducted in five Jordanian hospitals and employed a purposive-theoretical recruitment of 31 qualified paediatric nurses working in different paediatric areas. All participants had at least one year's experience in a paediatric department. An interview guide was developed from the literature and the feedback and comments received from supervisors and during peer review. Probing questions were modified based on on-going analysis of the interviews to saturate the emerging categories by using theoretical sampling. Interviews were transcribed verbatim. An initial analysis was undertaken before conducting further interviews. Twenty interviews were imported into NVivo 10 software[11] and analysed through a constant comparative method. To improve the rigour and quality of the study, interviewees were sent transcripts of their interviews for feedback and comment (member checking), the researcher spent time in the field (prolonged engagement). Peer review and debriefing techniques were used, along with negative case analysis and reflexivity. Academic supervisors reviewed some of the transcripts and the progress of the analysis.

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[11] An additional five interviews were analysed manually.

3.3 Philosophical assumptions

There exist a variety of philosophical assumptions about knowledge, truth, reality, and values. Researchers need to understand these assumptions and to explore their own belief system and its impact on choosing an appropriate research method. The understanding of philosophical assumptions frames the research process. Therefore, it is important to identify the study's underpinning philosophy, epistemology and ontology in relation to the identified methodology.

It is widely accepted that conducting rigorous research, requires an understanding of its philosophical underpinnings (Klenke, 2008). This last will provide a sense of how knowledge will be produced and used in the study. The study's philosophical underpinning reflects how the researcher thinks and takes decisions during the research journey (Norton, 1999). Pring (2004) suggests that without an explicit theoretical underpinning, researchers may lose the sense of awareness of the deep meaning of what they say and do in their research. The underlying philosophy describes the core ideas that guided the development of the study and which led to the adoption of the methodology and methods.

It is clear that research rigour is enhanced by making the underlying philosophy transparent and clear (Wilson, 2009). Mason (2002) has criticised research for often omitting the philosophical underpinning and the way this is related to the choice of method. An understanding of philosophical assumptions requires an exploration of the nature and form of reality (ontological position), and of how knowledge is developed (epistemological position).

Baker (2003) argued that qualitative studies should clearly describe the methodological approach underpinning the research, such as phenomenology, grounded theory, and ethnography. Baker described the need for purity in methodological approaches and argued that method slurring (failure to label the methodological approach) affected the rigour and validity of the research. However, Avis (2003) challenged this view and argued that there is no need for research to be underpinned by a particular method, and that the researcher should concentrate on the validity and reliability of the argument.

Researchers have argued for the use of a pragmatic approach and that this needs to be no less rigorous than the traditional approaches, though the study still needs to clearly describe the approach and methods used (Sandelowski, 2000; Silverman, 2005). It is arguably the case, at least in nursing research, that employing pure theoretical methods is rare. There is often the need to use an adapted approach because of the way in which this can provide for the necessary flexibility associated with research in clinical practice (Sandelowski, 2000; Johnson et al., 2001).

This current study employed an adapted form of constructivist grounded theory. However, the researcher adhered to the common elements of grounded theory, which include theoretical sensitivity, theoretical sampling, the coding process, constant comparative analysis, and memoing (this will be fully discussed in design section 3.6.3).

The decision to choose a particular methodology is influenced by researcher positionality (Opie, 2004) and other philosophical assumptions regarding beliefs, values, ontology and epistemology. This is justified in qualitative research, especially where it is accepted that the researcher himself or herself, plays an active role in the data acquisition ('insiderness').

3.3.1 The researcher's location within the study

The researcher had been working as a qualified paediatric nurse in a Jordanian hospital for four years. During that time, it was noticed that infection control and prevention practice faced many challenges as a result of limited resources and policies that lacked clarity.

At the beginning of the research journey, the aim of the study was to evaluate knowledge and attitudes regarding infection control guidelines among nursing staff by using a quantitative approach. However, after a brief review of the literature it became apparent that nurses' lack of knowledge was not the key issue. It is argued here that nurses generally do have knowledge of infection control and are aware of the risks of cross-infection. Nurses are commonly found to be change-agents and to be capable of

problem-solving. The existing literature did not appear to acknowledge that nurses did indeed know what they were doing, but that for reasons that were unclear, they often decided to fail to comply with easily understood procedures for avoiding cross-infection. As a result, the researcher modified the research proposal based on a qualitative approach, because it was thought that nurses know what they think, and that they know what practice takes place. Nurses' understand the constraints on their practice, and they know what they agree with and what they disagree with. So, it was felt to be appropriate to go to the field and simply ask them about their perceptions and experience of infection control practice.

The literature review identified that most studies in this area have used quantitative methods (positivistic approach) and 'survey' was the main form of data collection found in existing studies. Such quantitative approaches are an appropriate way to discern the prevalence of infections and the association with non-complaint practice. However, although quantitative studies have contributed to improvements in infection control practice, they fail to achieve an understanding of how it is that nurses continue to elect a form of practice outside the commonly understood guidelines for infection control in clinical practice (Forman et al., 2008). Consequently, although advances have been made in infection control practice, full compliance with SPGs remains stubbornly elusive. There is a need to understand why knowledgeable and professionally oriented nurses often choose to be non-compliant with the SPGs that are both easy to understand and whose deployment is in both practitioner and patient interest.

According to Parahoo (2006), the reductionist nature of a 'survey' limits the provision of deeper and more detail information about the phenomenon of interest. Based on the research aim, the researcher wanted to understand the lack of compliance with infection control policies from the perspective of the people who were involved in this experience. It was also necessary to focus the study on how paediatric nurses interpreted their experience in the context of Jordanian culture.

This study of paediatric nurses' views on compliance with SPGs stems from ontological and epistemological principles that consider nurses and their interpretations,

perceptions, experiences, meaning as the main focus of the study. In this way, it was felt that a qualitative approach would be able to achieve a better understanding of the factors influencing compliance with SPGs. By using a qualitative approach, it was possible to 'share' in the thoughts and feelings of the participants, and to map their experiences in a manner that could both be communicated to others and be readily understood by the participants themselves.

This approach is capable of discerning useful information about the way that cross infection measures are understood, perceived and experienced by nurses who are facing the challenge of cross infection. This plan rests squarely on the assumption that there is no objective reality, but that what the nurse participants 'feel' is real, is in fact real; both in terms of how it is experienced and in its consequences.

3.3.2 Philosophy: ontological and epistemological perspective

Researchers usually use abstract ideas to inform their research (Creswell, 2007). The study of these abstract ideas about the world is called philosophy and it is concerned with knowledge, reality, existence, and values (Teichman & Evans, 1999). Understanding qualitative, underlying philosophy helps the researcher to formulate the research problem, research questions, and facilitates answering these research questions. Such considerations consist of two main parts, ontology and epistemology, both of which mutually support each another (Lederman & Abell, 2014).

Ontology

Ontology concerns the 'nature of being' and addresses the question: 'what is the nature of reality, being and existence' (Holloway, 2005).

This study adopted 'relativist ontology' (antirealism) that views 'reality' as a subjective experience and therefore 'different' between participants (Denzin & Lincoln, 1994). The realties are individually constructed and mediated by individuals, to give meaning to phenomena (Scotland, 2012). Roberts (2002) suggested that ontological position could be shaped by interaction with individuals, biographies and experiences. The researcher's

ontological position was developed during the review of the literature. The researcher in this study began with certain assumptions about the phenomenon of interest, however, his position was sufficiently flexible to receive new ideas.

Epistemology

Epistemology is defined as the theory of knowledge and deals with the nature of knowledge. Essentially, epistemology poses the question: 'how human beings know what they know' (Holloway & Wheeler, 1996). It is important to know 'the truth', how people can access it, and what is the relationship between the researcher and participants. Qualitative researchers need to spend sufficient time with participants to become an 'insider', to gain understanding of their views about reality which is subjective and multi-dimensional. In essence, understanding and shared meaning is socially constructed through the interaction between researchers and participants to provide a constructed reality. This reflects that the meaning and language of the situation are constructed based on a specific context and timeframe, and there is no absolute truth or absolute reality (Kuper et al., 2008).

This study adopted a constructivist epistemology, with the acknowledgement that the researcher cannot separate her or himself from her or his background and what she or he knows about the phenomena. It is acknowledged that complete objectivity and neutrality is unachievable, and that the researcher needs to be reflexive about his or her own position as the main research tool (Holloway & Wheeler, 2009). In this context, the constructivist position is the belief that paediatric nurses construct meanings about the world of infection prevention and control through interactive experiences with others.

The researcher conducted face to face semi-structured interviews with eligible nurses. This enabled researcher interaction with participants and explores their meaning of infection control realities and experiences about the decision of whether to adopt compliance with SPGs. The study investigated paediatric nurses in their own context (hospital's paediatric departments) as the reality of the situation under study "cannot be understood in isolation from (its) context" (Lincoln & Guba, 1985, p:37).

In this study, the researcher adopted a relativist ontological and constructivist epistemological position.

3.3.3 Qualitative research (interpretive approach)

Choosing an appropriate methodology is necessary in order to conduct a good research study. The methodology provides the structure of the study; the sampling strategy, how the researcher will collect and analyse the data, and how reliability will be measured (Polit & Beck, 2004).

There are several ways of seeking knowledge about paediatric nurses' perceptions and experiences in relation to infection control practice. The two dominant paradigms that form the philosophical foundations of research are quantitative (or positivist) and qualitative (or interpretivist) paradigms. A paradigm is an approach or position that provides the researcher with a set of beliefs to guide the research process (Hesse-Biber & Leavy, 2010). Each paradigm has strengths and weaknesses, and is based on a different theoretical approach.

Positivists claim that truth and reality are objective (Creswell, 2007). The goal of quantitative methods such as those used in experiments and surveys is the measuring of phenomena rather than the discovery of the meaning of phenomena. According to Polgar and Thomas (2008), quantitative research is based on a scientific methodology to produce measurable evidence to accept or reject hypotheses.

Although the positivist approach to research has contributed to improved infection control practice, it is clear that this approach has limitations in addressing the study aims. For example, quantitative methods such as self-administered questionnaires provide an incomplete picture of the problem area and cannot answer why nurses ignore some parts of Standard Precautions and how this affects infection control practice. According to Berhe et al. (2005), self-reported compliance is likely to be higher than that found in actual practice. Quantitative approaches are unable to monitor the conditions around the participants who answer the questions in a research survey. It cannot capture the human experience in a holistic manner (Parahoo, 2006). Also, it

provides a limited ability to probe responses due to the structured form of the survey, and the closed type questions used to facilitate statistical analysis (Polit et al., 2002).

The interpretive approach is generally accepted to be a more appropriate way to explore (nurses') perceptions and experiences. The goal of the qualitative approach is to discover the meaning of phenomena to individuals who have experienced them. Data that is collected from research participants consists of subjective accounts, either written or spoken in their participants' own words (Creswell, 2007). In this approach, the researcher goes into the field and asks participants about their views and perspectives on infection control measures; this can potentially provide an understanding of why nurses sometimes choose to comply and sometimes choose not to comply with infection control guidelines.

In qualitative research, reality is understood through sharing experiences and interaction between people (Cohen et al., 2007). Furthermore, qualitative research focuses on understanding social phenomena, providing rich data, and sharing the participants' own experience (Creswell, 2007). Data collection methods in qualitative research, such as observation, document analysis, and interviews, are used to enable an explanation of the phenomena by allowing study participants to interpret their own experiences of it (Creswell, 2007). The qualitative researcher is the primary research instrument for data collection and analysis. There is immersion in the data in order to generate an in-depth analysis.

It should be understood that qualitative research uses a flexible and emergent design which involves data collection and analysis that can emerge as the research process unfolds (Mason, 2002). Because qualitative research is a process of discovery, the research process is iterative rather than sequential, and data collection and analysis occur concurrently. As a result, qualitative research needs considerable time and effort, because the researcher is involved more with the participants in the process before, during, and after data collection (Forman et al., 2008).

3.3.4 Rationale for choosing an interpretive approach

This study used a qualitative interpretive approach to explore how paediatric nurses experienced the barriers or facilitators in relation to infection control practice and the way in which they interpreted and experienced the reality of infection risk, the efficacy of control measures and resource limitations. It was anticipated that this would provide an explanation of why paediatric nurses sometimes fail to comply properly with Standard Precautions.

Various studies have investigated knowledge, attitudes, and beliefs toward infection control and Standard Precautions and their relation to compliance. Most of these studies are quantitative in nature (Ward, 2010). Although these studies have an important role in infection control research, they cannot explain why nurses sometimes still choose not to comply with SPGs (Forman et al., 2008). Conversely, the explorative nature of qualitative research enables the study to explore nurses' understanding and perceptions of the factors that affect their compliance with SPGs.

In comparison to quantitative research, qualitative research is better able to answer questions such as why and how, and not just accept the phenomena as it is but explore how it is understood and interpreted by actors. Qualitative research has the benefit of studying people in their natural setting (Pope & Mays, 2006). The goal of qualitative methods is the discovery of the meanings of phenomena reflected in the actors' own accounts (Creswell, 2007). According to Creswell (2014), qualitative research uses open-ended techniques such as interviews to collect data, which gives participants an opportunity to express themselves in their own words, and provides deep and rich data about individuals.

It is presumed that nurses have knowledge about guidelines, and that they are willing to protect patients' safety. There is a paucity of literature on the reasons why knowledge and attitude sometimes fail to change practice. As Magilvy and Thomas (2009) mentioned, "*the data do not always tell the full story*" (p.298). To date, no clear solution to the problem of non-compliance has been identified. It is clear that the improvement

of compliance requires more understanding and exploration of relationships between the factors that affect compliance and the meaning nurses find in them.

There are some qualitative studies of factors related to compliance in infection control (Efstathiou et al., 2011a). However, these studies do not explore how factors related to infection control practice affect paediatric nurses' compliance with Standard guidelines. These existing studies are also concerned with adult nursing practice. It should be noted that the risk of exposure to blood and body fluids and the incidence of infections are higher in paediatric units in comparison with other departments (Dement et al., 2004). In addition, the type of causative agents differs from those found in adult practice (Posfay-Barbe et al., 2008; Sarvikivi, 2008).

To fill this gap in the literature, this study used an adapted grounded theory approach to achieving a better understanding of the factors affecting compliance with infection control precautions among paediatric nurses. The study provides an opportunity to explore the reasons paediatric nurses have for failing to comply with infection control standards and does this by examining nurses' perceptions and experiences in relation to compliance with SPGs.

3.4 Chosen interpretive approach

There are a number of interpretive methods (approaches) that are employed in the qualitative arena, and which have superficial similarities. These mainly include phenomenology, ethnography and grounded theory (Sandelowski, 2000). While each approach has its merits and drawbacks, it is important that the approach taken is appropriate to the research aims, does not limit or constrain the study and is selected on applicability rather than any other criteria (Sandelowski, 2000). Each method will be briefly discussed, together with a rationale for rejecting the methods, and accepting the method chosen.

While Phenomenology is a well-respected approach, it is an approach that wholly embraces subjectivity in analysis. This last can make auditing and transferability rather more difficult to achieve than is the case with Grounded Theory. It is also the case, at

least arguably, that there is no fully developed 'method' in Phenomenology. It was considered, chiefly for these reasons, that Grounded Theory would be a better approach in this particular study.

Ethnography is a type of qualitative inquiry that aims to understand cultural rules by interpretation of cultural or social group behaviour. The researcher will immerse themselves in the culture and learn from (rather than study) the people in that cultural group to understand their world view (Polit et al., 2002). Ethnographic researchers use terms such as emic and etic perspectives. The emic perspective is the insider view of reality (members of culture group). The etic perspective is the outsiders' interpretation of the experiences of that culture. Good research requires both insider and outsider views (Holloway & Wheeler, 1996). Ethnography can provide a rich exploration of the daily lives of people in the culture under study. Ethnography can provide access to the health beliefs and health practices found in a culture or subculture such as nursing (Polit et al., 2002). However, ethnography was partly discounted because it requires the researcher to become fully immersed in the cultural lives of members making it difficult to carry out fieldwork. It is also very time-consuming and would be difficult to do within the constraints of a PhD programme.

Two sociologists, Glaser and Strauss, first used grounded theory in the 1960s. It is defined as an inductive process which involves developing a hypothesis from the research area upwards, towards developing new theory (Holloway, 1997). Strauss and Corbin (1998) defined Grounded Theory as a set of procedures used to develop theory that is inductively derived from empirical data. They argued that Grounded Theory is beneficial in that it can provide a common language (e.g., set of concepts), new insights and understanding of phenomena. Theory will emerge from the data to provide an explanation of events as they occur. It is useful to discover the patterns of individual behaviours in their social contexts (Engward, 2013).

Understanding social processes or actions requires probing people about what happens and how they interact with each other in the social context. The focus of Grounded Theory research is the discovery of patterns in social life that address the research

question and provide an explanation of the social phenomena in question. The main role of the researcher is to make sense of individuals' daily experiences in relation to specific phenomena (Glaser, 1992). Within Grounded Theory, human beings are not passively engaged in social processes; instead, the meaning of their actions and interactions are socially constructed and reflected in their language and communication (Charmaz, 2006).

Nurses' compliance with SPGs is a complex behavioural phenomenon. Explaining and understanding of this phenomenon, which occurs in every-day practice is not well understood in the literature, especially in paediatric clinical areas. This demands a methodology that focused on meaning, patterns, social interactions, social structure and structural features. Therefore, grounded theory is particularly appropriate in this current study as it can provide a theoretical understanding of this complex behavioural phenomenon.

3.5 Theoretical perspective: symbolic interactionism

This study adopted an interpretive approach. Grounded theory is a qualitative research methodology that aims to describe and interpret social, structural and psychological processes that occur in a social context (Woods et al., 2016). It is useful to interpret human behaviour, action and interaction. The literature acknowledges that grounded theory assumptions and its conceptual orientation are rooted in symbolic interactionism (Blumer, 1969; Benoliel, 1996; Norton, 1999; McCann & Clark, 2003; Chamberlain-Salaun et al., 2013).

Symbolic interactionism is a theoretical perspective that explains the relationships between people and society by understanding social interactions in the society and interpretations that individuals attach to social symbols (e.g. language and non-verbal communication) (Blumer, 1969).

Blumer (1969) identified three basic assumptions of symbolic interactionism:

- Individuals act toward objects or people based on the meanings that these objects have for them.
- Interacting with others in the social world derives these meanings.
- Meanings are interpreted and modified by individuals and used to deal with future encounters.

According to Holloway and Wheeler (1996), interpretation and giving meaning to symbols determine how people may behave and take action in a specific situation. They clarified that this symbolic meaning is shared by individuals within a social group or given culture and is learnt through socialisation. Individuals consider how others act, interpret this act and try to fit their action to those of others (Holloway & Wheeler, 1996). Based on these assumptions, individuals' behaviour is determined by the meaning that people make of their situation and is influenced by how they believe others will respond to them. In addition, individuals construct their interpretation of reality and they share an interpretation of reality in social settings through interacting that provides both subjective and multiple social realities. Charmaz (2006) argues that social interactions construct individuals' sense of reality, society and self and is reflected in our language and non-verbal communication. In this way, people are not passively engaged in social processes, rather, they think about their actions and the actions of others, and respond accordingly (Charmaz, 2006). This theoretical perspective seems appropriate for the current study and is consistent with the researcher's philosophical assumptions (which were discussed in section 3.3).

It is explicit in grounded theory that reality is constructed by how individuals perceive their world and the way they interact with others (Holloway, 2005). Also, the focus of grounded theory is to explore how participants' understanding of social processes can determine subsequent interaction (Crooks, 2001).

In this study, paediatric nurses understand their social context based on how they interpret their place in the social setting in relation to other nurses, other HCWs, patients and their families. This understanding is expressed by language and non-verbal communication. Depending on how paediatric nurses interpret their social role in relation to infection prevention and control practice, nurses will make decisions to

comply or not with SPGs. For example, paediatric nurses make choices in terms of how to comply with SPGs when they deal with emergency situations. To understand nurses' interpretation of reality in their social setting, the researcher needs to go beyond observation of external behaviour to understand how paediatric nurses construct meanings that affect their decisions. What they know about their world and what they believe to be important and how they behave in a challenging environment, which is often characterised by a lack of resources and the presence of unplanned (emergency) situations.

According to Schreiber and Stern (2001), symbolic interactionism influenced every level of grounded theory from theoretical underpinnings to actual data analysis. Symbolic interactionism concurs with the constructivist epistemological stance of the researcher. The researcher's position is that multiple subjective realities exist. Interaction between the researcher and participants leads to 'one' co-constructed reality. This reality is relative and not the only reality that could explain the phenomenon; rather, it presents as one interpretation of the participants' socially constructed systems of meaning. Charmaz (2006) argues that researchers are part of the world that they study, collect data from, and that they construct their meanings and realities based on their interaction with people, perspectives and the environment. Grounded theorists seek to identify social processes existing in human interaction. They aim to discover patterns and processes and understand how individuals define their reality, through social interaction (Cutcliffe, 2005).

3.6 Grounded theory design

Grounded theory is an inductive and systematic approach to data collection and analysis (Lawrence & Tar, 2013); it aims to develop a rich and dense theory or support an existing one (Strauss & Corbin, 1990).

In their collaborative work, Barney Glaser and Anslem Strauss articulated the strategies of grounded theory that adopted on a research project about awareness of dying (Glaser and Strauss, 1967). Glaser and Strauss came from different research backgrounds.

Glaser was a quantitative researcher who trained at Columbia University, while Strauss was a qualitative researcher who had been influenced by symbolic interactionism which was the tradition of Chicago school (Bulawa, 2014). Walker and Myrick (2006) argue that their different experiences equipped the new methodology with the strengths of both quantitative and qualitative methodology.

Grounded theory was developed to challenge the way that sociological research was dominated by existing theories (Willig, 2013). Glaser and Strauss noted that quantitative researchers aimed to confirm existing theories rather than to challenge or test them, and qualitative studies involved lengthy descriptions and little generation of theories (Glaser & Strauss, 1967). They argued there was a need for a systematic method that would allow them to move from data description to theory formation. This development of grounded theory addressed the criticism of positivists about the lack of rigour of qualitative research (Smith & Biley, 1997), and challenged the dominant oral tradition of teaching qualitative study (Charmaz, 2006).

According to Glaser and Strauss (1967) the main feature of grounded theory is the general method of constant comparative analysis. It is initiated by identifying concepts in the data (e.g. events, incidents, and other instances of the phenomena) and by comparing them with other concepts to find similarities and differences (Lincoln & Guba, 1985). Similar concepts are grouped together to form categories, then both concepts and categories are tested and compared against new data until theoretical saturation is achieved. These categories are then integrated with their properties; delimiting and forming a new theory (see the elements section on 3.6.3).

A grounded theory approach was chosen for the following reasons:

Grounded theory offers a framework of data generation and coding procedures; these guide the analytic process toward the generation of new theory. The methods used can be modified within the course of the study where the data being collected suggest that this should be done. Grounded Theory differs from other qualitative research methods in that it not only provides meaning, understanding and description of the phenomenon under study but is also theory generating (Glaser, 1978). Grounded theory has the ability

to offer a fresh perspective about the subject of enquiry (Stern, 1980). This is therefore useful in this research as the literature review indicates that little is currently known about compliant behaviour with SPGs, especially in paediatric clinical areas.

Grounded theory uses a flexible, yet systematic approach to data collection and analysis which enables the researcher to constantly compare codes and categories and stimulate theoretical imagination to develop theoretical understanding of complex phenomena (Glaser & Strauss, 1967; Strauss & Corbin, 1998).

It is useful to study human action, social structure and interaction (Annells, 1996; Cooney, 2010). This is helpful when investigating social problems or situations where people need to adapt (Schreiber & Stern, 2001). In this study, it is important to understand paediatric nurses' experience in relation to compliance with SPGs and the processes they use to make decisions about whether or how to implement SPGs. It is argued here, that compliance with SPGs rests far from simply re-educating nurses to wash their hands, rather, compliance can only be understood in relation to nurses' perception of their social world and their cultural understanding of compliance with SPGs. It is argued here that compliance with SPGs is a social construction.

3.6.1 Versions of grounded theory

The different intellectual backgrounds of the originators of grounded theory (Glaser and Strauss) contributed to the later divergence in the application of grounded theory in research (Charmaz, 2006). This divergence led the literature to classify grounded theory to two main versions: the Glasarian version based on the original work and later writings of (Glaser, 1978; 1992), and Straussian version based on the modifications made by Strauss (1987), Strauss and Corbin (1990, 1998), and Corbin and Strauss (2008). However, Charmaz (2006) developed another approach of grounded theory called Constructivist Grounded Theory which evolved from the Straussian approach. The debate in the literature about grounded theory divergence focused on three major issues: ontological and epistemological perspectives; the Straussian coding paradigm

and the approach of data analysis; and the point in the research process where the literature should be used.

Annells (1996) argues that the Glasarian approach adopts a critical realism ontological stance, which assumes that an objective realty exists that needs to be discovered and which is initially independent of our knowledge and beliefs. Hence, when researchers use a Glasarian approach they keep a position of a distant expert (Mills et al., 2006). It therefore focuses on the discovery process to generate theory, and then verifies it through measurement, such as using surveys. In contrast, Straussian approach assumes that reality is interpreted and encourages researchers to be involved in the research process which is reliant on a relativist ontology (Corbin & Strauss, 2008). Annells (1996) supported this perspective and clarified that Strauss and Corbin (1990, 1998) acknowledged that the researcher and participants create the theory together considering the contextual social factors, and recognised that 'reality' can only be interpreted. Moreover, Cooney (2010) suggests that Corbin and Strauss (2008) shifted to a more constructivist approach by acknowledging that concepts, categories and theories are constructed by researchers who interpret research participants' constructed stories.

Moghaddam (2006) explains that Glaser focused on a more rigorous and positivist analysis in contrast to Strauss's pragmatic approach. Glaser emphasised that the researcher should be a natural observer and focus on the supposition of an objective and external reality which reflected his traditional positivism (Moghaddam, 2006). While Strauss assumed that the researcher needed to keep an unbiased position through collecting data and use technical procedures to facilitate participants to 'raise their own voice', thus acknowledging their view of reality (Ghezeljeh & Emami, 2009).

However, Charmaz (2006) suggests that the approaches of both Glaser and Strauss adopt both a realist ontology and positivist epistemology, but with some differences. Charmaz's approach asserts that the meaning of a social phenomenon is constructed rather than discovered through social interaction between people, objects and culture, with multiple realities, interpretations and meanings arising out from this interaction

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(Crotty, 1998). This perspective is based on the notion that grounded theory is rooted in symbolic interactionism.

Bryman (2008) described Glaser and Strauss's approaches to reality as external to social actors and which reflected an objectivist stance. On the other hand, the constructivist approach recognises that categories, concepts and theory, are the outcome of mutual interaction between researchers and participants and these concepts and categories are hidden in the data awaiting discovery through interrogating.

Another cause of divergence between Glaser and Strauss was the using of a coding paradigm in Straussian approach. Strauss and Corbin (1998) produced a detailed, step-by-step guide to analysis that led grounded theory to be seen as almost a 'method' (rather than an 'approach' to qualitative research). The structured coding and analysis contained three stages of analysis, open, axial, and selective coding (Chen & Boore, 2009). This paradigm enables the researcher to look for the appearance of particular patterns in the data which adds a verification and deductive element to grounded theory (Woods et al., 2016). The coding paradigm helps to explore data through a set of dimensions, which causes the researcher to become sensitized to those essential aspects of the data and so to better understand the social phenomena.

Strauss and Corbin (1998) asserted that induction, deduction and verification are equally important in a Grounded Theory approach. Strauss criticised Glaser's emphasis on the inductive nature of Grounded Theory (Mansourian, 2006). While Glaser criticised Strauss's coding paradigm and argued that induction is the only way to conduct grounded theory, and that there was no place for verification as an outcome of analysis (Cooney, 2010). Glaser claimed that the Straussian approach became a full conceptual description that forced data and interfered with the emergence of concepts and the discovery of theory, that their analytical techniques inhibited creative interpretation of the data (Cutcliffe, 2005). However, Strauss and Corbin (1998) clarified that their approach was developed not to promote rigidity as their procedures were guidelines that help researchers to do data analysis, these procedures were not mandatory and researchers could adopt and adapt these guidelines in their own way.

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Charmaz (2006) criticises the objectivist nature of both Glaserian and Straussian approaches, arguing that axial coding and conditional matrixes represent a structured objectivist approach. These guidelines are perspective and not emergent and interactive, rigid and not flexible enough to enhance the theory generation (Charmaz, 2006). Walker and Myrick (2006) suggest that a rigid application of these guidelines may inhibit the emergence of the theory.

Another debate about using grounded theory related to the time of using the literature (before or after data collection). Glaser emphasised that the researcher should go to the field without preconceptions or assumptions about the phenomena, so the researcher needed to look at the related literature later at the stage of analysis (Glaser, 1978). This approach enables the researcher to be free and open to the discovery and emergence of concepts, categories, problems, and interpretations from the data. In contrast, Strauss and Corbin (1990) and Charmaz (2006) support the use of literature review prior to undertaking the study, asserting that this process is essential to stimulate theoretical sensitivity.

Creswell (1994) criticises Glaser's perspective to go to the field with a blank mind and leave the literature to the very end of the research project, and suggests that researchers still require knowledge of the research topic area, related research questions, and perspectives that are important to clarify the research focus. Also, Glaser's approach is pragmatically and theoretically unmanageable especially in a PhD doctoral programme. One of the requirements to conduct a research project is to design a formal research proposal and ethical submission (Cutcliffe, 2005). This requires an understanding of the literature in the specified area to formulate a design that can convince others of the importance of the study.

3.6.2 Why adopt and adapt constructivist grounded theory

This study was guided by an adapted version of constructivist grounded theory to address a real issue in practice. Glaser and Strauss (1967) and Strauss and Corbin (1990a, 1998) clarify that their approaches encourage researchers to use strategies of

grounded theory flexibly. LaRossa (2005) argued that rigidity was not the intention of Glaser and Strauss in their original approach and researchers can use their guidelines in different ways. Grounded theory can therefore, be adapted to suit the research question (Henriksen & Hansen, 2004), with the premise that if it works, it will be appropriate (Jolley, 2013).

Based on the epistemological stance of the researcher and on the above discussion, the current study adapted a version of constructivist grounded theory which reflected the nature of the research aims and question, and the researcher's personal philosophical stance on relative ontology and constructivist epistemology, influenced by symbolic interactionism as a theoretical perspective. Constructivist grounded theory is a flexible approach that adopts a set of principles and practices originating from traditional grounded theory guidelines to generate a theory grounded in the data (Charmaz, 2006).

Constructivist grounded theory studies people in their natural setting, in order to understand what is happening in reality, and acknowledges that social realities are not separate from the researcher because he/ she constructs the world (Ghezeljeh & Emami, 2009). Epistemologically this approach assumes that knowledge is created through social interaction between the researcher and participants (Lincoln, 1992), and that the researcher is not separate from what we can know through the construction of a particular reality (Guba & Lincoln, 1989).

Data analysis, in this approach, generates the concepts that researchers construct through constant interaction with participants to build a theoretical understanding of participants meaning of reality (Charmaz, 2006). However, the researcher needs to be aware of his/her values and presuppositions and how these affect the research process (Ghezeljeh & Emami, 2009).

This approach was chosen because it is compatible with the researcher current position that it is impossible for the qualitative researcher to remain objective. The researcher had worked in paediatric settings and had experience of the issues being discussed, so it would be difficult to assume the role of an objective outsider. The constructivist position

employed here is that paediatric nurses construct meanings about the world of infection prevention and control through interactive experiences with others.

In the present study, a comprehensive literature review was undertaken before the methodology and methods were selected. This is compliant with Strauss and Corbin (1990, 1998) and Charmaz (2006) viewpoints. The constructivist approach was adapted through using the analysis structure described by Strauss and Corbin (1990, 1998), but with a flexible and creative 'lens' to facilitate theory generation. So, the researcher maintains the constructivist mind-set to concentrate on the data rather than rigid procedures to allow theory development (Charmaz, 2006).

The researcher's professional and personal experience was considered as important to improve theoretical sensitivity and gain insight and understanding of the phenomenon under study. Reflexivity and clarifying the research position in the study enhances rigour and dependability (Johnson et al., 2001). The adapted constructivist grounded theory approach was carried out by using semi-structured interviews as the main data collection technique. Furthermore, a constant comparative strategy for the data analysis (as described by (Strauss & Corbin, 1998)) was employed, and included systematic data collection, coding and analysis through theoretical sampling. The process of constant comparison was continued until data saturation was achieved, this being a characteristic of rigorous inductive data analysis.

An adapted constructivist grounded theory approach can address those factors that affect paediatric nurses' compliance that are not well understood in the literature (Foster & Sabella, 2011). Moreover, this design helps to describe what is going on in terms of the nurses' own sense of reality, to discover meaning. There are no studies conducted in the paediatric infection control area from Jordan using this approach. Using an adapted constructivist grounded theory approach provided rich insights and in-depth information to achieve more understanding, and the impact of, nurses' compliance with SPGs in paediatric clinical practice.

Regardless of the variations between different approaches that apply to grounded theory, there are common elements that the researcher needs to follow to claim a grounded

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theory approach. In the following sections these elements are discussed and clarified by the researcher on how they were use in this research.

3.6.3 The main elements of grounded theory

In order to enhance rigour, the researcher adhered to the common elements of grounded theory that include using literature in grounded theory, theoretical sensitivity, theoretical sampling, the coding process, constant comparative analysis, and memo writing.

Using literature in grounded theory

There is a debate between grounded theory schools as to when and how existing literature should be used. The researcher adopted the Strauss and Corbin (1998) and Charmaz (2006) standpoint, which accepts the desirability of reading the literature prior to undertaking the study, asserting that this process is essential to stimulate theoretical sensitivity.

This process assisted the researcher to prepare a range of questions to use as interview prompts. A comprehensive literature review was carried out before the researcher began data collection and this process helped in clarifying thoughts and facilitating the narrowing down of the topic of study. This review identified existing areas and helped to identify where further research was indicated. In addition, prior reading of the literature ensured originality of the work for doctoral study and allowed the study to build on existing work in this field. The access to literature was an on-going process during data collection and analysis. Literature was used to stimulate theoretical sensitivity by checking ideas in the literature against the actual data.

Theoretical sensitivity

Theoretical sensitivity is gaining insight, and being sensitive to the data, so the researcher becomes able to find meaning in the data, has the capacity to understand the data, and is capable of separating the important and related data from that which is not (Strauss & Corbin, 1998).

The sources of theoretical sensitivity include the reading of literature to gain familiarity with publications and to enable the researcher to obtain insight into the phenomenon under study. Another important source which was rejected by Glaser (1978), included the personal and professional experience of the researcher. The researcher had more than ten years' experience in both academic and clinical settings, four of them in the PICU. This experience enabled him to understand how infection control issues work in the field, and what may happen under certain circumstances.

To avoid forcing analysis when reading the literature, Elliott and Jordan (2010) suggest adoption a strategy of in vivo coding (participants' words), especially in early stages of open coding. Furthermore, they suggested beginning early constant comparative analysis to correct any distortion that can potentially occur as a result of earlier reading of the literature. The researcher was conscious that complete objectivity and neutrality are impossible to achieve because of his familiarity with some of the care settings and his role as the main research tool; preconceptions about compliance with SPGs did indeed exist. However, it was important to maintain a balance between subjectivity and objectivity, and to identify the researcher's preconceptions and participants' understanding. This self-awareness knowledge enabled the researcher to constantly reflect on the need to be as open as possible in order not to influence the participants' perceptions in order to discover their own beliefs and perspectives.

Theoretical sampling

There are different types of purposive sampling, such as homogenous, heterogeneous, total population, snowballing, convenience, and theoretical sampling. Many qualitative studies use purposive and theoretical sampling (Mason, 2002). Theoretical sampling is often used in grounded theory and is defined by Charmaz (2006) as *"seeking and collecting pertinent data to elaborate and refine categories in your emerging theory"* (p.96).

Purposive-theoretical sampling is appropriate for qualitative research because it is a flexible method that allows researchers to shift their sampling plan throughout the research process as a result of the theoretical issues raised during data collection. Hence

this qualitative design is suitable for this study as the emergent process is enabled during data collection and analysis (Parvizy & Ahmadi, 2009). In this study, a purposive recruitment method was undertaken but the sampling method subsequently became theoretical in order to identify key individuals (nurses) to address the research question and to elicit their views and experiences (Mansour, 2011). Recruitment of volunteers continued until theoretical saturation was achieved.[12]

The purposive sampling technique was used in the initial stages of this research to recruit three pilot interviews at different times based on the recruitment questionnaire. The initial interview guide was used in this stage and preliminary analysis subsequent to the interviews was undertaken. Based on these findings, comments from the participants, and feedback from the study supervisors, minor modifications to the prompts were made. One of the advantages of semi-structured interviews is the possibility of adding or remove questions during the data collection period in response to the data being collected (Strauss & Corbin, 1998).

The analysis of the pilot interviews and the modification of interview prompts directed the future of the data collection. The researcher did not do a full extent theoretical sampling for practical considerations as the data collection from Jordan had a three-month window of opportunity. In addition, the level of freedom to change the interview guide through the process of data collection was problematic as any changes required ethical approval from each participating hospital. However, the minor modifications of interview prompts, elicited answers to concerns in the data and guided the researcher to find key individuals to saturate the codes and categories to enable theory building.

As a result of theoretical sampling, it was necessary to conduct a number of interviews in a private hospital to compare the resources and type of education with those of public and teaching hospitals. Additionally, more participants were invited to participate from one of the public hospitals to confirm the results. Further recruitment also took into consideration the age and experience of participants. Some wards were underrepresented, so the researcher recruited more participants from these wards.

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[12] According to (Strauss & Corbin, 1990; 1998), saturation means that no additional codes or themes are added.

Additionally, in paediatric settings only a few male participants were found, but the researcher managed to recruit three who met the inclusion criteria.

Coding process

Both Glaser and Strauss consider coding as an essential element of the data analysis in grounded theory. It begins with a deconstruction of information to form the initial codes and concepts. Then, these codes are arranged to form categories, which exist as theoretical concepts that reflect their content codes. These categories are then compared with other categories. Charmaz (2006) asserts that the coding process in grounded theory generates the bones of analysis by linking data to the emerging theory, explaining what appears and is happening in the data. This approach facilitates the management of a large set of data by dividing the whole into smaller, more manageable units.

The importance of coding in grounded theory is that it is concerned with building rather that testing theory, so, at any one point in time, the researcher needs to ask analytical questions of the data in order to understand what is happening (Charmaz, 2006). The analytical issues that emerge from this process direct the subsequent data collection (Corbin & Strauss, 2008).

Coding is the first step of the analysis, which includes either concepts' that are abstracted from the research data or labels, behaviour, or categories that are constructed by the analyst to provide an explanation of the phenomena being expressed by the data (Kenny & Fourie, 2015). The researcher begins to code each incident in the data to as many concepts and categories as possible. Then he/ she compares each incident with other incidents in the same category and so with other categories (Strauss & Corbin, 1998; Charmaz, 2006). Later, the researcher integrates categories and their properties through constant comparison of new incidents with properties in each category. Finally, by discovering relationships between concepts and classifying them into categories, subcategories and properties, distinctive categories will emerge to provide a theoretical understanding of what happens in the data (Strauss & Corbin, 1998).

The researcher's role in the coding process is to interpret codes that were originally raised from participants' language and their experience of the phenomena in question. Therefore, it is important to interact with data with a close attention to detail and the emergent data to facilitate an interpretation of participants' tacit meaning and understanding of the phenomena (Mills et al., 2006).

Grounded theory schools utilise three distinct coding systems with many similarities. The classic grounded theory or Glasarian version maintains the original approach that described by Glaser and Strauss (1967) which consists of substantive (open and selective) and theoretical coding to discover a theory that is grounded in the data. Straussian version adopts a more rigorous coding structure that consists of open, axial and selective coding, which aims to apprehend the data to develop the theory (Strauss & Corbin, 1990; Strauss & Corbin, 1998). While Charmaz implements a more flexible and pragmatic approach in coding the data to facilitates the construction of conceptual interpretation of the phenomena (Charmaz, 2006).

The researcher in the current study follows the coding structure that was described by Strauss and Corbin (1990, 1998), while he maintains the constructivist mind-set to concentrate on the data rather than rigid procedures to allow theory development (Charmaz, 2006). In open coding the categories are discovered, and in axial coding the links between categories and their subcategories emerge, while selective coding aims to integrate and refine the theory (see the discussion in the data analysis section 3.11).

The coding process was not entirely sequential (the line between coding stages is transparent). For example, during the axial coding stage, the researcher returned on several occasions to the open coding stage and modified the codes and categories. Interview transcripts were the main focus of data analysis and coding, while field notes and memos were used through the whole process to support the coding process and check the consistency.

Constant comparative analysis

The general method of constant comparative analysis is an essential feature of grounded theory. Mansourian (2006) argues that the success in grounded theory research is linked to the use of the constant comparative method where data collection and analysis occur simultaneously. This method helps to enhance theoretical sensitivity by stimulating the researcher's thought about incidents, concepts, categories, properties and theory development (Corbin & Strauss, 2008).

Initially concepts in the data are identified (e.g. events, incidents) and compared with other concepts at the property or dimensional level to find similarities and differences (Strauss & Corbin, 1998). Strauss and Corbin described property as an attribute of the concept, while dimension is the location of this property on a continuum. For example, 'autonomy' is a property of the concept of 'nursing professionalism'. Autonomy dimensionally ranges from 'no autonomous control', to fully autonomous. Similar concepts or incidents are placed together to form categories, then both concepts and categories are examined and compared against new emerging categories until theoretical saturation is attained. The next stage is for concepts and categories to be integrated with their properties to help in delimiting and writing the theory (Charmaz, 2006).

The researcher compared concepts and incidents with each other in the same interview to find a relationship, and then compared them with different interviews. Analysis and comparison of data from the first three pilot interview transcripts developed codes, concepts and categories that guided data collection in subsequent interviews. The researcher used this method along the whole period of data collection and analysis.

Memo writing

The researcher used memos from the beginning of the study and continued until the chapters related to the findings were completed. Memos were kept as notes to provide a means of documenting thoughts about the codes and emergent categories, and to record the interaction between these categories as the study progressed. These memos assisted the researcher in linking categories to their subcategories and were useful in the analysis

stage to help identify issues relating to theoretical sampling (Strauss & Corbin, 1998; Charmaz, 2006). Memoing allowed the researcher the freedom to record ideas during the analysis process, so that the ideas could be sorted, categorized and reflected upon. The writing of memos and the subsequent reflection was useful in the development of the final categories based on open, axial and selective coding. Moreover, the researcher used the memos to discuss the progress of the analysis with his supervisors.

Memoing was an essential element of the analysis process as it sensitized the researcher to his personal biases by reflecting on memo notes. Memos, in this study, ranged from just a sentence or a paragraph to a few pages. They recorded ideas in both Arabic and English languages, and were used to support analysis of codes and categories. The researcher kept a file for his memos, including both handwritten and printed type notes, to keep them organized and ordered, which facilitated retrieval during analysis and the writing up process. Each memo was dated, and referenced the source from which it was taken (Strauss & Corbin, 1990).

To conclude, this study employed an adapted grounded theory strategy for the analysis as described by Strauss and Corbin (1998) and Charmaz (2006). The initial analytical process began during the data collection phase, and all concepts and categories emerging from one stage of the data analysis were compared with concepts emerging from the new text.

3.7 Setting

The data collection took place in a number of paediatric departments at five hospitals (one large teaching hospital, two large public hospitals, and two private hospitals) in Amman, the capital of Jordan. The paediatric departments included paediatric wards and paediatric intensive care units. The researcher selected these hospitals for several reasons. First, the use of a variety of hospitals and different paediatric departments facilitated the recruitment process. Second, 40% of the Jordanian population live in Amman. Third, Jordanians come to Amman from different regions seeking good

medical services. Fourth, choosing hospitals in the same city facilitated the recruitment process.

The healthcare system in Jordan consists of four sectors: public, military, educational, and private. The Ministry of Health is the regulatory body for all healthcare sectors in Jordan. Therefore, these sectors follow the general principles and laws of the Ministry of Health, but also have their own regulations and policies to organise the daily work. The study was conducted in five hospitals in Amman. The first one is a large teaching hospital with a capacity of more than 500 beds, with different paediatric wards and departments, including the Paediatric Intensive Care Unit (PICU), and medical and surgical wards. The Ministry of Finance, Ministry of Health, and service user fees fund this hospital. The second and third hospitals are large public hospitals with a capacity of more than 500 beds each, which provides most of the population with health care at low cost, and which are mainly funded by the government. These hospitals include one large paediatric ward receiving medical and surgical patients and a small PICU unit, which are served by the same nursing staff. The fourth and fifth hospitals are private, with a capacity of more than 200 beds, and include only paediatric wards (no PICU unit).

The researcher selected the above paediatric settings for the following reasons:

- No studies in Jordan could be found about paediatric nurses' experiences and perceptions regarding infection control measures.
- In general, the factors that prevent compliance with SPGs among paediatric nurses are not well understood in the literature (Foster & Sabella, 2011).
- Despite HCAI being a major issue in paediatric departments (Purssell, 1996), few studies have examined compliance with SPGs in paediatric clinical areas.
- Infection control practice in paediatric areas is different from adult areas, because paediatric patients, especially young children, differ in their behavioural characteristics when compared to adults, in relation to hygiene and direct contact between children during play. These characteristics facilitate the spread of infections.

This study aimed to achieve a better understanding of factors influencing compliance with SPGs, and how these factors affect paediatric nurses' decisions to adopt compliant behaviour.

3.8 Recruitment

This study recruited qualified paediatric registered nurses in eight paediatric departments at five hospitals in Jordan (one large teaching hospital, two large public hospitals, and two private hospitals). The nurses were on the working schedule.

In Jordan, there are two types of nurses. Professionally qualified registered nurses' hold a four-year bachelor of science in nursing. Associate nurses (nursing assistants) hold a two-year associate degree in nursing.

The inclusion criteria for the study sample were:

- Registered nurse with at least one year's experience in paediatric departments (there are no associate nurses working in PICU departments, and their duties are limited to paediatric wards);
- Being currently on the working schedule;
- Currently working in one of the paediatric departments.

Also, actors needed to be:

- Willing to participate;
- Able to participate;
- Willing to discuss their perceptions, and share detailed information about their experience with the phenomenon upon which this study focuses.

The exclusion criteria were:

- Associate nurses, because there are no associate nurses working in PICU departments, and their duties are limited to paediatric wards (families participate in their children's' care).
- Registered nurses with less than one year's experience in the paediatric area.
- Registered nurses who take prolonged leave (e.g. unpaid leave for one year).

3.8.1 Sampling

The goal of qualitative research is to gain an in-depth understanding of phenomena, rather than to generalise findings to a population. Therefore, using random sampling is

unusual (Cooper & Endacott, 2007). In qualitative research, it is important to select participants who have experienced the phenomenon and are interested in sharing their understanding and knowledge of that phenomenon (Seidman, 2006). Therefore, there is a need for a specific technique of sampling to recruit appropriate participants to share their experience with the researcher.

In qualitative research, purposive sampling, a type of non-probability sampling, is usually used. Purposive sampling is defined as the intention to select participants who have experience and in-depth information about the phenomenon being studied. Purposive sampling also allows for the selection of participants based on their willingness to share their experience and their suitability to provide rich data for in-depth analysis (Patton, 2002).

There are different types of purposive sampling, such as homogenous, heterogeneous, total population, snowballing, convenience, and theoretical sampling. Many qualitative studies use purposive and theoretical sampling (Mason, 2002). Theoretical sampling is often used in grounded theory and is defined by Charmaz (2006) as *"seeking and collecting pertinent data to elaborate and refine categories in your emerging theory"* (p.96).

Purposive-theoretical sampling is appropriate for qualitative research because it is a flexible method and researchers can shift their sampling plan throughout the research process based on the theoretical issues raised during data collection. This feature is suitable for a qualitative design that is emergent during data collection and analysis (Parvizy & Ahmadi, 2009).

In this study, a purposive recruitment method based on theoretical sampling was employed in order to identify key individuals (nurses) to address the research question and to elicit their views and experiences (Mansour, 2011). Recruitment of volunteers continued until theoretical saturation was achieved. According to Strauss and Corbin (1990, 1998), saturation means that no additional codes or themes are being added to new data.

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An adequate sample size is important in qualitative studies to enhance rigour and credibility and to reach theoretical saturation. However, there are no definite rules for sample size in qualitative research. The sample may range between four and 40 participants (Holloway & Wheeler, 1996). Moreover, the aim of sample size is to understand the phenomenon rather than to represent the population (Mason, 2002).

Existing qualitative studies conducted in infection control areas used different sample sizes. For example, Efstathiou et al. (2011a) used semi-structured interviews with 30 nurses to study the factors that influenced their compliance with SPGs. Ward (2010) used semi-structured interviews with 40 nursing and midwifery students to explore their experience in relation to infection control in their clinical placements. In another study, Ward (2012) recruited 31 nursing students and 32 nursing mentors to investigate their views towards infection prevention and control practice. Gurses et al. (2008) used semi-structured interviews with 20 healthcare providers to explore underlying causes of non-compliance with evidence-based guidelines. All of these studies claimed that they reached theoretical saturation. In the present study, the researcher planned to recruit around 25 to 30 participants. In the event, 31 qualified nurses were recruited over a period of three months. Figure 3-1 shows the demographic characteristics of participants.

Sampling started with three pilot interviewees and continued until theoretical saturation had been achieved. In fact, this point had been achieved after 25 interviews. However, the study continued to recruit an additional six interviews from different paediatric areas to be sure that saturation had been reached.

Figure 3-1 Demographic characteristics of participants

Interview NO.	Hospital	Department	Code number	Gender	Age	Total Experience	Paediatric experience
1	Teaching hospital	PICU	AA1	M	30-34	6_10	6_10
2	Teaching hospital	PICU	AA2	M	25-29	6_10	6_10
3	Teaching hospital	PICU	AA3	F	<25	1_5	1_5
4	Teaching hospital	PICU	AA4	F	<25	1_5	1_5
5	Teaching hospital	Floor	AC1	F	25-29	1_5	1_5
6	Teaching hospital	Floor	AB1	F	30-34	6_10	6_10
7	Teaching hospital	PICU	AA5	F	25-29	1_5	1_5
8	Teaching hospital	PICU	AA6	M	30-34	6_10	6_10
9	Teaching hospital	Floor	AB2	F	25-29	1_5	1_5
10	Teaching hospital	Floor	AB4	F	34-39	>10	>10
11	Public hospital 1	Floor	BA1	F	25-29	1_5	1_5
12	Public hospital 1	Floor	BA3	F	30-34	>10	6_10
13	Public hospital 1	Floor	BA4	F	34-39	>10	>10
14	Public hospital 1	Floor	BA5	F	<25	1_5	1_5
15	Public hospital 1	Floor	BA6	F	30-34	6_10	6_10
16	Public hospital 2	Floor	CA1	F	<25	1_5	1_5
17	Public hospital 2	Floor	CA2	F	30-34	6_10	6_10
18	Public hospital 2	Floor	CA3	F	30-34	6_10	6_10
19	Public hospital 2	Floor	CA4	F	<25	1_5	1_5
20	Public hospital 2	Floor	CA5	F	<25	1_5	1_5
21	Public hospital 2	Floor	CA6	F	25-29	6_10	6_10
22	Public hospital 2	Floor	CA7	F	30-34	6_10	6_10
23	Public hospital 2	Floor	CA8	F	25-29	6_10	6_10
24	Public hospital 2	Floor	CA9	F	25-29	1_5	1_5
25	Private hospital1	Floor	DA1	F	25-29	1_5	1_5
26	private hospital 2	Floor	EA1	F	34-39	>10	6_10
27	private hospital 2	Floor	EA2	F	<25	1_5	1_5
28	private hospital 2	Floor	EA3	F	30-34	6_10	6_10
29	private hospital 2	Floor	EA4	F	25-29	1_5	1_5
30	private hospital 2	Floor	EA5	F	30-34	6_10	6_10
31	private hospital 2	Floor	EA6	F	25-29	1_5	1_5

3.8.2 Recruitment procedure and gaining access

At the beginning of this stage, the researcher gained ethical approval from ethics committees in the following institutions:

- Faculty of Health and Social Care (FHSC), University of Hull;
- Jordan Ministry of Health;
- The ethics committee of each participating hospital.

Letters were sent explaining the purpose of the study to gatekeepers (hospital administrators and paediatric department managers) to arrange for meetings to take place.

There is no national ethical approval system in Jordan, and most hospitals have separate ethics committees. For example, to gain ethical approval from public hospitals in Jordan, the researcher applied to the Ministry of Health ethics committee, then to each participating public hospital separately. Private and teaching hospitals have separate ethics committees, and the researcher applied to them immediately.

After the FHSC[13] had approved the study, an ethics application was made to the Human Resource centre in the Jordan Ministry of Health. Then, when approval was received, applications were made to the ethics committees of two large public hospitals. One of these hospitals called the researcher for an interview with the head of the ethics committee to clarify the recruitment process. The application to this hospital took a long time, and the ethics committee meeting was cancelled many times. Ethical approval was also gained from the second public hospital. Later, the researcher visited the nursing managers of the hospitals and explained to them the research study's aims, methods, and recruitment process. They were very cooperative and expressed their interest in the study. In addition, the researcher visited the paediatric departments and discussed the research with the ward managers to ensure their cooperation.

The ethical application process for private hospitals was slightly different from public ones. In the beginning, two private hospitals were chosen (each containing one

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[13] Faculty of Health and Social Care, University of Hull.

paediatric department), and the researcher gained ethical approval from both of them. However, one paediatric manager in one hospital refused to give access to nurses, because it was felt that this would increase the nurses' workload. As a result of this concern the researcher clarified that interviews could be undertaken outside working hours, however this was not accepted and so this hospital was excluded. This meant a new application to another private hospital was made and this time the researcher received the necessary hospital ethical approval and the paediatric manager was supportive of the research initiative.

It was necessary to take into consideration some factors that could have affected access to participants. These include anxiety from institutions that the researcher would disturb the setting or because there was a fear of criticism, especially as gatekeepers may have regarded the research focus as sensitive (Holloway & Wheeler, 1996). The researcher considered these factors when contacting gatekeepers.

To gain access to a clinical area, the researcher spoke to gatekeepers such as internal education departments, directors of nursing, and paediatric department managers in order to secure their cooperation. The discussion included the purpose of the study, researcher identity, recruitment strategy, data collection method, sample size, and ethical issues (see appendix 2 from 1-7 and appendix 3 from 1-4). This discussion was important to reduce institutional anxiety and to clarify any risks, which might have been posed by the research.

The researcher had previous experience in different clinical areas, mainly in paediatric settings, in one of these hospitals. His training at bachelor's and master's degree level was in Jordanian hospitals and provided an understanding of the healthcare system in Jordan, and of the participating hospitals. Furthermore, it helped him to gain access to those hospitals, and to contact nurses. As a result of this familiarity with the paediatric departments and staff it facilitated the recruitment process and communication with nurses.

The potential implication of the researcher being familiar with the personnel and potential recruits was mitigated by the fact that he had not worked in the areas since

2006 and most of the staff had changed since that time. Also, the researcher introduced himself to paediatric departments' managers and nurses as a PhD student to conduct a research study, and this was clarified in information sessions, and outlined in the information sheet (see appendix 3 form 3.4).

Once ethical permission and access had been obtained, the researcher arranged meetings with each paediatric department manager (paediatric wards, and PICUs) to arrange dates and times to conduct brief information sessions (around 15 to 20 minutes) to explain the nature of the study and to ask for volunteer participants. These sessions were conducted in each paediatric department for three different shifts. During each of these sessions, the study's purpose, brief background, consent form, and the interview procedure were discussed. The researcher visited paediatric departments and conducted information sessions many times. This helped to build a trusting relationship between the researcher and participants.

At each information session, envelopes were distributed which included a very brief demographic questionnaire for recruitment purposes, invitation letters and information sheets. Nurses were asked to complete the recruitment questionnaire (including brief demographic data) in their free time and to leave it in a special box in the department. The information sheet contained a short explanation of the aim of the study, risks and benefits, rights of the participants, informed consent process, and the researcher's email address and phone number for any enquiries from participants. The researcher left additional envelopes in all paediatric departments and asked the departments' managers to distribute them to other staff members who did not attend the information sessions. In addition a period of two weeks was given for participants to read the information sheet and fill the recruitment questionnaire. The researcher also clarified that the participation was voluntary and that the staff were free not to participate if that was their wish.

Using information sessions as part of the recruitment process may reduce prospective nurse participant's' doubts or fears about the study. Moreover, the recruitment questionnaire was designed to facilitate participants' selection, and make them aware of the nature of the study (Saifan, 2010). This technique was designed to increase the

recruitment (Baker, 2003), and help to build a trusting relationship with participants prior to the interviews taking place.

The nurses who completed the questionnaire, who met the inclusion criteria, and who expressed their willingness to participate in an interview were asked to complete an interview consent form. The interviews were conducted in a private room in each department, for example, in a paediatric manager's office, seminar room or treatment room if it was not in use. The researcher also offered the option to conduct interviews in a comfortable place outside clinical areas (in a comfortable room in a university setting), but all participants preferred their clinical areas. Most paediatric managers gave the participating nurses a break of one hour during their duties to undertake the interview.

Conducting interviews in a place that is comfortable and convenient for interviewees is important for the following reasons:

- To avoid interruptions during the interview;
- To enable participants to speak freely without fear of being identified if they choose to discuss sensitive topics.

Figure 3-2 shows the steps of the recruitment process.

Figure 3-2 The steps of the recruitment process

Ethical approval from the University of Hull (UK), Jordanian Ministry of Health, and participating hospitals

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Letters to directors of nursing, paediatric department managers

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Visiting clinical areas, meeting with stakeholders (gatekeepers) such as nursing directors, internal education managers and paediatric department managers, to secure access to participants

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Information sessions were conducted, and recruitment questionnaires were distributed and collected from each department. Participants were given two weeks to complete the questionnaire and express their willingness to participate Around 46 nurses completed the recruitment questionnaire. Some of these were excluded because either they did not meet the inclusion criteria or they changed their mind and refused to participate in interviews

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Nurses who met the inclusion criteria and were willing to participate were asked to complete an interview consent form

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Interviewees had the opportunity to choose the date and place to conduct the interview

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Before conducting the interview, the researcher checked that participants understood the information sheet, and knew that they could withdraw from the study at any time (after they signed the consent form)

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3.9 Ethical consideration

Formal approval was gained before starting the data collection from the research ethics committees at the University of Hull, the Jordanian Ministry of Health and from each participating hospital's ethics committee. All ethical applications in Jordan included the following documents: ethical approval from the FHSC, project details, a formal letter from the supervisor, an invitation letter to participants, a consent form, interview guide questions, the recruitment questionnaire, and the information sheet (All the documents are attached in the appendices from 2-3).

Potential ethical issues were addressed to protect participants from any harm. According to Todres and Holloway (2006), ethical issues should be considered in the whole research process, including avoiding doing harm to participants and researchers, autonomy and voluntary participation, anonymity and confidentiality, and justice.

The following procedures were undertaken to protect participants:

3.9.1 Autonomy and voluntary participation

This refers to the right of the individual to decide voluntarily what research activities they will or will not participate in, without any risk of penalty or unfair treatment (Polit & Beck, 2004). This means that participants needed to be fully informed about the study and their rights and responsibilities, and make a voluntary decision to participate without influence from others.

In this study, information sessions were conducted to recruit participants who met the inclusion criteria. In each information session, the researcher distributed an envelope that included a brief demographic questionnaire for recruiting purposes, an invitation letter and an information sheet. Nurses were asked to complete the recruitment questionnaire attached with invitation letter, which included the demographic data and inclusion criteria, in their free time, and returned it to the researcher in the enclosed envelope at the end of their duty or at any other convenient time.

The information sheet contained an explanation of the aim of the study, risk and benefits, rights of the participants, informed consent process, and the researcher's email address and phone number for any enquiries from participants. Nurses were welcome to ask questions about the study and contact the researcher for any clarifications.

Oral and written consent were obtained from participants before conducting the interviews to clarify that their participation was voluntary and that they had the right to refuse to participate or withdraw at any time without any penalty. Further, the participants were told that they could refrain from answering any questions and could terminate the interview at any time (this did not happen in any interview). The consent process was important to be sure that the participants understood the information sheet and were fully informed about the study. All participants received a copy of their signed consent.

During the interview, the participants had the right to take a break or stop voice recording (some participants asked to stop recording for a few minutes).

3.9.2 Beneficence and non-maleficence

The researcher used techniques to protect participants from harm, either physical or emotional. The participants were informed about the possible benefits and risks of taking part in this study, and this was clear in the information sheet.

For example, the researcher clarified in the information session and the information sheet that there would be no direct benefit from participation in this study, such as payment for participation.

The participants were told that the findings could improve the standards of care, patient safety, and nursing practice. Therefore, by participating in this study, the participants' voice would be heard by stakeholders to improve standards of care. It was recognised that the nurses could become upset or embarrassed when talking about their experiences of infection control measures. In recognition of this fact participants were offered the option of stopping the interview at any time, and of refraining from answering

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questions. Participants were also offered the opportunity to pause the interview if they felt it was necessary.

To minimise the possible harm from participating in this study, the researcher distributed an information sheet including the participants' rights and detailed information about the study (the purpose of the study, potential risks and benefits). The information sessions and consent form process helped the participants to understand their rights and responsibilities during their involvement in this study.

The researcher was aware that the participants might be afraid that what they said could reach their colleagues, and consequently may be reluctant to talk about some issues. Therefore, the researcher clarified both orally and in written form (information sheet) that the identity of each participant would be protected, replacing their names with a code number in the transcripts, and using pseudonyms in the thesis reports and published papers. Undertaking it in this way meant that it would not be possible for any participant to be identified as working for any particular hospital. This enabled participants to speak freely, without fear of being identified.

3.9.3 Anonymity and confidentiality

The interviews were conducted in a private room in each department (paediatric managers' offices, seminar rooms, treatment rooms) to avoid interruptions and maintain privacy during the interview.

The information sheet stated that the participants' responses would be treated with full confidentiality and anonymity, and anyone who took part in the research would be identified only by code numbers or by a pseudonym. Pseudonyms were used when quoting from the transcripts so that research participants could not be identified.

Furthermore the researcher demographic information and the transcribed interviews were stored separately. The researcher asked the participants not to mention their names in the recording, and each recording was assigned a code number.

All interviews were recorded on audiotape and then transcribed. The audiotapes were stored in a locked, secure place at all times, and the computer data were encrypted and so protected from intrusion. The audiotapes will be destroyed at the end of the study. Access to tapes was only available to the researcher and his supervisors.

All data were collected in Jordan and brought to the UK. These data were protected in transit by using a password-protected personal laptop and magnetic hard disk drive (with all the data encrypted). The personal data will be destroyed upon completion of the study and dissemination of the findings (maximum up to ten years).

The interviews were processed using a computer package (NVivo 10). At the end of the research, a thesis will be completed and publications from this will be submitted to peer-reviewed journals and conferences presentations will be undertaken to disseminate the findings. No research participant will be identifiable in any of these outputs.

Electronic data were stored in password protected and encrypted computer files (personal computer in the university, and personal laptop). Other hard data were stored in a locked file, and only the researcher and his supervisors could access them. Storage of data followed the University of Hull regulations.

3.9.4 Justice

This study employed purposive sampling to recruit qualified paediatric nurses from different paediatric areas in five hospitals. All participants were given the same information about the study and asked the same prompt questions from the interview guide.

3.10 Data collection

Semi-structured interviews are commonly employed in qualitative research. To meet the purpose of this study, the researcher used semi-structured face-to-face interviews. The processes of data collection and analysis were conducted simultaneously until concepts and themes became saturated when there were no further new codes from additional

interviews (as outlined in Strauss & Corbin, 1998). However, for practical reasons, the detailed analysis was performed after the data collection. In the following sections, the qualitative interview method and the rationale for its use in this study is discussed and justified.

3.10.1 Qualitative individual interview

The interview is an important method of data collection. For example, nurses can report their beliefs and attitudes and may talk about their actions and behaviours. The interview is a two-way process in which the researcher and participant engage in a dialogue to explore the topic at hand. The partnership relationship facilitates this discussion and enables the researcher to explore interviewees' perspectives and experiences with the phenomena in question.

The interview has many benefits in comparison with other data collection methods. For example, it can discover the interviewees' own framework of meaning and give them the opportunity to describe their experience in detail and give their perspective on the phenomenon in question. The researcher, through discussion with participants, can better understand the research problem.

According to Silverman (2001), conducting interviews is a good opportunity to build a trusting relationship; one that can enable participants to express their feelings openly and talk in detail about their various experiences. Pope and Mays (2006) assert the research interview is an interactive method that enables the researcher to explore what people say in as much detail as possible and to uncover new ideas that were unexpected. While Gill et al. (2008) highlight that the qualitative interview approach helps to achieve a better understanding of peoples' beliefs, views and experiences of the phenomenon. Hence the interview used in qualitative research is a partnership between the researcher and actor. The control has, therefore, to be shared; as the actor will tell the researcher things that he/she did not know. In this way, actors need to be willing to work with the researcher (Holloway, 2005). The researcher here needs to choose

participants who are willing to participate to tell the 'truth' about the phenomenon under study.

The researcher uses probing in an appropriate way to achieve a better understanding of the actor's experience and perspective. This means there is a need to provide appropriate verbal and non-verbal feedback to the actor to promote discussion and allow him or her to communicate in an open and comfortable way. In pursuance of this, the researcher completed training in qualitative interviewing that equipped him with the required interviewing skills, including those of probing.

The researcher in this study used face-to-face interviews as the main data collection tool. This option was consistent with the study's philosophical assumptions. Nurses are experts in the field and know what actually takes place in practice, so it is valuable to go to the field and ask nurses about their experiences and perceptions by conducting in-depth interviews.

The use of focus groups was considered but was rejected after due consideration. For example, use of this data collection method can threaten the confidentiality of participants (Pope & Mays, 2006). In addition, because of the nature of nursing, it is difficult to bring nurses together at the same time to participate in a focus group.

Direct observation was considered as a data collection method, however, this approach was dismissed for several reasons. The aim of the study was to understand nurses' experiences and perceptions, rather than to describe their behaviour. It would not be possible to observe different procedures regarding infection control measures at the same time. It would be difficult to measure what change in performance might have taken place because of the observation itself. Lastly, direct observation presents a number of ethical challenges in that it can easily breach patient confidentiality standards and needs on-going consent (Jolley, 2013).

Diaries can be useful in situations where participants are reluctant to be interviewed, or the collection of data needs to be carried out over a long period (Jolley, 2013). However, the nurses may be reluctant to put their thoughts down on paper, especially for issues

related to non-compliance with guidelines, such as 'I didn't wash my hands today because they were sore'. Therefore, it was considered better to use semi-structured interviews to elicit participants' experiences, rather than diaries.

3.10.2 Semi-structured interviews and rationale

An interview guide (see below) was used to direct the conversation and focus on the phenomenon in question (Pope & Mays, 2006). Prompts were used to give the interview some structure and to provide the interview with the necessary focus. The length of the interviews ranged from 30 to 55 minutes.

According to Patton (2002), thick description of the phenomena can be achieved by using semi-structured interviews, where open-ended questions are used to enable participants to express their experience in their own words. In this study, using open-ended questions enabled probing to take place to ensure that deeper and more meaningful responses were secured. The interviews were 'open-ended' to allow participants to express themselves in their own words and to facilitate a process of discovery (Forman et al., 2008). This approach was chosen to explore both nurses' perceptions and experiences, and other concerns related to infection prevention and control practice.

The interviews as described above, were appropriate to explore participants' perceptions and their experiences of complex and sensitive issues. The interview enabled probing to elicit a deeper clarification of participants' responses to the prompts (Louise Barriball & While, 1994). This facilitated the participants to discuss in depth their own experience of infection control practice, and to acknowledge any non-compliant behaviour by themselves or other healthcare professionals. Semi-structured interviews enabled focus while also allowing participants to expand on topics that they considered important in practice.

This type of interviewing includes pre-planned prompts to guide the researcher to cover the same area in each interview and to collect similar types of data from all participants. The researcher can use probing to explore interesting emergent points in the interview.

By following this approach, the researcher can exclude irrelevant information and save time in comparison with the unstructured approach (Holloway & Wheeler, 1996).

Before conducting the interviews, a small number of guided prompts (pre-set of core questions) were designed to ensure an appropriate focus of the discussion. These prompts were derived from reviewing gaps in the existing literature. In addition, the researcher discussed with his supervisors and other PhD colleagues to check the suitability of the prompts and the interview guide.

These prompts guided the discussion toward:

- Participants' understanding of the factors influencing compliance with SPGs;
- Participants' perceptions of dissonance between what is 'meant' to take place and what actually takes place in relation to infection practice;
- Participants' views on how they perceive the importance of Standard Precautions; what things are more important, and what things are less important.
- What factors are seen to render basic precautions less important or more important (for example, diffusion of responsibility, the ability to rationalize the lack of adherence to basic precautions')?
- What is their perceived risk analysis of HCAI (how do they view the risk)?
- How can things be made better?

3.10.3 Interview Guide

The researcher used an initial interview guide to conduct three pilot interviews. Based on these interviews, comments from the participants, and feedback from the study supervisors, minor modifications to the prompts were made. One of the advantages of semi-structured interviews is the possibility of adding or remove questions during the data collection period in response to the data being collected (Strauss & Corbin, 1998). Table 3.1 shows the initial interview guide.

Table 3-1 The initial interview guide

General questions to build rapport with the interviewees, such as: 'could you tell me about yourself; your job; roles and experiences?'

1. Please tell me about your experience with infection control measures in the paediatric clinical area.

2. What do you think about infection control in the paediatric clinical area?

(Prompts: Is it part of your professional role; is it a priority in your work)?

3. What are your overall perceptions of infection control in your hospital?

(Prompts: Tell me whether you think your department shares similar aspects to those of your hospital. Tell me whether you think there are differences and why do you feel this is the case.)

4. Tell me about the factors in the clinical area which you feel may affect Standard Precautions.

(Prompts: How do these factors affect practice? Which of these factors do you feel are more important?)

5. In your view, are there times when Standard Precautions have to be omitted?

6. Is there a case for using personal judgment in deciding whether to use Standard Precautions?

7. Is there general agreement amongst the staff about situations where Standard Precautions are not seen as necessary?

8. Tell me how you feel when you use protective barriers while caring for children.

It will be possible to add and modify prompts, based on emerging themes and feedback from on-going interviews.

General prompts during the interview:

1. How did you do that?

2. Can you tell me more about this?

3. Can we summarise what you said as "…"?

At the end of interview:

1. Do you need to add anything else?

2. In case I need further details, would you mind if I contact you?

3.10.4 Conducting interviews and practical issues

Interviews were conducted according to the scheduled time, which was arranged by the participants. Participants were offered a convenient place for the interview, either in the hospital or a classroom in the faculty of nursing at the teaching hospital affiliated with the University. All participants chose a place in the hospital (paediatric manager's room, seminar room, treatment room). Before each interview, the researcher reminded participants about the study's purpose, confidentiality, and that their participation was voluntary.

Pre-interview preparation

According to Bryman (2008), a successful interview needs preparation, and he suggests five steps for the interviewer to be prepared. The interviewer used these steps to prepare for interviews:

- Getting familiar with the settings where the interviewee works or lives. The researcher met with paediatric managers in their departments and obtained information about the area. Then he visited the clinical area many times to distribute the demographic questionnaires and to conduct informational sessions. The duration of information sessions ranged from 15 to 20 minutes.
- The quality of equipment was checked before the interview to exclude any problems (e.g. tape recorder, extra batteries, and logbook for documentation).

- The interviews were conducted in a comfortable environment (paediatric managers' offices, seminar rooms, treatment rooms) for two reasons:

  o To avoid interruptions during the interview.
  o To enable participants to speak freely, without fear of being identified if they discuss areas of poor practice, or of breaching confidentiality.

- The researcher was equipped with the necessary skills to interview (e.g. by completing an interview module, reading interview books, and practicing with other Ph.D. colleagues). Also, during the interview process, the study supervisors provided feedback.
- A pilot study was conducted to pre-test the interview guide. This consisted of three interviews, all of which were transcribed verbatim and analysed.

Interview stage

The researcher conducted one to two interviews each day as recommended by Polit and Beck (2004). This facilitated concentration in the interviews and left time for listening to the interviews and for transcribing. Most of the interviews were conducted on B-shift (late shift) between 2pm and 11pm. The least busy time for nurses tended to be between 2pm and 3pm. One of the private hospitals arranged all the interviews to occur in the morning between 8am 9am. Two nurses changed their mind and withdrew their participation, and some demographic questionnaires were excluded because they did not meet the inclusion criteria. In this case, the researcher apologised to the nurses and thanked them for their interest.

At the beginning of the interview, the researcher introduced himself in order to achieve a rapport with the interviewee, and the participant was asked for permission to record the interview. The use of digital voice recording was explained in the information sessions and on the information sheet. Other steps to enhance building rapport were conducting information sessions, distributing a recruitment questionnaire, and frequent visits to the departments. The interviewer explained the purpose of the study again, and clarified that there were no right or wrong answers, and that the discussion would represent their perspectives and experiences about infection control practice. Participants were told that they could stop the interview at any time or withdraw from

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the study without giving any explanation. Only four nurses asked for the recording to be stopped for a few minutes because they thought that their answers were inappropriate. The interviewer clarified that their inclusion in the study was on the basis that they would be anonymised and that no one would get access to the recordings except the researcher and the study supervisors. In all cases, the participants were unfamiliar with the interview as a research method; this was the first time they had participated in a recorded interview.

The interviewer began with a broad open-ended question to start the conversation and to 'break the ice'. After that, prompt questions were used to guide the rest of the conversation. The researcher tried to be a good listener and gave the interviewee opportunities to ask questions if they wished to do so. Participants were given positive feedback by the researcher, such as moving his head up and down, and using words like "aha", "okay", "mmm". The researcher sometimes used silence to assist nurses to recall what happens in practice and to tell their stories about infection control practice.

The expected time of the interviews was estimated to be 45-60 minutes, and the participants were aware of this. This time was viewed as too long by most of the participants, but none of them refused to begin the interview.

The researcher had taken into consideration the fact that most of the paediatric nurses were female, and that they might hesitate to participate in an interview with a male person for a long period (a culture issue). As a result, the researcher discussed this issue with the paediatric departments' managers in order to arrange a comfortable room and inform other staff that this was an interview room for the purpose of the research. Also, the researcher asked the participants if they preferred to keep the door open or ask other female colleagues to attend with them. Some female nurses did not have a problem with the door being closed. On other occasions, female colleagues attended part of the interview, and the door was left open.

Some interviews took only 30 minutes, because either the interviewees felt tired, or they did not have additional information to add. Other interviews took more than 45 minutes, and the researcher used several techniques to guide the interviews. For example, the

expected time for an interview was mentioned to all participants. The researcher followed up and probed the participants' responses to guide the conversation and discover unclear issues of their discussion. Also, the participants were reminded of the final part of interviews by saying "we will discuss the final part of this interview". The researcher tried to summarise what was discussed at the end of interviews and followed this by asking interviewees if they had anything else to add.

At the end of the interview, the participants were thanked for their kind participation and the researcher obtained their permission to be contacted in the future for the purpose of member checking or to get further information if necessary. The contact details of the researcher were left with interviewees (email, and telephone numbers) in case they needed any further information. The researcher mentioned that the anonymised results of the study would be provided to the participants and the participating hospitals and that the study would be presented at national and international conferences and published in peer-reviewed journal articles.

Transcription

All interviews were digitally recorded and transcribed verbatim. Many researchers advise participants to transcribe their study interviews themselves. Poland (1995) argues that self-transcription helps the researcher to become involved in the interview and gain the expertise of study subject. In view of this, the researcher transcribed all the interviews in order to become sufficiently immersed in the data. The process started with three pilot interviews, which were transcribed verbatim. After this, one of the interviews was translated into English and was sent to the supervisors for their feedback. The rest of the interviews were transcribed within the collection stage. In addition, memos and a reflective journal were used to allow for reflexivity.

All recordings were listened to again and compared with the transcripts to check the accuracy of the transcription. Fifteen transcripts were returned to participants by email to check that they represented what had been discussed in the interviews.

Following interview transcription, 20 out of 31 transcripts were uploaded to the NVivo 10 software for analysis and five transcripts were manually analysed. NVivo is a qualitative software package designed to organise data and facilitate data analysis (Bazley & Richards, 2000). Each transcript contained between 12 and 20 A4 pages, and the researcher conducted 31 interviews. The analysis needed considerable time and resources. Therefore, using NVivo organised the study data, and stored transcripts and their analysis in one place (protected by username and password).

Translation

Jordanians speak Arabic and use English as a second language. They take English courses in secondary and tertiary schools and use English as a means of instruction in many specialities in higher education.

The language of instruction for Bachelor, Master, and Doctoral studies in nursing is English, and all nurses use medical language in their careers. Despite this, participants were asked which language they preferred to use in the interview. Some participants chose to speak in English, but after a few minutes they changed their mind and continued the rest of the interview in Arabic. Participants found that they could express themselves better in Arabic. Therefore, in the event, all the interviews were conducted in Arabic. However, the participants used English for medical terms because it is difficult to translate these into Arabic.

The researcher translated three complete interviews into English, and the rest of interviews remained in Arabic. Medical terms were translated into Arabic to facilitate them being imported into NVivo 10 software. In the analysis stage, all codes and categories were written in English, and selected quotes were translated into English.

To check the accuracy of the translation, reverse translation from English to Arabic was conducted, and the consistency of the text was examined. The translation was shown to be accurate in relation to the meaning being communicated. This process helped to immerse the researcher in the data and become familiar it. The translation facilitated the

beginning of data analysis, and enhanced the researcher's awareness of particular expressions such as laughing, silence, pausing, and to understand their meaning.

During the process of translation, the researcher kept in contact with the study supervisors and discussed any translation issues with them. In addition, the process was written in the study journal for use in the reflection process.

3.10.5 Piloting

Piloting can be described as a small-scale version of the study, which is carried out in preparation for the full study. It is used to test study measures, assess feasibility, improve clarity, and refine the methodology.

The researcher conducted a pilot study in the same setting as the full study using the interview guide documented above. The first three interviews acted as a pilot to test the appropriateness of the data collection method and to determine whether the data obtained was capable of addressing the research questions. The pilot participants were invited to give their views on the interview prompts, the setting and the duration. Furthermore the study supervisors viewed one of the interviews transcripts (English version) and provided the researcher with comprehensive feedback.

Piloting enabled the researcher to test the audio recording equipment, the suitability of the environment, and the suitability of the interview guide, and to determine the approximate length of the interview. In addition, it helped the researcher to identify problems that could be dealt with before conducting the full study, to review practical issues, evaluate and refine the interview guide if necessary.

Minor modifications were carried out on the interview guide based on these interviews and feedback from the participants and the study supervisors, and the data were included so that they were part of the main study.

3.11 Data analysis

According to Strauss and Corbin (1998), the qualitative researcher is an instrument of the research process, and his/her analytical skills and creativity are paramount in interpreting the meaning and the interconnections of the data to develop theoretical concepts and theory. Therefore, the credibility of this study was influenced by the researcher's previous experience, skills, and competence. The researcher completed a module in qualitative analysis and practiced interview analysis (specified for training) with his colleagues (PhD students). Also, the researcher kept contact with his supervisors to get their advice and feedback on the data analysis process. This equipped him with the required skills and training to conduct a credible analysis.

Data analysis in qualitative research is an on-going process characterised by constant reflection on the interview transcripts, and is aimed at generating codes and categories that reflect the data. The researcher transcribed verbatim all the interviews during and after the data collection stage to provide a record of what participants communicated. Initially, the researcher heard the voice recordings and read transcripts to familiarise himself with the relevant thoughts and ideas (Glaser, 1978). Then, initial analysis began before conducting further interviews. Twenty-five interviews were analysed through a constant comparative analysis method.

The adapted form of grounded theory design in this study used semi-structured interviews and employed a strategy for the analysis described by Strauss and Corbin (1998) and Charmaz (2006). This strategy consisted of a constant comparative method, which included systematic data collection, coding and analysis through theoretical sampling. However, the researcher did not rigidly follow Strauss and Corbin (1998) set procedures as he maintained a constructivist approach that utilised a flexible approach to allow theory development (Charmaz, 2006). Furthermore, the coding process was not entirely sequential. For example, while the researcher was doing axial coding he returned on several occasions to the first stage (open coding) and modified the codes. The data analysis and coding focused mainly on the interview transcripts, while the field notes and memos were used to support the coding process and check for

consistency.

The analysis adhered to the common elements of grounded theory, which include theoretical sensitivity, theoretical sampling, the coding process (open and axial coding), constant comparative analysis, and memoing. These elements are considered vital to ensuring a coordinated, systematic, and flexible research strategy.

3.11.1 Qualitative analysis software

In qualitative research, the researcher has to read and engage with the text and code it, and the qualitative analysis software made this process easier. Twenty interviews were imported into NVivo 10 software (an additional five interviews were manually analysed).

The researcher read the transcripts and translated any English terms that were mentioned by nurses into Arabic terms, so the final transcripts contained Arabic text only. This was important to facilitate importing them into NVivo and to avoid software problems (NVivo does not deal with mixed language text properly). In the end, the researcher formatted the word document transcripts to plain text because NVivo does not support Arabic and only works properly in this format.

Using qualitative analysis software in this study enhanced the process of managing and organising a large set of data. The researcher was able to search the actual words in the text, view, and print selected passages with their assigned codes, and compare codes with other codes, as well as being able to view new transcripts with previous ones. This process reduced the researcher's workload and enhanced the power of the qualitative analysis. Keeping all the data in NVivo enhanced the credibility and facilitated an audit trail. Also, memos and field notes were imported into the software and used alongside the data analysis to support the coding process.

However, using this software faced many challenges. Firstly, the researcher needed to learn how to use the software, and he attended three training sessions, then followed the official NVivo website for support. Secondly, the software did not support Arabic,

which meant that the researcher could not import transcript word documents to NVivo, as the words and sentences would be disordered during import. The researcher sorted out this problem by converting word documents to PDF documents, then importing them to NVivo. However, the quotes, words and sentences of PDF documents were disordered. Consequently, guidance was sought from the NVivo support team, and he was advised to import the transcripts in plain text in font size nine and this solved the issue.

3.11.2 Open coding

Initially, the transcripts were read while the researcher was listening to the audio recordings to sensitise himself to the data and related ideas. This was important to develop theoretical sensitivity and awareness of the data (Glaser, 1978). The researcher began analysis of the pilot interviews first, followed by the rest of the interviews. Table 3.2 is an example of initial codes, which were extracted from NVivo 10 software.

Table 3-2 Example of initial codes

Workload affects nursing practice
Infection control increase patient safety
Infection control team follow up staffs (role)
Laws are not applicable
Workload on infection control staffs
Number of infection control team members is important
Lecture times contradict work duties
Information and learning is not enough
Not all staff have time to attend lectures
Quality manual as a guideline
Existing policies are not applicable
Supervisors ask staff only when they make mistakes
Staff shortage affects the care
Good staff-patient ratio improves practice
Compliance and follow up in paediatric wards better than adult wards
Separate room for each patient reduces infection rate
Room capacity affects infection rate and hand washing compliance
Financial support and material affects staff
Resources depend on the type of hospital
Staff and housekeeper use damp materials and leave them in corner
Housekeepers need follow up
Dieticians do not wash their hands
Infection control staffs are mainly nurses- are they follow others

Communication about mistakes in infection control is diffecult between different group HCWs
Mismanagement causes miscommunication between healthcare team members
Infection control is a part of nurses' professional role
Infection control is a priority
Infection control teams know their duties
Shortage of staff largely affects infection control
With limited time and load you will not do hand washing
Arrangement of buildings and departments affects compliance with infection control
Providing sterillium in each room motivates compliance with infection control
Negligence affects infection control
Follow up is important in all conditions and enforces compliance
Lack of religious influence or beliefs affects compliance
Put yourself in the patients shoes- how do you like to be treated
With limited resources staff should find alternatives
Infection control regulations are similar in all hospitals and they are easy to follow
Compliance with infection control guidelines is easy
Some staff ignore to protect themselves
Risk of staff exposure to infection should increase compliance
Exposure to infections increases compliance for some people
The effect of difficulty to get access to equipment
Sinks are not in short distance to do hand washing
Problems or unavailability of sterillium in other departments
Sterillium is not enough if you are exposed to blood, you need hand washing
Influential person may affect the decision to comply or not
Non-compliance is personal decision
Medical staff sometimes don't care about protecting themselves in CPR situations even when exposed to blood
Staff protect themselves even in emergency situation
In hospital there is no place for personal judgment and you should follow Standard Precautions
Example of not using gloves in cardiopulmonary resuscitation situation
Using protective barriers increases confidence of safety
After doing everything, Allah will protect you
Using personal protective equipment is comfortable
Children phobia from HCWs will not increase with using personal protective equipment
Family concern about using personal protective equipment
Infection control procedure for positive lumber puncture
Families should be informed about their patient status in relation of isolation and neutropnea
Family denial that their child can't transmit infection
Mothers say that they didn't get infection from their children
Families' unawareness

In the open coding stage, the researcher examined the text, line by line or sentence by sentence, to find recurrent words and identify the initial codes and ideas in the data. This process was useful in order to discover initial categories and their properties and dimensions. According to Strauss and Corbin (1998), in open coding the researcher breaks down the data, examines it, compares it with other data, develops concepts, and categorises the data, and this is how the researcher proceeded.

The codes which emerged either consisted of participants' actual words, called in-vivo codes, such as lack of equipment and self-protection, or those constructed by the researcher and representing his understanding of the data, for example, the positive influence of religious belief. Using participants' actual words as codes provides the evidence that the findings were grounded in the data (Glaser & Strauss, 1967). In general, the researcher coded the keywords, sentences, and expressions that seemed significant or interesting. During this stage, it was evident that some issues were not clearly explained in the pilot interviews. The researcher added prompts for these in the remaining interviews.

The texts were analysed to identify the main themes by asking questions such as 'what is revealed in the data going on here?' and 'what do these data represent?' (Strauss & Corbin, 1998). The researcher questioned the data to facilitate constant comparison between different events, incidents, actions and interactions (Strauss & Corbin, 1998). For example, the researcher asked questions about negligence or ignorance (in-vivo code) such as why the nurses sometimes failed to follow the SPGs, whether this is routine in the department, what the response of other nurses was toward negligence, and whether there were descriptions that were similar or different in other texts.

The repeated coding and comparison of codes was important because the process had at one time generated more than 1500 codes, many of which were similar. The researcher was aware in the early stage of analysis that he needed to distinguish between the lower level explanatory concepts (e.g. ambiguity of infection control policies) and the higher level concepts (more abstract ideas) such as 'conflicting policies negatively influencing compliance'. This was important to avoid ending up with many pages of initial codes (Corbin & Strauss, 2008).

The researcher progressed in analysis from one transcript to the next, using constant comparison and questioning the data; initial codes clustered into broader abstract codes which were then aggregated to build conceptual codes. However, hundreds of conceptual codes remained, these were further reduced by grouping similar codes together and reflecting on the meanings resulting from this process (Strauss & Corbin,

1998). A list of all the codes was extracted from the NVivo software to an Excel spreadsheet and printed to facilitate the refinement process. The researcher then identified the repeated codes with similar meanings and either integrated or deleted them. Additionally, he changed some conceptual codes' names. This process resulted in reducing the number of stems (parent nodes in NVivo), while the conceptual codes themselves were also reduced.

The process of merging and refining the codes made it easier to identify categories and their relationship to concepts. The next stage (axial coding) of the data analysis was, therefore, to code at a higher level of abstraction for the main categories and document their relationship with subcategories.

3.11.3 Axial coding

Strauss and Corbin (1998) defined the process of axial coding as making connections between categories. In this study, axial coding was performed alternately with open coding that began after the analysis of six interviews in which the discussion ended with certain categories. These categories were important to start axial coding and to relate categories with their subcategories through their properties and dimensions; this provided a precise explanation of the phenomena under investigation (Strauss & Corbin, 1998). Axial coding developed the subcategories that answered many questions about the category, such as when, where, and why the phenomenon occurred; who took the actions, and how in response to the phenomenon; and with what the consequences were of these actions.

The researcher used these questions in his analysis. For example, nurses mentioned that physicians did not comply properly with SPGs and this negatively affected the nurses' compliant behaviour. So, the researcher asked questions of the data during analysis such as why physicians behave in this way, and whether it is related to their social status or to physicians' authority as mentioned by some nurses. Then in the subsequent interviews, the nurses were asked how they respond to this behaviour and what actions they take. As revealed in the data, nurses did not take effective actions to change the physicians'

behaviour, instead they just informed their managers and did nothing after that. This was explained in the way that nurses did not see themselves as a change-agent and did not behave in a fully professional manner by accepting responsibility for care delivery, being prepared instead to consider others' actions as being without their sphere of responsibility. Finally, the researcher thought about the consequences of nurses' actions that nurses might look at the non-compliant behaviour of physicians and accept this level of practice for themselves.

Constant comparative analysis was also used in axial coding and each category was compared with other categories; this facilitated the refining process and confirmed that each category was mutually exclusive. The use of the constant comparative analysis helped the researcher to check and recheck the consistency of the main categories which emerged from the data.

Finally, the aim of this study was to develop a new understanding of concepts and main categories that explain the phenomenon of non-compliance with the SPGs. So, the researcher needed in the next stage to make a link between categories and their subcategories and integrate them to form a core category or theoretical scheme that could explain the phenomena. The final stage of data analysis in grounded theory is selective coding which builds upon the foundation of the previous work in open and axial coding.

3.11.4 Selective coding

Selective coding aims to refine and integrate the major categories into a larger theoretical scheme that takes the form of a new 'theory'. Core categories are discerned which links to other categories in the data (Charmaz, 1990). The core category has the function of 'pulling' other categories together to provide an explanation of the whole phenomena (Strauss & Corbin, 1998).

Core categories were a conceptualisation that fitted the data and appeared in all of the interviews to some extent (see Charmaz, 2006). This allowed for a logical and consistent interpretation of what was occurring in paediatric clinical settings in relation

to compliance with SPGs. It explains paediatric nurses' understanding of the phenomena and why they sometimes fail to comply properly with SPGs.

After identifying the theoretical scheme, the researcher continued with theoretical sampling and data analysis through constant comparative analysis to reach theoretical saturation (Strauss & Corbin, 1998). This was achieved when all categories became saturated, no new theoretical insights appeared in the data, and the theory became well-developed (Charmaz, 2006).

By using selective coding, the researcher was able to identify variations in the data both within and between the categories. This stage was continued until the completion of the thesis writing up.

3.12 Quality and trustworthiness

Trustworthiness essentially means that the research quality can be judged by a third party (Creswell, 2003). According to Lincoln and Guba (1985), there are four criteria to achieve trustworthiness in qualitative studies, which is equivalent to the reliability and validity in quantitative studies. These are credibility (similar to internal validity, the 'truth' of data), transferability (similar to external validity, results can transfer to other similar settings), dependability (similar to reliability, data will be constant over time) and conformability (objectivity or neutrality of the data).

3.12.1 Credibility

Credibility is a concept that refers to the 'truth' of the study results (Lincoln & Guba, 1985). According to Jolley (2014, p.65), credibility is *"the degree to which the researcher's interpretation of the data can be justified in the data itself."* In this study, the researcher adopted a number of techniques to achieve credibility.

Prolonged engagement and spending sufficient time in the field helped the researcher to build a trust relationship with the participants and gain an adequate understanding of the setting. This was achieved by frequent visits to the study settings and conducting many

information sessions. The researcher is originally from Jordan and had previous experience as a paediatric nurse, which provided him with a good understanding of the healthcare system and the culture in Jordan. This enabled him to deal with different field circumstances and facilitated the communication and interviewing process.

Using the constant comparison of the emerged data from the participants' interviews is another technique to enhance credibility. It helped the researcher to check and recheck the consistency of the main categories and subcategories (Guba & Lincoln, 1989). Additionally, the study employed purposeful and theoretical sampling that contributed to credibility. The participants who were selected were registered nurses with at least one year's experience in paediatric departments, being currently on the working schedule, and willing to participate. Therefore, they had the required knowledge of the phenomenon and were willing to share their understanding and experiences in relation to infection prevention and control.

In qualitative studies, the researcher is the instrument of data collection, and credibility of the study is influenced by his or her previous experience, skills, and competence. The researcher had four years' experience as a qualified paediatric nurse, which facilitated the recruitment process. The interviews were conducted during the second year of his PhD. Before this time, the researcher completed three qualitative modules, one of them about qualitative interviewing. Also, the researcher kept in contact with the study supervisors to get their advice and feedback and solve any problems. This equipped him with the required skills and training to conduct credible interviews.

Peer review and debriefing techniques were used to verify the accuracy of the study. The study supervisors provided critical feedback and reviewed the work of the researcher at each stage of the research process. They guided him through the process of data collection, analysis and interpretation and validated the study results. Also, one doctoral colleague provided informal feedback about the method of analysis and the emerging concepts and categories. Overall, the debriefing process enabled the researcher to enhance the organization and clarity of the study findings.

Negative case analysis was used to consider cases that do not fit the emerging theory. Negative case analysis helps to achieve a better understanding of trends and patterns in the data (Patton, 1999). Considering rather than ignoring negative cases promotes credibility and dependability of qualitative studies (Tuckett, 2005). The researcher considered negative cases in the whole process of data collection and analysis. For example, during interviewing, participants in one of the public hospitals discussed the challenges of the working environment and the lack of professional support. However, one nurse stated that these challenges are not the main concern as there was a good support system in place and an excellent infection control educational program for staff. Considering negative cases and singular views helped to lead to the idea that it was not the lack of the resources and training (etc.) that was the problem but a lack of professional orientation in the staff.

Member checking also took place to ensure that transcripts accurately reflected what had been said during the interviews. soft copies of the transcripts were sent to 15 participants by email (those who provided their emails in the demographic questionnaire) asking them to comment on the accuracy of the transcripts and provide further explanation if required. All the participants were satisfied that the contents of the transcripts represented what was discussed in the interviews.

3.12.2 Transferability

The aim of qualitative research is not to generalise the findings to other populations, but to accurately describe a phenomenon under study, and generate knowledge which can be transferred to other situations and settings (Holloway & Wheeler, 1996). This criterion is similar to 'external validity' and can be achieved by producing an interpretation of the phenomenon that can be usefully applied to similar settings, such as paediatric units in another hospital.

The study was undertaken in Jordan because the researcher wanted the results to be transferable there. Also, it should be of interest around the world and useful in other

settings with similar conditions. This is because its focus and findings are as relevant to the USA, the UK, Australia and other countries.

The study recruited five hospitals from different healthcare sectors in Amman, the capital of Jordan, which occupies 40% of the Jordanian population. The participants in this study were all working in paediatric clinical settings and represented the members of those settings. The emerging categories from participants' views related to other paediatric settings in Jordan; for example, nurses' roles and relationships with other healthcare professionals.

The researcher provided a thick description of the context of the research setting, the methodology, and the results to allow the future researcher and the reader to judge the applicability of the research enquiry in other paediatric clinical settings. In addition, the researcher used purposeful recruitment to enable researchers to approach key individuals and get opinions from different paediatric units.

3.12.3 Dependability

Dependability refers to the consistency of the study's findings, which means that the replication of the study will generate similar results. It was achieved by the fact that the researcher conducted all interviews by himself using the same interview guide. Then, the researcher transcribed all the interviews and analysed 20 of them using NVivo 10 software (additional five interviews were manually analysed). The researcher during his doctoral study was equipped with reasonable skills and knowledge to do data collection and analysis, which enhanced the reliability of the data.

Comparing the study findings with the existing literature to write the discussion chapter used a stepwise replication approach. Additionally, one doctoral student randomly analysed part of one transcript to check reliability, and the study supervisors checked the analysis progress. The feedback was reasonable, with minor comments.

Inquiry audit was used, which refers to examination of the research process and findings by external examiners. The researcher presented his work, study findings in many

national and international conferences at different stages of his PhD, and received feedback on the content of the presentations and the abstracts. Also, the study supervisors reviewed the work at each stage of the research process and provided comprehensive feedback.

3.12.4 Confirmability

Confirmability refers to the steps that should be taken to ensure as far as possible that the study findings represent the experiences and ideas of the participants, rather than the preferences of the researcher. It can be achieved by audit trial, which allows external bodies to follow the research process, step-by-step via the described procedures and decisions. According to Holloway (2005), audit trail is a record of the researcher's decisions regarding gaining access to the field, recruitment of participants, ethical issues, and analysis methods.

This study employed audiotaped and transcribed interviews, which would facilitate any future audit. Any quotes used in the findings chapter are referenced with a participant code and interview number. Additionally, the researcher documented the data analysis and interpretation using NVivo software, which itself facilitates auditing.

Reflexivity is another technique used in this study to enhance confirmability. The researcher was conscious that complete objectivity and neutrality are impossible to achieve because of his familiarity with some of the care settings and his role as the main research tool. Therefore, it was important to maintain a balance between engagement in the field, which enhances sensitivity, and objectivity in (Hewitt-Taylor, 2002).

The researcher used a reflective journal and memos during data collection and analysis to note any preconceptions, feelings, and ideas about infection control practice, and reflect on them. Also, constant feedback from the study supervisors, PhD students, other researchers, and input from national and international conferences assisted the researcher to identify his own contribution in the interpretation.

In general, the thick, rich description of the study context, reflexivity of the researcher and existence of credibility and dependability enhanced conformability.

3.13 Chapter summary

This qualitative study used an adapted form of constructivist grounded theory, designed to investigate paediatric nurses' views and experiences concerning infection control practice. It also enables a better understanding of the factors that influence nurses' compliance with SPGs. Ethical approval was gained from ethics committees in the Faculty of Health and Social Care at the University of Hull, Jordan's Ministry of Health, as well as from the ethics committees of each participating hospital. The study was conducted in five Jordanian hospitals (two public, two private, and one teaching hospital).

The sample consisted of 31 qualified paediatric nurses from different paediatric areas (PICUs and paediatric wards). Data were collected through the use of 'face-to-face' semi-structured interviews to elicit 'rich' data from experienced nurse professionals in Jordan. All the interviews were audiotaped and transcribed verbatim. Twenty interviews were imported and coded using NVivo 10 software (an additional five interviews were manually analysed) to extract the emerging themes which were then analysed through constant comparative analysis. Data were kept anonymous and confidential and accepted ethical standards were addressed to protect participants from any potential harm. The analysis follows the Straussian three stages of coding (open, axial and selective) while maintaining Charmaz flexible constructivist ideas to allow theory development. The trustworthiness and quality of the study were achieved by using the following measures: external audit by the academic supervisors, member checking by sending a sample of transcripts to 15 participants, peer debriefing, prolonged engagement, reflexivity and negative case analysis.

Chapter Four: FINDINGS

4.1   Introduction

The purpose of this study was to understand how the provision of nursing care to children might affect nurses' decisions whether to comply with SPGs. The study identified paediatric nurses' understanding of factors affecting compliance and ideas they had about means to increase compliance.

The main research question in this study is:

'Why do paediatric nurses sometimes fail to comply properly with SPGs, and how do they explain their behaviour?'

This chapter will present the data generated from face-to-face semi-structured interviews, which ranged from 30 to 55 minutes in length. Data were collected purposefully from thirty-one qualified paediatric nurses in five different hospitals in Jordan. All interviews were audiotaped and transcribed verbatim. Twenty-five interviews were analysed through constant comparative analysis.

Data analysis in qualitative research is an ongoing process, characterised by constant reflection on the interview transcripts, and is aimed at generating codes and categories that reflect the data. This study employed a strategy for the analysis described by Strauss and Corbin (1990, 1998) and Charmaz (2006) and commonly known as 'constant comparative analysis'. The initial analytical process began during the data collection phase; the concepts and categories emerging from each stage of the data analysis were compared with concepts emerging from any subsequent new text. The process of constant comparison was continued until data saturation was achieved.

4.2   Participants in the study

Participants ranged in age from 23 to 39 years with the largest group (65%) being between 25 and 34 years. Twenty-eight women and three men were interviewed. It

should be noted that paediatric clinical areas in Jordan are staffed predominantly by females, whereas there are a roughly an equal number of male and female nurses in other clinical areas. All nurses had a bachelor's degree in general nursing; one nurse also had a postgraduate degree. The participants' length of experience in nursing ranged from 1 to 17 years.

4.3   Major themes generated from the study

Codes and categories generated from the interviews were continually refined until four major themes were identified (Table 4.1).

These four themes were:

- Children are different: the lack of fit between SPGs and the needs of child patients;
- Nurses are human first: the impact of nursing culture and idiosyncratic problem solving;
- Limited professional status- lack of autonomy;
- The challenges of the working environment.

Table 4-1 The four themes derived from the data

Theme	Category
Children are different: the lack of fit between SPGs and the needs of child patients	- Providing nursing care to children - The role of family in infection control
Nurses are human first: the impact of nursing culture, and idiosyncratic problem solving. Justification for using standard precautions	- Attitude and beliefs - Conscience - Habitual practice - Religious beliefs - Risk perception and non-scientific thinking - Benefits of compliance with infection control measures
Limited professional status	- Intra- and inter-disciplinary communication - Power imbalance - Knowledge - Education - Awareness
The challenge of the working environment	- Policies and evidence-based practice - Leadership and administration - Equipment issues - Staffing issues

Each theme and their categories and subcategories are discussed in detail with related quotes from the data.

4.3.1 Children are different: the lack of fit between SPGs and the needs of child patients

This theme refers to the effect of providing nursing care to children and the families'
role in infection prevention and control practice. All participants mentioned this effect
as either a facilitator or barrier of compliance with SPGs.

Providing Nursing care to children

This category related to the effect of providing nursing care to children and was
mentioned by all participants. Two-thirds of participants identified that provision of
nursing care to children is a facilitator for using precautions properly. Accordingly,
participants mentioned that nurses' compliance with SPGs is better than in other
departments, and the infection rate is low. They thought that supervision and follow-up
was better in paediatric departments especially in a PICU. The evidence of compliance
is illustrated by the positive feedback from the administration, infection control team,
and physician.

> *"The Paediatric ICU managed to keep the levels of infection under
> control, it is the least infected rate in the hospital, and therefore I think we
> are following the guidelines properly" (AA2 interview).*

> *"As a caring nature in the paediatric clinical area is better than adult
> clinical area" (AB3 interview).*

> *"Our compliance is better ... the follow up is better than other
> departments either from supervisors (administrators) or staff" (EA1
> interview).*

> *"Possibly it is easy to deal with children because their sizes are small"
> (AA2 interview).*

> *"Mainly infection rate here is not too high" (AA5 interview).*

> *"... Paediatric wards better than other wards. For example, we try to
> keep the Sterillium and soap available all the time ... and also we have a
> good follow up" (CA3 interview).*

Half the participants identified that children have a less well-developed immune system in comparison with adults, and they can acquire infection easily. This point encouraged nurses to use SPGs more fully than did other departments.

> *"... They can get infections easily" (EA2 interview).*

> *"... Their immunity less than adults" (EA3 interview).*

Three nurses mentioned that paediatric patients need more emotional support than do adults. This increased nurses' internal motivation to use Standard Precautions. Nurses become attached to their patient, and they were more eager to protect them from harm.

> *"I think from my experience that there is a big difference between children and adults, we consider their emotional needs, and we take care and be accurate in preparing medication doses for them… they can't express their feelings … this help us to improve our compliance" (CA1 interview).*

The nurses were aware that paediatric patients could acquire serious infections that could be transmitted to HCWs. Therefore, they were determined to use Standard Precautions:

> *"The patients might be carrying a certain disease that is still incubating inside their body, and most probably we might not notice anything. For example, someone with chickenpox might pass any initial tests, but actually he/she is still carrying the disease" (CA2 interview).*

However, the nurse participants did point out that working with children did present some barriers to compliance with SPGs. For example, children and their parents visited other patients, and this could cause cross-transmission of HCAI. It had proved difficult to stop this happening. Children would play with other children even when asked not to do so. Nurses claimed that it was difficult to control children's behaviour in the department.

> *"Sometimes we urge patients not to leave their beds, but they usually walk around despite our orders" (CA3 interview).*

"Sometimes the families and/ or the mothers of the sick children will carry them and sit at the bedside of other sick children with different diseases (i.e. gastro infection)" (EA3 interview).

"We tried as possible to stop patients from sitting on the bedside of other patients as some of them are used to, however, we can allow them to have a short walk along the corridor if they want to" (EA2 interview).

Two nurses mentioned that they placed personal protective equipment inside isolation rooms because other children play with this equipment if they are put outside the room (they put them on a table, not hung on the wall).

"I suggested that we put a table outside the Children rooms on which we put all we need to wear before examining the child (i.e. masks, gloves), but then the management said that objects like tables might pose a danger to children who might bump into them while going in and out, so we suggested putting things on a stand, but again this has never been actualised" (EA4 interview).

Playrooms were viewed as important for the children who were allowed to mix with other children, both to meet their emotional needs and to for them to see the staff as friendly and the department as a friendly place. The playroom also enhanced children's feelings of safety. However, playrooms were described as insufficient or unavailable in the majority of paediatric wards to solve the problem of infection transmission.

"We would have loved to have a playroom for the sick children in the hospital, and we suggested that to the management. But, they said that they need to take the necessary precautions to control infection levels. For example, if two children ate from the same bowl while playing, one with gastro and the other with chesty infection, they would infect each other. Sometimes, we are not sure if their mothers made sure to wash their hands properly, therefore, the management refused to risk opening a playroom" (EA4 interview).

"There should be a playroom for the sick children to have fun, and enjoy their time while in hospital. Yet, other than the stickers on the walls, people would never think that they are in the children department because there is nothing that indicates so" (EA4 interview).

One nurse said that they did not fear acquiring an infection from the children, because it is unusual for children to have blood-borne infections in Jordan. The nurse here

considered the severity of exposure to blood-borne infections as higher than other forms of infections, and ignored the fact that non blood-borne infections may also cause serious illness.

> *"We are less concerned of infection through children than adults. With adults we might be concerned mostly of blood transmitted diseases, but with children we feel safer" (CA2 interview).*

The majority of participants identified that children were afraid of nurses using personal protective equipment. Children were afraid, even of the nurses' white uniforms, and they refused to be cared for by them. This factor may affect negatively on infection control practice. For example, nurses may minimise their use of personal protective equipment to reduce children's fear and anxiety.

> *"My feeling is not a problem, but patient feeling is important because gown and mask ... may scare the patient and makes him/ her refuse the service that is provided by nurses" (AA5 interview).*

Nurses mentioned that they used many techniques to reduce patients' fear from personal protective equipment. These techniques were considered to improve cooperation from child patients, and enhance infection control practice. For example, nurses mentioned that they provided the protective equipment (e.g. as masks and gloves) for the child to play with and become familiar with. Also, they used games to explain to the child how and why they use personal protective equipment. Moreover; nurses mentioned that glass doors for patients' rooms are better than the current wood doors because children can see nurses while wearing protective equipment and this will reduce their fears. Furthermore, nurses suggest that they should use brightly coloured uniforms to make children feel comfortable. However, there is no evidence that nurses tried to make these changes to their practice.

> *"We need to put children at ease before examining them, talking to them gently might break the fear barrier between them and us. If they are big enough, we can explain things to them before examination" (EA3 interview).*

"It is not necessary that these precautions can cause stress for children, I can use them in other ways that make a child feel of entertainment" (AA1 interview).

"As we said a child can wear a mask or touch it to feel that he/ she is one of the team with you, as I feel this will improve the patient status, and his/her response for you will be better" (AA1 interview).

The above indicates that nurses are knowledgeable and knew what they needed to do to improve infection control practice, but they perceived themselves to be unable to initiate change.

The role of family in infection control

Most participants identified the family and visitors as a major barrier to compliance with SPGs. The nurses mentioned that the child's parents and visitors often lacked knowledge of infection and suffered from a low level of general education. This lack of knowledge about micro-organisms, their propensity to cause disease and their mechanisms of spread, had a direct effect on their behaviour in the clinical areas and on the nurses' ability to fully implement SPGs. Relatives often refused to use the protective barriers that had been put at their disposal for the protection of their children and the other children in the clinical area. Relatives were seen to lack knowledge and failed to value the nurses' advice.

"Frankly, the patient's family is a large point faces us, because as we said there is a knowledge deficit in medical information" (AA1 interview).

"Sometimes, families of patients get too apprehensive when they see their children in isolation unit. They would ask: 'why my child is in the isolation unit?' They, sometimes, misunderstand the idea of isolation … A nurse might ask them not to take the patient out of isolation unit, yet, you would find them taking their sick children outside their rooms" (CA5 interview).

Nurses mentioned that the visiting families needed more health education, knowledge and respect of nurses and that with this, they would cooperate better. Family education was considered a nursing role by many nurses, especially for isolated patients, but some nurses mentioned that the policy prevented them from talking to families about isolation

and their children's status, because this was seen as the physician's role. It is expected as a professionals that nurses are able to challenge parents' non-compliance and this seems to be an excuse for their failure to deal with the issue. Nevertheless, the nurses argued that families respected physicians' medical advice regarding their children without question, but they had many concerns about what they heard from nurses.

> *"Families fear from isolation ... When the families ask about the reasons of isolation, we usually explain that it is a procedure to prevent them taking the infection back home and infect the rest of their children, or even themselves. Sometimes, we would ask them to wear masks before getting into contact with their children, or even stop them from visiting them to protect other children in the family. Some would follow orders, and others will not" (AA4 interview).*

> *"... The second solution includes conducting lectures for parents and how they can increase awareness of other people around them. It is not permitted for me to talk to the rest of the family about their child's disease. So parents can talk to the rest of family and help us, and frankly in-service education should work more on this issue with family, and conduct lectures for those families" (AA1 interview).*

> *"Not All people have trust of medical and nursing staff and especially nurses suffer from this point. When a doctor tells people to follow certain procedures before getting into contact with their patients, they would follow the doctors' orders even if the doctor is still a junior one, while nobody trust the nurses when it comes to following procedures" (AB3 interview).*

Lack of knowledge is related mainly to the previous educational background and lack of health education inside hospitals, because many families are willing to learn what has happened to their children. Families, in general, are willing to protect their children from becoming infected by using precautions and encouraging healthcare professionals to use them, but the problem lies with their knowledge and awareness of infection control practice and their lack of respect of nurses. For example, some parents said that they did not get any infections from their children, so they are non-infectious. Why then do nurses use these precautions?

> *"Mother said I'm okay, and I did not get an infection. So these questions always have been repeated" (EA1 interview).*

> *"Some families may not understand our concerns, and justify that their children did not transmit infections to them, so they did not use precautions" (CA2 interview).*

The nurses mentioned that families need someone to talk to them and explain what happens to their children. Without this intervention, families will be uncomfortable, and their trust of health professionals will be negatively shaped. It seems that nurses felt unable to practice health education.

> *"In general, families when they come to the hospital, they like that someone stay with them, assure them, and explain what's going on. If this not happen, families will be uncomfortable, even for temperature level, they will say we came to the hospital to decrease our child temperature, and you did not do that ... if physicians make mistakes, the trust in doctors and other healthcare teams will be bad, even with a lot of efforts from the nursing team, because families do not understand what happen" (EA1 interview).*

However, nurses can use pamphlets and games to teach children and their families about infection control and disease process. Nurses try to involve families in some procedures such as how to deal with a central line (patients leave the hospital with this line). So, there is evidence that nurses have practiced health education. Again, there seems to be a professional impotence to deal with this issue without involving the medical staff.

> *"In the scientific day, we distributed brochures about hand hygiene to families and their children, these brochures were simple including draws about microorganisms'" (EA4 interview).*

> *"... Education for mothers how to care of central line, not to touch it during bathing, and use chlorhexidine each day" (AB3 interview).*

Some nurses mentioned that there was no time to give health education. This is related to nurses' priorities but chiefly to their perceived lack of authority to deal with this nursing issue.

> *"We have to deal with the families of the patients. Some of them would keep arguing for certain things for fifteen minutes, and we have to keep explaining things to them. This, also, takes way of our time that is much need to take care of others" (EA4 interview).*

Nurses mentioned that good communication with families is important to reduce their fear and encourage acceptance of medical advice, therefore; teaching families in a polite and respectful way was considered essential to get their cooperation. Also, health education for families about using personal protective equipment can decrease their stress and concerns. Nurses here seemed sensitive to parents needs and knew how to communicate with them and showed ability to do it. However, the nurses could not deal with the issue of educating parents on cross-infection because this was not a medical problem in the same way as educating them about central lines, it was not something the doctors were interested in. This was a nursing-only issue and the nurses simply lacked the authority to deal with it on their own.

> *"There is a certain way to communicate certain diseases to the families of the sick children. For example, if a child has got meningitis, which is a treatable infection, and the nurse revealed to the family that their child has got it, they would think it is as dangerous as cancer. Therefore, a nurse can deploy better communication means by saying that the child has got a treatable viral infection to avoid scaring the families" (BA6 interview).*

> *"...Families' awareness of infection prevention in this hospital is better than other hospitals which facilitate their cooperation, personally I talk with them about infection control" (CA6 interview).*

A few nurses mentioned that even some families with good health education do not comply with nurses' advice about cleaning and hygiene.

> *"However, there are still some people who would not take orders, for instance, if we tell people to take care of their children's cleanliness, they will not take it easily. In other words, they would take it as an insult" (BA6 interview).*

Nurses reported that some families showed a negative attitude toward precautions. For example, nurses would ask mothers to comply with infection control regulations, but mothers were careless, and they do not follow the advice and education from nurses. They would go with their children to visit other children, despite the fact that they had signed a form on admission on which they agreed to reduce their child's contacts with other children. In this situation, it is hard to see how nurses can fully implement SPGs.

"We would explain to the family members that their children need to be kept away from other patients, yet they would not listen and they would keep wandering around with their children, touching other patients and talking with them because they think that they are not too dangerous on others (CA5 interview).

The nurses reported that families would sometimes deny that their child had an infectious disease, and mothers would take their child outside the room and permit him or her to play with other children. Also, mothers were embarrassed to say that their child had an infectious disease.

"Other times, we would find people carrying their sick children to walk them along the corridor in the hospital. When we explain to them that their children have been isolated in a room on their own due to the infectious nature of their diseases, they would not take it seriously. Or they would be insulted, because they would think that it is shameful to have a contagious diseases" (BA3 interview).

Five nurses mentioned that a large number of visitors influenced infection prevention and control practice negatively because they needed time from staff to teach and explain to them what is happening to their child. Also, they do not follow the guidelines, visiting isolation patients without using isolation precautions.

"... There are a large number of visitors for this patient, and we said to them that this patient needs isolation .... They said why he/ she needed isolation. So they are not aware about isolation requirement" (EA1 interview).

"However, other family members who would visit the children are less serious and less concerned about the child's wellbeing than the parents. They would crowd the child's room with people thinking that the child will be better by more people around him" (EA3 interview).

However, not all parents were ignorant and some of them did understand about infections. For example, mothers would sometimes clean their child's room, because they did not trust the ward housekeeper.

".. Sometimes the patient's mother may be enforced to clean the room, because she does not want services (cleaners) who enter other rooms to

enter her child room, for example, they will transmit infections to her
child, do you understand me" (AB3 interview).

In fact, some parents were so well informed about infection and its management that they may have wanted to point out the poor practice exhibited by some nurses. However, one nurse identified that families are unable to confront nurses' non-compliance with guidelines.

> *"Sometimes I empathise with families as they feel of the hygiene and*
> *trustworthiness of our work, but in another hospital you can find many*
> *things goes wrong and mothers know that but they cannot say anything."*
> *(CA6 interview).*

Around half of the participants mentioned families' feelings about nurses using personal protective equipment. Most families feared this equipment or felt uncomfortable with it. They asked nurses why they used personal protective equipment. The equipment made the parents fear that their child was seriously ill. Therefore, nurses were uncomfortable using personal protective equipment. Also, if families saw nurses use personal protective equipment for other patients, they asked nurses what those patients had and if there was any possibility of transmitting the infection to their child.

> *"Some people feel concerned when they see us with masks and gowns*
> *while examining their children. They would ask us if their children have*
> *serious illness. Others would be concerned when seeing us treating other*
> *children and then turning to them because they think they would catch the*
> *infection" (EA4 interview).*

> *"When we explain the matter to the family members, we would ask them*
> *to put masks and gown lest they go back home and infect other family*
> *members" (AA4 interview).*

> *"Yet, it is not that easy because we have to convince the parents of a sick*
> *child that their child is seriously ill and therefore we have to wear*
> *protective barriers around him/her. They are not convinced that their*
> *children have infectious diseases" (CA1 interview).*

> *"We do that to raise the awareness of the people so that when we examine*
> *their children with our masks every time, they would not feel that their*
> *children have dangerous disease or get shocked" (CA6 interview).*

However, three nurses said that some families felt comfortable when they saw nurses using personal protective equipment because they knew that this would protect their children from getting an infection.

> *"Families may feel that we are more compliant when we use precautions', and they feel that we are compassionate with their children" (AA2 interview).*

4.3.2 Nurses are human first: the impact of nursing culture and idiosyncratic problem solving

This theme was frequently mentioned in the data. Nurses reported several examples of the influence of nursing culture, social and religion influences. These included attitudes and beliefs, conscience, habitual practice, religious beliefs, risk perception and non-scientific thinking and benefits. Most participants considered religious beliefs, conscience, positive attitude and perceived benefits and consequences as facilitators of compliance with SPGs except in few circumstances. However, habitual practice and risk perception and non-scientific thinking were sometimes considered to be a barrier to compliant behaviour.

Attitudes and beliefs

This category is related to aspects of individual personality that influenced compliance with SPGs in a positive or negative way. More than half of the participants identified that a positive attitude toward using standard precautions enhanced nurses' compliance with them.

> *"… I can say that compliance is associated with the person attitude either positive or negative. If they have a positive attitude they will comply properly" (CA6 interview).*

Two nurses mentioned that using Standard Precautions was an ethical issue, and all healthcare professionals should comply properly, to protect themselves and their patients. For example, Participant AA5 interview said:

> *"As a staff we have the commitment, not because someone monitors infection control (laugh), but because it is an ethical issue from staff themselves."*

Also, the attitude in paediatric departments was viewed as positive for a high compliance rate.

> *"The attitude in the department, you can see 90-95% is positive" (CA9 interview).*

Many nurses mentioned that nurses should put themselves in the shoes of others, which means that they need to experience the feelings of mothers, families and their children.

> *"The most important thing is to empathise with the patient, and imagine that you are in the patient place, so how you will feel and behave" (AB3 interview).*

> *"What we think that if you come to the hospital with your child, so how you feel, and what you expect from the staff, for sure you like to get the maximum care for your child" (CA6 interview).*

> *"The people should think that they may be in the patient place, not just their relatives ... when you have a dirty cannula, you expect someone to come and clean it for you before giving medication" (EA1 interview).*

Similarly, internal motives and awareness were viewed as important for full compliance with SPGs, especially in dealing with children. This indicates that these nurses had a full professional orientation to prevent infections transmission. Nurses knew what needed to be done but sometimes felt disempowered to take action (see Theme one).

> *"It is a positive attitude enable nurses to use precautions even if there is no external observation or monitoring" (EA1 interview).*

> *"There is internal feeling enforce me to follow the precautions, not because someone observe me" (EA5 interview).*

The nurses expressed an emotional commitment to the child patients, and a commitment to nurse them to a good standard of care.

"Internal beliefs and fidelity of work, so you take care of patient as someone close to you or member from your family" (EA2 interview).

"I'm responsible to protect patient integrity, and I should sincere in my work, so you need to consider all patients that they may have an infectious disease, and follow the required guidelines to protect them" (EA5 interview).

Another important factor that reported by only one nurse was feeling guilt and regret. Nurses sometimes blame themselves when their patients acquire an infection because they had not complied properly with SPGs.

"The patient admitted with a specific diagnosis and in the hospital he/ she may obtain another infection, so we feel that our efforts without a purpose. I mean that we feel of regret and we feel that our work cause another problem for the patient" (CA2 interview).

However, two nurses clearly knew colleagues who did not believe in the use of SPGs because of their perceived invulnerability to infection. Interestingly, this 'belief' was thought to be irrevocable; the nurses could not see how it could be changed.

"If they do not care to protect themselves, how they will protect other patients, for example if the patient connected to the ventilator, nurses think that he/ she will not get other respiratory infections" (AA4 interview).

"It is a personal belief, so he or she does not want to use gloves ..." (EA6 interview).

Conscience

Nurses viewed conscience as a facilitator of compliance with SPGs. Conscience was seen to enable people to distinguish right from wrong based on their culture and religion. Nurses mentioned that they should be held accountable for their deeds, whether they complied properly with SPGs or not. Nurses believed that internal monitoring and observation of work was more effective in changing practice than external observation from the administration. Some participants said that conscience is associated with religious commitment. As such, this notion of 'conscience' goes beyond the Western, professional sense of 'responsibility'.

"People should be conscious enough without external coercion. We need to put ourselves in the position of children patients" (CA3 interview).

"If everyone had a sense of responsibility, they would clean their hands completely every time they touch a patient, before transferring to deal with another even if they think they are spending a little bit more time than they should be, it's a personal conscience" (EA3 interview).

"Being motivated by moral and ethical values and fear of Allah definitely makes nurses abide by such rules, because they will think that if they did not, they might be infecting either themselves or other patients" (EA3 interview).

"… Another reason is lack of conscientiousness …" (AB2 interview).

Habitual practice

This category means that if a behaviour becomes routine, it will be repeated regularly, whether this behaviour is negative or positive. Nurses mentioned that if they use precautions frequently as a routine, and comply with them in all situations, they can use them easily and properly without any problem. This can be achieved by training and commitment to use these precautions. They will face some problems, but gradually they will be able to use precautions as a habit and do them faster. In this sense, nurses being bound by their culture and they cannot change unless their culture changes first. This position militates against true professionalism which (should) allow a degree of independence in practice.

"Sometimes, when certain practices become a habit, it would not matter if there is work pressure or not because the nurse will have got used to doing them anyway. For example, changing gloves while treating more than one patient, becomes a routine if the nurses started doing it every time they get into contact with a patient. If things reach that level, then it would not matter working in a quiet or busy place because it will have become an essential part of the day" (EA5 interview).

"Changing gloves every time the nurse deals with a new patient might seem difficult in practice, but when it becomes a habit, it will not feel difficult anymore" (BA6 interview).

Some nurses mentioned that bad practice had become a routine. For example, some nurses did not comply properly with SPGs, because this was their routine: they had not used gloves or gowns for a long time. Also, nurses reported that poor practice over a long time had become a habit, because they had not faced problems or acquired infections from patients. This indicates that nurses are human first, and sometimes they fail to think logically.

> *"However, sometimes the nurses feel safe when there are no serious consequences for following the wrong procedures, so it will become a habit" (CA2 interview).*

Religious beliefs

Religion was viewed as something good, which could improve compliance with SPGs. The data shows that nearly one third of participants thought that religion persuaded people to comply properly with SPGs. This compliance was related to religious regulations about the importance of cleaning and hygiene. The nurses argued that nurses without faith would tend to be practice less hygienically and comply less well with SPGs.

> *"Lack of religious faith, what I can say for you" (EA1 interview).*

> *"Sometimes, we keep working all the time to be able to do as much as we could to feel satisfied with ourselves when we get back home. Because we're accountable in front of Allah and we are conscientious enough to feel the responsibility of giving as much as we can to the patient. I hope that we had the necessary tools, and equipment for that" (BA3 interview).*

The nurses mentioned that they were accountable to Allah for their deeds. Fear of Allah is partly responsible for their attempt to practice well in terms of SPGs even in the face of resource issues. The nurses tried to differentiate between what is permitted or forbidden by Allah. Interestingly, the nurses claimed that their accountability to Allah had more influence on their practice than their compliance with hospital rules. The nurses also thought that they were especially accountable to Allah because they worked with children.

> *"I feel that I'm more accountable in front of Allah because I deal with a child, so if I did something bad to her/ him, what I will do at the day of judgement ... this motivates me to do the right thing" (AB2 interview).*

Nurses said that they were willing to protect children in hospital, and pray to Allah to protect their children and their families.

> *"Being educated and conscientious enough and fear Allah wherever you are plays a role in delivering a good job and providing enough care to the patients and to ask Allah to protect my children or brothers. All nurses should comply and fear Allah not only who have children" (BA6 interview).*

Some nurses thought that Allah usually protected their patients, when they failed to comply properly with SPGs. Also, they thought that Allah would protect nurses when they forget to use precautions or they failed to use them in life-saving situations, and they always prayed to seek protection in that situation. In this sense, nurses were fatalistic to perhaps a greater degree than one would find in the West. This fatalism can be clearly seen to militate against the successful implementation of SPGs.

> *"Sometimes, when dealing with sick children, things are more complicated. For example, when I examine a child, the mother would ask that I discontinued his/her intravenous fluids to go to the toilet, so I would take him/her there without putting my mask, or sometimes, I would not be wearing my mask or gloves when touching the child. In such situations, I'm aware of my fault but would be hoping not to catch the infection, and I ask Allah to protect me" (EA4 interview)*

> *"In front of Allah I should work well to prevent the transmission of infections to patients ... (other nurses) there is internal feeling that they should do the right things and what is forbidden, but in the same time they said we trusted in Allah to protect us ... I do not consider this as tawakkul (Islamic concept means trust in Allah plans, but with removing the causes of the problem) it is laziness" (AB2 interview).*

> *"... However, not everybody would be cautious enough, some of them would refer everything to Allah's plans and hope that things will not go wrong" (AA4 interview).*

Two nurses discussed using personal protective equipment while wearing headscarves (Muslim head covering) or veil covering (head and face covering). For example, one

nurse mentioned that nurses use personal protective equipment such as face masks, but that feel uncomfortable with some types of face mask especially the one with a rubber tie. She suggested that the administration should provide them with suitable types of facemasks.

> *"I remembered that they put a type of surgical mask with a rubber tie. It was not appropriate with head scarf ..." (AB2 interview).*

Another nurse said that nurses are willing to comply with SPGs, so they use different headscarves, one for their duties at the hospital and one for other times. They do this to prevent transmission of infection between the hospital and their home and community.

> *"We are emotionally connected with the patients... I'm getting more cautious now (becoming a mother) when dealing with the hospital environment. For example, as a nurse you wear uniform and take care of different patients, so the uniform may become infected. For me, I used to wear the same scarf I wore inside the hospital when I go back home, but now I change my hospital scarf before going back home for fear of infecting my daughter or bringing external infectious diseases from outside" (EA4 interview).*

One nurse mentioned that some hospitals do not hire nurses who wear a veil covering (head and face covering) because this will increase children fears.

> *"Some children fear from us when we use a face mask and the evidence that some hospitals do not hire nurses who wear a veil covering to reduce children fairness ... I know a friend who was refused hear job application by one of the Jordanian hospital because she wear a veil covering" (AB2 interview).*

Risk perception and non-scientific thinking

Nurses' are human first, their behaviour is influenced by their perception of the risk of actually getting the infection. Nurses' decision to comply with SPGs was influenced by subjective judgements rather than evidence based practice. These judgements were sometimes affected by their emotional (non-rational) assessment of the risk of exposure. All participants identified at least one psychological factor, including caring for undiagnosed or newly admitted patients, fear of exposure to blood and body fluids, and

feelings concerned with using personal protective equipment. All nurses outline the importance of this category as it was referred to in all the interviews through the following four subcategories

- Caring for undiagnosed or newly admitted patients;
- The impact of family life;
- Occupational exposure to infections;
- Staff feelings while using personal protective equipment.

CARING FOR UNDIAGNOSED OR NEWLY ADMITTED PATIENTS

This subcategory mainly contained factors that acted as a barrier to compliance with SPGs. Nurses stated that they often failed to comply properly with SPGs when they took care of undiagnosed or newly admitted patients. This behaviour seems associated with the way that the nurses sometimes appeared to use SPGs when they felt a need to protect themselves (as opposed to their patients). In this way, the nurses reported complying with SPGs better when dealing with isolated patients.

> *"Here we use only what is available (gloves, gown or masks) to protect ourselves and take care of patients, then we discover that they had infectious diseases, the problem we know that after patient recovery"*
> *(BA3 interview).*

> *"Sometimes you receive a new patient or new admission and you work with him/ her without using precautions, then you discover that he/ she has infection" (AA3 interview).*

> *"For a round one week we cared of that patient without using precautions, and physicians informed us that this patient has a chicken pox. So I asked them why you did not inform us to take precautions …"*
> *(AB2 interview).*

Despite nurses failed to comply properly in these cases, a few nurses were aware that they should comply properly with newly admitted patients, where the infectious status was not known. However, if a patient was admitted with serious signs, like a seizure, nurses tried to comply properly with SPGs. This indicates that nurses sometimes problem-solved emotionally, rather than logically.

"Sometimes we receive undiagnosed patients and they may have serious infections. We will draw blood and insert cannulas which expose us to blood and patient's secretions, so if you do not use precautions, you may hurt yourself, hurt your patient or other patients" (CA1 interview).

"It is supposed that when you deal with patient for the first time, you should deal with him/ her as infected person. …When we receive patient (admitted) with too much productive coughing, and you feel that this is harsh cough, so my personal judgment when I see this patient…, I will put question mark that this patient may has TB or something else, so you will use SPGs … this also applied for patients who admitted with infected wounds" (AA5 interview).

"If patient is admitted as a suspected case of Rickettsia, immediately I use gloves because I do not know if this patient is infectious or not" (BA3 interview).

THE IMPACT OF FAMILY LIFE

This subcategory was viewed as a facilitator of compliance with SPGs, as the nurses were willing to comply to protect themselves and their families, and when they did not want to transmit infections to their families at home. Some female nurses mentioned that they tended to be more compliant with SPGs when they were pregnant or had a new-born child. They said that sometimes they used more protection than was required at these times. Also, the nurses' experience of motherhood made them more aware of the importance of compliance with SPGs.

" … Especially because now I'm pregnant, so honestly hand washing become like drinking water, I should do it for simple reasons …" (CA1 interview).

"When I got pregnant, I became more cautious of catching infection and passing it on to my baby. When my baby became six months old, the caution level has risen especially that I'm dealing with hepatitis and meningitis patients. When I was single, I was different, I would not be too cautious dealing with patients, but now, after becoming a mother myself, I'm more empathetic with the children" (EA4 interview).

"When we work around isolation unit, and deal with cases that need isolation we are cautious that we might not only infect ourselves, but we

might also infect other patients if we did not follow the guidelines" (AA4 interview).

"I have children at home, and it is not appropriate to acquire infection from the hospital and transmit it to my children" (BA6 interview).

OCCUPATIONAL EXPOSURE TO INFECTIONS

Seven participants identified this subcategory; they mentioned that previous exposure was usually a facilitator of compliance with SPGs. For example, the nurses said that colleagues' previous exposure to infections encouraged them to use Standard Precautions properly. The nurses said that this previous exposure was an internal motivator for compliance. Now they were more aware of the risk of exposure. Also, the nurses mentioned that if they used Standard Precautions properly, they felt that they would be safe from infection.

"As experienced nurses, we heard many cases of infections being transmitted through the patients because the nurses did not take the necessary measures. Therefore, we are more cautious now… I'm more motivated now to take the necessary measures when dealing with patients" (EA5 interview).

"Second, you are as a nurse deal with patient 24 hours, so you are at risk of exposure to nosocomial infection or existing infection more than other" (AA1 interview).

However, two nurses said that they did not care about previous exposure, and they had done their duty for a long time without being exposed to infections even when they had not used precautions. Another nurse said that previous exposure would be forgotten with time, and nurses would return to their previous practice of non-compliance with SPGs. This supports the idea that nurses were fatalistic and thought that Allah would protect them when they failed to use precautions

We don't wash our hands properly … may be because we used to do that without getting infections from patients for many times, but if we feel that the patient is unclean we will immediately wash our hands" (CA2 interview).

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"For the patient who infected with meningitis, her status became bad, and we discussed with (XXXX) hospital and University, about how we can increase the compliance with precautions. Later we talked about the person who infected with hepatitis. But again, everything will be forgotten with time" (EA1 interview).

STAFF FEELING WHILE USING PERSONAL PROTECTIVE EQUIPMENT

Nurses acknowledged that they did not fully use protective equipment. However, many nurses identified that using protective equipment was psychologically comfortable, not embarrassing and that they were happy where it would protect their safety. They mentioned that using protective barriers enabled them to provide better care for patients. For example, some nurses said if they did not use protective barriers, they would feel unsafe and would try to avoid a long contact time with patients by implementing care procedures quickly.

"I will be very safe; I'm sure of that. I do everything I should do and trust of Allah that he will protect me. When I enter the room, I will be confident that nothing will hurt me … For sure, comfortable" (EA1 interview).

"You will be comfortable that you will not transmit infection to the child. Also, if you do not use personal protective equipment you may transmit infections to the families. So, for sure you will be comfortable" (AA3 interview).

"It is not embarrassing to wear mask even if other staff choose not to use it. We should be careful and take the required precautions" (BA6 interview).

"If I enter the patient room without using precautions, I will be frightened and stressed to take care of him/ her, and I will be very cautious to touch the patient, but if I use the precautions, I will be comfortable and provide a competent care to the patient" (EA5 interview).

Despite nurses' acknowledgement that using protective equipment was psychologically comfortable, four nurses mentioned that these the equipment was physically uncomfortable and affected their movement, it was unsuitable in summer (nurses wear long sleeve gowns), and it felt suffocating when they had flu symptoms while using a face mask. They sometimes needed to work quickly, so they preferred to reduce their

use. Also, nurses mentioned that using personal protective barriers such as gloves decreased their skills in procedures such as cannulation or venepuncture. This indicates that nurses did not fully use protective equipment.

> *"They hinder my work. I cannot insert cannula while using gloves" (CA5 interview).*

> *"Sometimes personal protective clothing are annoying especially in a hot weather" (EA3 interview).*

The nurses mentioned that some staff members only complied with some personal protective equipment such as gloves and for specific procedures.

> *"It is supposed to use the full protection. But for me I may use gloves, but I do not always wear mask and gown" (CA3 interview).*

Some nurses mentioned that although using personal protective equipment was sometimes considered a nuisance, staff should comply and use it to protect themselves and their patients.

> *"These equipment may be considered annoying but we should use them to protect ourselves and our patients" (EA3 interview).*

Benefits of compliance with infection control measures

This category refers to perceived benefits from using Standard Precautions. Many participants said that protection and safety for healthcare professionals and patients are the main facilitators to compliance. Other benefits of compliance with SPGs include improving their hospital's reputation and patient satisfaction, and reducing the length of hospital stay and treatment cost.

PROTECTION AND SAFETY

The nurses were aware that they could protect themselves and their patients by the proper use of Standard Precautions. They mentioned that they needed to protect their families and their children, and that this could be achieved by compliance with the

guidelines. The nurses described patient safety as a priority, and that it was inappropriate to transmit infections to them.

> *"Compliance with infection control policies is useful for all parties, for the patient, for you, and for families. Because the patient may transmit infections to his or her families, or any member of the family may acquire the infection in the hospital and transmit it to the home ..." (AA2 interview).*

> *"It is not appropriate to transmit infection from a patient in isolation room to another patient ... it is important to facilitate patient treatment and in the same time to protect myself, my family and other children patients" (BA6 interview).*

> *"I need to guarantee the provision of the required equipment to use them in patient caring to protect him/ her and protect myself. Also, I will isolate the patient and be cautious in using the equipment, and ensure to prevent the cross transmission of infections between patients or from nurses or physicians to patients" (BA3 interview).*

Moreover, nurses viewed themselves as more compliant with guidelines if they worked with protective isolation patients who have compromised immunity systems.

> *"Always I fear of cross-transmission, especially when I care for cancer patients because their immunity is low" (AB2 interview).*

Nurses sometimes sought to protect themselves more than protecting their patients. For example, some nurses reported washing their hands before and after contact with patients, but not between patients.

> *"... I feel that they (other nurses) care more to protect themselves rather a patient, I mean when they care of patients they do not wash their hands between them" (AB2 interview).*

REDUCE HOSPITAL STAY AND TREATMENT COST

A benefit of using Standard Precautions is reducing the cost of treatment and hospitalization time. Serious infections have negative effects on patients, families and medical insurance companies. Also, they increase nurses' workload by increasing the number of patients in the department.

> *"(By preventing infections), this will relief the patient by reducing treatment period, it will reduce hospital costs, and you will reduce costs for patient, families, and insurance companies"* (AA1 interview).

> *"As a result of malpractice patient may get an infection and this will cause prolonged hospitalization period for him/ her"* (AA5 interview).

> *"If patients get infections, they will pay more, and stay in the hospital and take antibiotic for a longer period"* (EA1 interview).

HOSPITAL REPUTATION AND PATIENTS' SATISFACTION

Three participants described that infection prevention and control practice improves patient outcome and satisfaction, families' satisfaction. Also, they mentioned that prevention of infection transmission will raise the department's and hospital's reputations.

> *"When you do more controlling, the level of satisfaction will be high, and you will see the higher outcome. This point will be reflected on the hospital; you will increase patient and family satisfaction and treatment level in the hospital"* (AA1 interview).

> *"… We protect our department reputation"* (CA1 interview).

4.3.3 Limited professional status - lack of autonomy

Limited professional status was viewed as an important factor influencing compliance with SPGs. The majority of the participants identified this theme. Everyone in health care facilities should apply the practice of infection prevention and control consistently. Hospitals have a responsibility to provide a safe environment and HCWs are also responsible for following the recommendations. Prevention of transmission of HCAI begins with nurses who are the occupational group most frequently in contact with the patient for long hours. Therefore, paediatric nurses need to develop to become fully professional in its orientation so that nurses take full responsibility for their actions.

Through the analysis of interviews, six categories emerged related to this theme, including intra- and interdisciplinary communication, power imbalance, knowledge,

education, awareness and self-efficacy and the ability to comply properly with the Standard Precautions.

Intra- and inter-disciplinary communication

This category relates to cooperation and communication as a factor influencing compliance with SPGs either positively or negatively. Almost 50% of participants mentioned that poor communication affected infection control practice in a negative way. Nurses frequently mentioned that the medical staff would not comply with SPGs when asked to do so by nurses. In addition, other healthcare professionals such as dieticians and physiotherapists did not accept requests by nurses to comply with SPGs.

> *"Unfortunately not all people accept prompting from nurses, I mean if you talk to respiratory therapists or dieticians about what they should do, they will not accept this, or accept it for one time and that is it. They have a separate administration ... so they think that this is not our role. Unfortunately, our people have this concept" (EA1 interview).*

> *"Some people are not cooperative there is a dependency, so each one seeks to finish his/ her duty and leave ... so, on handover we try to purport other to do the right thing" (AB2 interview).*

Furthermore, nurses mentioned that there was limited communication with the infection control committee and administration around non-compliance issues or about improvement strategies; this meant that changes were difficult to implement. Also, nurses showed professional impotence as they did not seek to implement these changes by themselves.

> *"There are many situations... mentioned to infection control team, and our supervisors, but still there is no improvement..." (EA1 interview).*

Nurses also viewed communication with housekeepers as difficult and tended not to reprimand them for using damp or dirty clothes that could spread infection. Nurses justified this as a problem that related to the housekeeping companies not providing appropriate equipment, rather than placing the responsibility on the cleaners carrying out the cleaning. This highlights that some nurses were failing to challenge poor housekeeping.

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> *"We observe them, or talk with them when we smell a bad odour, this mean when we reach this late stage (bad smell) we ask them to change the material"* (EA1 interview).

Nurses acknowledged that good communication and cooperation would improve infection control practice. They mentioned that using effective communication techniques between nurses was important in the nursing handover process as well as on the ward rounds. Nevertheless, nurses found it difficult to communicate with other occupational groups on issues relating to the quality of practice.

> *"If the patient admitted to your department and he/ she has an infection you should inform other about this case, and you should use these precautions. Also, you should inform next nurse who will care for this patient ... cooperation between medical team this is considered as a positive factor"* (AA1 interview).

> *"... If the person from infection control comes to talk with us instead of only observe, or document what we do. We hope if there is a communication so that we can talk"* (AA5 interview).

Nine nurses said that nurses thought that they were more compliant than other healthcare professionals, and that nurses had a fundamental obligation to adhere to infection prevention and control practice. Nurses viewed physicians, Consultants and other professional groups as less compliant than were nurses. However, the nurses felt impotent to change the practice of other occupational groups.

> *"If you do a study or survey to investigate compliance with hand hygiene for all HCWs, you will find it low, for example, (previous statistics in the hospital) indicated the highest compliance rate was among nurses while physicians' compliance was too low ..."* (AB3 interview).

> *"Registered nurse plays a major role in preventing nosocomial infections ... you are responsible for your patient, you should be an advocate, and you should be a consultant for your patient"* (AA1 interview).

> *"I have comments on respiratory therapists practice, how they deal with patient suctioning, there are many personal mistakes we notice as a nurses... Also dieticians do not do hand washing when they enter and exit*

from patients rooms, as they do not deal with patients directly" (EA1 interview).

"Moreover, there are many doctors who, themselves, do not follow necessary measures while dealing with serious diseases. Even when they are treating neutropenic patients" (EA3 interview).

Power imbalance

Nurses felt that there was a power imbalance between them and the medical staff which prevented them from challenging the medical staff. Physician's power and authority was viewed as a negative factor as they were the least likely to comply with SPGs, yet nurses found it difficult to challenge their authority. Nurses disagreed with some physicians' decisions regarding isolation and infection control practice. For example, physicians would take the decision to isolate patients who needed barrier nursing, or discharge patients who were fit to go home. These decisions were often made by physicians without consulting nurses.

"Doctors would not let us know in case there are certain contagious diseases to be aware of or take measures against. Once, I had an argument with a doctor because I reported that the patient had MRSA, but as long as the doctor did not report it, I should not have done so. He should have at least report to the nurses to wear gloves while dealing with that patient to avoid infection ... As a nurse, I'm not allowed to discuss anything with the doctor, although I feel I still have the right to warn fellow nurse to take necessary measures when treating that patient" (BA3 interview).

Furthermore, the infection control committee and administration also felt powerless to confront physicians and consultants' decisions, so instead they focussed on nursing and housekeepers' practice. Another issue was that some families ignored nurses' advice; as they were more likely to accept the decisions given to them by physicians.

"Consultants' and medical doctors have the authority in the hospital, for example, there is a well-known consultant enters the department while wearing gloves and leave with the same gloves ... nobody can talk with him even the hospital general manager" (AB3 interview).

> *"... Maybe this is a historical community perspective to nursing that playing a role ... Moreover, sometimes families accept only physicians' words" (AB3 interview).*

One nurse reported that physicians sometimes made inappropriate decisions based on personal judgment rather than from the use of evidence-based guidelines. In these instances, nurses, who were unconvinced of the efficacy of the physicians' decision (not follow the regulations), had to be strong to contest these.

> *"... There was a female patient in isolation, and we were advised not enter her room. Then, the consultant (xxx) came here, and asked why you not put a gown ... when she received a new patient after two hours, she said discontinue isolation and put the patient on outside beds ..., but she was fighting before why there are no gown or gloves" (AA5 interview).*

> *"Actually, doctors would not follow regulations when it comes to certain contagious diseases. For example, when doctors do blood tests, they would not dispose the needle, the syringe, and the gloves the right way. Instead they would throw them all over the place or in the wrong bin" (EA5 interview).*

> *"... Interaction and/or communication between infection control team and the doctors is absent, and therefore, things are unclear to them" (EA5 interview).*

Knowledge

More than half of the participants acknowledged that knowledge of infection control guidelines was essential to improve their practice. AA1 touched on this when he said:

> *"Basically. Nurses should know about hand washing or infection control measurement ... at least to protect yourself and your patients."*

AA3 supported this by saying,

> *"I think knowledge is important, so you need to know the disease process and what you should do to prevent the transmission of infections."*

Nurses reported different sources of knowledge acquisition about infection control guidelines, such as an orientation programme for new employees, basics in their initial

training, leaflets, and brochures from the infection control team. They also highlighted their own initiatives through reading online articles in an effort to keep up to date. AA5 illustrated some of these issues saying,

> *"With experience and by looking for the signs, we learned that to care for contact isolation patients, we should wear gown and gloves … University courses, we took in fundamentals. In university courses, you learn about Standard Precautions, droplet isolation, and what the contact isolation is."*

In addition, CA1 described the orientation programme as a source of knowledge,

> *"First thing when I came here they gave orientation programme that includes a lecture about infection control, and they gave us leaflets and brochures."*

However, some participants claimed that nurses had insufficient knowledge to deal properly with Standard Precautions. It seems this is just another excuse for poor practice, as considered nurses' non experts to deal with practice issues. The reasons provided related to lack of in-service education, insufficient orientation lectures about infection control for fresh nurses, lack of refresher workshops and lectures and using old methods of teaching. Some senior nurses commented that they had no refresher courses since their initial training.

> *"… From my ten years' experience, some nurses have knowledge deficit about infection control… I worked with those people … some of them still do not know the importance of doing infection control"* (AA1 interview).

> *"Lack of education and staff knowledge deficit about Standard Precautions … if the nurse does not know/ understand what the droplet isolation, airborne precautions, is or contact isolation are. For sure this will effect."* (AA5 interview).

> *"Lack of knowledge either for nurses or physicians"* (AB3 interview).

> *"… For example, caring for a central line, there are no lectures about it, we read about it, but we need more education"* (AA2 interview).

Education

Nurses were aware of the positive influence of continuous education on their infection control practice, and they described some educational activities in their department such as seminars conducted by senior nurses and lectures provided by the infection control team.

> *"Education is improving, and seniors teach juniors" (AA2 interview).*

> *"Sometimes, we are assigned to do lectures in our department about new cases or incidents, so we update ourselves" (EA4 interview).*

> *"There are some lectures conducted by infection control team" (AB3 interview).*

However, around half of the participants reported many barriers to getting a good education in the infection control area. For example, they mentioned that there are some lectures, but these either are conducted over a long interval period, or lectures were delivered at a time when they were unable to attend. This is another excuse to not doing the job properly, as professionals can study in their own time.

> *"… We are staff work three shifts. So if this lecture is given once per month, it will be given to the specific group, and the second group will not take it … For example, I request a lecture about isolation and meningitis, and I was interested in attending, but my work was not appropriate for lecture time" (EA1 interview).*

> *"Even if they assigned me to attend a lecture, sometimes I cannot attend with the high workload in the department" (EA4 interview).*

New and junior nurses needed time for good training, but this raised conflicting concerns with existing nurses who viewed this as an additional burden for staff if they had to undertake training new staff alongside the demands of delivering patient care at the same time.

> *"But for juniors no one teaches them about infection control, and how they should work with each patient" (AA5 interview).*

> *"... Especially when you want to teach juniors and in the same time you want to provide care to the patient, and writing the care plan" (EA4 interview).*

Some nurses claimed that continuing education was insufficient in their hospital, and that the hospital intranet did not contain useful information on infection control. Additionally, they highlighted concerns about the quality of the educational provision as they outlined that some educational providers were unable to convey the information needed to ensure quality practice. However, these are just excuses; professionals are not spoon fed information and they should seek it out themselves.

> *"We do not have lectures about new diseases ... I did not see people gave lectures" (BA3 interview).*

> *"They do not conduct studies on infection control" (CA5 interview).*

> *"We informed that there is a study ... why they do not publish this study on the employee corner (intranet web page) same as policy" (AA5 interview).*

> *"There is no reference to return to it, this means that nothing is entered into the system that we can return to it, and read and follow what happens" (EA1 interview).*

> *"Also there is a problem in the person who convey the information, he is not fit to convey the message, he just comes to read not to be understood" (AA5 interview).*

Some nurses suggested different strategies to improve infection control education in their hospital. For example, this needed to be enhanced by collaboration with other hospitals through conducting shared conferences and symposiums so nurses were continually reinforced with the most up to date information for best practice. Another suggestion for continual reinforcement was the provision of posters about compliance close to the points of the patient care.

> *"They can activate the courses and involve us in large conferences with other hospitals ... we can share experiences with other hospitals" (EA5 interview).*

"They can hang posters about Standard Precautions close to patients' rooms" (EA2 interview).

Awareness

Nine nurses reported on the issue of awareness and these revolved around the idea that awareness of the risk of exposure to blood and body fluids is essential to improve infection control practice. For example, AA1 said,

> *"… You are at risk of exposure to nosocomial infections … you should be aware of the way of transmission (airborne, contact), and if your patient needs to be isolated or not".*

Also, EA4 said,

> *"… Two patients admitted to the hospital with Coronavirus syndrome (The Middle East respiratory syndrome Coronavirus), and they died, so now we became more aware of the importance of infection control practice".*

Some nurses illustrated that lack of awareness is influencing infection control practice negatively, as nurses may not be aware of the consequences of their actions.

> *"If you are not aware you will increase the rate of infection as 99% of nosocomial infections depend on staff nurse because he/ she work more than other HCWs with patients in a direct way" (AA1 interview).*

> *"They may do not aware of the current situation, but if they know what happens to their colleagues (occupational exposure to infectious diseases), and the main objectives of infection control, they will comply properly with the Standard Precautions" (EA5 interview).*

Only two nurses reported that despite nurses being aware of the risk of exposure, they ignored the guidelines as they needed to finish their duties quickly,

> *"Awareness exists that any patients may suffer from the infectious disease, but at the end people may ignore the guidelines, or justify that they want to finish their duties (no time)" (EA6 interview).*

4.3.4 The challenge of the working environment

The 'working environment challenges' theme considers the structure of the work environment and the way that it influences paediatric nurses' behaviour towards compliance with infection prevention and control measures. All participants reported challenges in infection control practice in Jordan, and these reflect similar concerns in other developing countries. These challenges will not be addressed until nurses take their responsibility and start to campaign for them to be changed. The problem here is a lack of professional development and perceived independence. This was clear in the nurses' justification in the previous themes.

The nurses outline the importance of this theme as it was referred to in all the interviews through the following four categories:

- Policies and evidence-based practice
- Organizational structure and quality programmes
- Equipment issues
- Staffing issues

Policies and evidence-based practice

This category contained a number of different factors associated with infection control policies and practice. Most of these factors were considered as barriers to good practice in the infection control area. They described how nurses' decisions to use the Standard Precautions might deviate from the best available evidence. However, there are a few points reported as facilitators of proper compliance with SPGs. This category discussed the following factors:

- Conflicting policies and regulations,
- Clinical practice and experience,
- Isolation rooms and policies,

CONFLICTING POLICIES AND REGULATIONS

Participants described many points that affect their practice negatively, and at the same time mentioned few points that improve their practice. For example, nurses mentioned

that there is disagreement with some guidelines and conflicting policies in their hospitals. Different versions of policies are confusing and provide little evidence to justify why changes have been introduced. The nurses felt some policies were ineffective in preventing the transmission of HCAI and argued about the rationale for introducing policies without providing the evidence base to encourage them to use these policies. Nurses did not intervene to solve this issue, and it seems that they are working like skilled operatives, rather than as professionals; they recognise a problem but do nothing about it because they fail to see policies affecting their work as their responsibility.

> *"Each time they generate a new policy, how to care for a central line, sometimes the policy said use povidine, in another time normal saline. So, we cannot adapt to these changes … each time they design different policy … as a policy you should do this, but why, there is no evidence-based " (AA5 interview).*

> *"… Some patients such as who have hepatitis-A virus admitted as a contact or airborne isolation case. But I'm not convinced that they need contact or airborne isolation even if the policy said that …" (CA1 interview).*

However, some participants described that existing policies positively influenced their compliance with infection control measures. For example, compliance with SPGs is obligatory by law and regulations and nurses do their best to follow these guidelines. This disparate view may suggest that nurses just offering excuses for their poor practice.

> *"As a nurses or employees in this hospital are obliged to follow these steps in general and comply with them" (AA1 interview).*

> *"In general, here the precautions for known cases are clear, and all staff should comply with them at least… there are guidelines, and you should follow them exactly" (EA1 interview).*

> *"… At the end there is a policy and you should follow it" (CA1 interview).*

In addition, a few nurses reported that despite they faced many challenges in using SPGs, they acknowledged that these regulations should be applied similarly in all departments because they are a quality standards. For example, nurses mentioned that

they perform different procedures and provide nursing care according to written policies such as the management of sharp instruments policy, waste management, positive lumbar puncture policy, and intravenous cannulation and medication administration policy.

> *"Generally. It means that infection control regulations are similar in all hospitals. Their principles are similar, and it is not difficult to comply with them"* (EA1 interview).

> *"Urinary tract infections policy are the most applied in our hospital even in paediatric department"* (AA4 interview).

> *"A waste management policy is clear, and there are brochures describing how to manage the waste products and the types and colours of waste bags. Also, sharp containers and poster for both surgical and standard hand washing and alcohol hand gel"* (CA2 interview).

There are exceptions to maintaining compliance for example the use of attaining a sick note when ill was cited as problematic. A few nurses mentioned that hospitals were reluctant to provide sick notes for staff, (even if they had flu), because of staff shortages. Nurses though that this was counterproductive and placed patients at risk of infections from HCWs especially immunocompromised patients. One nurse outlined that accepting a sick note was problematic even when they were genuinely ill and so they remained working and took measures to prevent infection spreading.

> *"It is supposed that the sick staff member take sick note and leave, but the number of staff does not allow to do that, so she will use a mask to protect patients and staff members"* (CA2 interview).

Another nurse highlighted that while there were genuine cases of staff requiring sick notes there were also some staff who misuse the sick leave policy. Yet a professional would refuse to put patients in danger.

> *"To be honest, we have a problem in sick leave policy, sometimes some people get sick leave without being sick, but other people if they are sick they cannot get sick leave may be this is related to your relationship with the physician"* (EA4 interview).

This subcategory occurred frequently and deals with how clinical practice might be affected either positively or negatively by experience. Many nurses said that their practice improved with experience because they gain more skills and knowledge with time. For example, nurses with experience could manage their time and organise their work properly, and they become more knowledgeable and aware of infection transmission. In addition, they saw a large number of situations through their experience, which was beneficial to SPGs compliant behaviour.

> *"When I came to the hospital for the first time they gave us courses about infection control and the right method of hand washing. However, frankly I did not apply these principles properly because I did not understand them. So, experience enabled me to understand that the practice sometimes not only build on scientific base but also on reality and logic"* (EA5 interview).

> *"When you were a new graduate you did not have enough practice (experience) and information to work, but with practice you see what you studied in the reality"* (AA3 interview).

> *"I did not work with children before ... and paediatric need more concentration than adults. Now I feel that my knowledge became better than before, and we know what this patient need to do. So, the experience is useful"* (EA4 interview).

Conversely a few nurses reported that their infection prevention and control practice worsened with experience, due to practice norms and routines. They mentioned that nurses at the beginning of their careers fear more from exposure to blood and body fluids and hospital environment, and this fear is reduced with experience. Another issue was that nurses' tasks increased with experience and so their workload created job-related stress and affected their SPGs compliance. Furthermore, some nurses thought their experience enabled them to avoid exposure to blood and body fluids' even if they did not use these precautions because they had the skills to undertake tasks in an effective manner.

Nurses also portrayed a sloppy practice to fully complying with SPGs standards.

> *"Yes, my practice is changed. When I had started my job, I was more compliant with these precautions, because I feared more from contact with patients. ... but people do not follow properly the guidelines" (CA2 interview).*

> *"If I do not use these guidelines, I will use my experience, and I know in this situation that this behaviour will not affect me, and there is no high risk" (EA1 interview).*

> *"In the first year of work, you apply the precautions properly, especially with isolation cases. However, when I got more experience, my responsibilities have increased ... you will be overwhelmed with the hospital requirements. However, if you have few tasks to do, your compliance become better than when you are under stress or pressure" (AA4 interview).*

Oher nurses had a divergent view and portrayed full SPGs compliance, for example three nurses reported that their practice had not changed from first employment, and they continued to apply what they studied at the university. Nurses thought that infection prevention and control involved clear guidelines regardless of years of experience, and everyone should follow these guidelines.

> *"No, it did not change, what I learned at the University, I applied it here. Maybe because I worked in a special unit that occupy a large number of babies" (AB3 interview).*

ISOLATION ROOMS AND POLICIES

Almost 75% of participants described the issues relating to isolation rooms and related policies. These issues related to the number of isolation rooms in both PICUs and paediatric wards. Some PICUs only had one isolation room and this lack of facility did not meet patient's needs, while other departments had two to four isolation rooms but these were also considered to be insufficient to meet the demands needed for the number of patients who needed isolation. Furthermore, the availability of isolation rooms was considered as better in the private sector compared to other healthcare sectors.

> *"We have only one isolation room in PICU, and frankly more than one patient may be admitted who need isolation which considered a barrier"* (AA1 interview).

> *"It is not available here in the public sector, for instance, isolation rooms. Other hospitals have good internal and external ventilation like private hospitals"* (BA6 interview).

> *"We have only two isolation rooms …"* (CA6 interview).

Additionally, these rooms were either not prepared to be isolation rooms or did not have negative or positive pressure systems. A negative pressure system is used to protect the environment from contamination; this is important in some cases such as tuberculosis, while positive pressure is used to protect patients such as bone marrow transplant patients who are especially vulnerable to infection.

> *"I mean that thing which is called negative pressure is not found"* (AB3 interview).

The solution used to offset the lack of individual isolation rooms was to use larger isolation rooms to receive two or three patients. This practice was considered dangerous to patient safety, because patients and staff had to use the same sinks, wash basins and toilets in these rooms.

> *"There is only one isolation room, and sometimes more than one be patient need isolation… we will put them in the same room"* (AA5 interview).

> *"Because the place and time is limited we admit some patients such those have infected with Rotavirus to normal rooms, but we try to leave a space around them"* (CA6 interview).

> *"They thought that the cause of infections transmission was the washing, bed bath, and toileting"* (interview AA4).

Even with a good number of isolation rooms, the demand for these rooms was still high. Also, patients with different conditions were often accommodated together causing further cross infection risks. For example, gastroenteritis patients and respiratory patients could share the same isolation room. Paediatric nurses had tried to find a

solution to this problem and had suggested discharging patients from as soon as possible

to protect them from acquiring a HCAI. This is an evidence that nurses knew what they

should do, but they felt unable to initiate change.

> *"It is difficult to isolate patients with respiratory infections (except high-risk infections), because it is not necessary, and we do not have the capability (financial)" (EA3 interview).*

> *"We do not consider patients with respiratory infections or gastric infections as isolated patients ... we try to put them in isolated beds, but if we cannot do that, patients are admitted to standard rooms with other patients" (CA2 interview).*

> *"We try to keep infectious patients away from other patients, especially meningitis who are admitted to isolation rooms or rooms with a small number of patients. However, if the patient covered by antibiotic for more than 48 hours, he/ she may be transferred to standard rooms" (BA6 interview).*

Physicians were responsible for making decisions on whether a patient needed to be

isolated, and the type of isolation required. However, these decisions were sometimes

problematic if there was no isolation room available. Moreover, some physicians gave

contradictory and confusing information to families so they refused to accept the nurses'

use of protective equipment. Nurses did not challenge the physicians, who were viewed

as having more knowledge and authority (the issue is related to power is highlighted in

theme 3).

> *" I want to understand on any base you (physician) discontinued isolation and sent the patient to outside area, and admitted a new patient ... suddenly as simple as, she said there is a critical patient came and wants to admit him to isolation and discharge this patient from isolation" (AA5 interview).*

A few nurses illustrated that to protect themselves; they deferred the care of the isolated

patients, as they finished other caring duties first, then returned to care for the isolated

patients. This meant that some caring components for isolated patients were delayed.

This issue means that nurses are thinking people knew what they were doing, but they

were not empowered to work with doctors and administrators to solve the problem in the long term.

> *"However, if we are assigned to care for meningitis patient, we will wash our hands properly, or we finish the duties with other patients, and leave isolated patients to the end" (CA2 interview)".*

Conversely, more than half of the participants claimed that when they cared for isolated patients they tended to follow the guidelines properly, understood each case. They also undertook measures to raise awareness, such as, placing door signs on the patient's room clarifying the type of precautions required (e.g. contact or droplet isolation).

> *"As a hospital policy, there are cards for isolation rooms, these cards clarify. For example if the patient needs contact isolation, you should wear gloves, gown, preferable mask, also you should wash your hands before and after doing any procedure with the patient" (AA5 interview).*

> *"If we have isolation cases, we deal with them in a special way. We strictly adhere to the isolation based precautions … the supervisor follows up our compliance …" (CA6 interview).*

Nurses noted that signs for isolation-based precautions were important not only for healthcare professionals but also for patients' families and visitors. These signs improved families' compliance with the precautions and cooperation with nurses and other healthcare professionals. Furthermore, isolated patients were more likely to be allocated resources such as masks, gloves, gowns, alcohol gel, and medical devices like sphygmomanometers.

> *"We put signs on the room door, so families and visitors know the type of isolation, so there is follow up on this matter" (EA5 interview).*

> *"These signs clarify the way of transmission, how you can avoid this disease, and how you can deal with this disease either by contact or droplet isolation" (AA1 interview).*

> *"Everything is available in front of the patient room such as gown, mask, gloves and Sterillium, so everyone can use them before entering the room" (CA2 interview).*

Leadership and administration

Most participants frequently mentioned this category. It includes the accreditation programmes and quality standards; administration role; structure and design of hospital building; environmental cleaning and hygiene; and infection team roles and responsibilities.

ACCREDITATION PROGRAMMES AND QUALITY STANDARDS

This concept was viewed as a facilitator of compliance with SPGs. For example, nurses mentioned that application of these programmes improved medical and nursing care to patients and highlighted how to use resources effectively. Additionally, infection prevention and control was outlined as a quality indicator, and so administration concentrated on this concept to get national and international accreditation.

> *"Here we follow quality management which means that Hospital will provide appropriate medical care for patients with lowest possible costs … we should deal with the definition of quality by using infection control to reduce the existing costs" (AA1 interview).*

Nurses thought an accreditation process enhanced awareness of infection prevention and control and enabled them to become more involved in educational seminars and workshops to disseminate their knowledge. Nurses also highlighted accessibility to infection prevention and control guidelines which had the potential to improve their infection control practice. Furthermore they highlighted that administration made changes so that resources were targeted to paediatric departments and isolation areas to improve infection control practice.

> *"Accreditation programmes enhance the level of the hospital, and the staff awareness of infection control is improved as a result of providing more courses and designing new papers for infection control" (AA2 interview).*

> *"In the hospitals that get JCIA (Joint Commission International Accreditation), the infection control was good. For example, each bed has a separate sharp container, so it's easier to dispose needles without risk of exposure to accidents"" (EA1 interview).*

However, one participant described how the influence of accreditation programmes on practice did not continue for long because of the infrequent visits by the infection prevention and control team outside times of an accreditation round. Addition, it was noted that administration provided more equipment at times of accreditation but afterwards the situation returned to its limited situation. Therefore, the core problem remained and accreditation did not actually make much difference. Nurses did not challenge this situation and instead blaming others for deficiencies in infection control practice which reflects a lack of professional orientation.

> *"We see them (infection control team) only during accreditation period, they do monitoring and follow-up for all wards. Also, they should provide us with the required equipment all the time, not only during accreditation round" (CA3 interview).*

ADMINISTRATION ROLE

Many nurses described the administration role and its relevance to infection prevention and control practice. They mentioned the supervisor's role, the hospital administration's responsibility, documentation, and paperwork. Other factors relating to the administration role was that of financial concerns (limited hospital budget, patients health insurance), motivations (increasing salaries, honouring good nurses), and punishment (warning letter, practice investigation).

Half of the participants discussed the supervisor's role and argued about its importance in enhancing infection prevention and control practice. They outlined supervisors' awareness and assertiveness with regard to infection control practice in different environments. Supervisors undertook daily rounds to check compliance with the hospital's standards of providing good quality care to patients. Nurses highlighted the supervisors' role in follow-ups and observation of nurses and healthcare professionals to ensure SPGs compliance. They also pointed out that not all supervisors undertook this role but instead delegated responsibility to expert nurses.

> *"The ward supervisor each day check that precautions used properly or not, we should open a new Sterilium (Alcohol gel container) each day,*

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and check the cleanness of the nursing station and other parts of the
ward ..." (CA6 interview).

"Not only infection control team do a periodical follow-up but also wards
supervisors do that. They distribute the tasks" (EA5 interview).

Few nurses mentioned that a good role model (i.e. supervisor or charge nurse) could
influence practice in a positive way but that if an influential person's practice was poor,
other nurses would follow him/ her.

"For example, if our in-charge said that no need for these precautions,
staff members will follow him/ her. However, if your colleague said that,
she will not affect other" (EA1 interview).

Only a few nurses admitted to informing their supervisors about the lack of equipment,
but felt their efforts were unappreciated and the supervisors did not always action the
shortfalls. Also, even when supervisors intervened these were not always effective.

"We inform the ward supervisor about the lack of equipment, and she
manage this issue as other unavailable stuff, not as something important
to prevent the transmission of infections or for isolation rooms" (CA5
interview).

The hospital administration had a positive role to perform in infection control. For
example, nurses mentioned that people were fearful of not adhering to administration
standards to improve practice. However, professional nurses have to be self-motivated.

"From my point of view, not all people apply the principles of infection
control, but when we have a good administration during accreditation
period, I feel that people feared from the administration and complied"
(AB2 interview).

The nurses suggested that the hospital administration had an important continuing role
in staff motivation to enhance quality care practice.

"The supervisor of every team needs to support and encourage his/her
staff members. Using words such as 'well done' or 'good job' to
encourage their staff member to work harder, and deliver a better job. ...
dedicating one day a year to honour and reward nurses for their hard

work will encourage and boost the morale of the staff members" (AB2 interview).

However, Nurses raised many negative points around excessive bureaucracy to complete documentation during busy times and how this impacted on patient care.

> *"The administration yesterday asked us to fill a consent form for Midazolam, and we have much paperwork to do, so this will take time on behalf of the patient care" (AB2 interview).*

Many nurses described the financial issues as a barrier to compliance with SPGs. For example, nurses mentioned that hospitals had limited budgets that hindered attaining the required equipment for their departments or to hire enough staff in each department. This problem was mainly found in public hospitals, where government funding is limited.

> *"The isolation unit in the private sector is more advanced than in the public sector… also, the public sectors lacks essential equipment when it comes to dealing with serious diseases" (BA6 interview).*

> *"In my opinion, the main problem is the materials or financial support, so if the hospital has a good financial support, this will affect the staff … hire more qualified staff will help to follow the regulations properly" (EA1 interview).*

Other negative points related to patients' health insurance. For example, some patients did not have health insurance or their insurance did not cover the whole treatment especially in public hospitals. Patients sometimes found it difficult to pay for the cost of treatment. As a result, nurses tried to minimise usage of medical equipment to reduce patients' treatment costs; doing this had unintended consequences through infection risk exposure for both patients and healthcare professionals.

> *"There are no enough disposable gowns, and they will cost families much money because they will pay for these gowns that will be used for one time and discard it. So, if the receipt for cash payer's families (without insurance) is high, the families will not come again to this hospital" (EA1 interview).*

A few participants identified motivation factors. For example, nurses mentioned that incentives such as the amount of salary, was important to improve compliance with infection prevention and control guidelines. Nurses described distinguishing individual nurses, either junior or senior, in their jobs and involving them in special workshops as facilitators to improve practice. Nurses cited the need for feedback and acknowledgement as motivating factors towards improving standards.

> *"Appreciating and encouraging the new generation of staff members might be a good incentive for others when they want to follow the example of their peers" (BA6 interview).*

> *"They can motivate us by honouring good nurses, or increase our wages, or at least incentive every six months ..." (AB3 interview).*

Senior nurses mentioned that no privileges exist for charge nurses who do the same tasks as junior nurses. At the same time, they get more responsibility and workload, but their salary is only slightly higher than that of juniors. They mentioned that their only privilege is working on early shifts, but this is not a high motivation factor. Other nurses mentioned that the lack of incentives makes nurses who work hard behave less professionally and that this had the potential of making them less committed to SPGs.

> *The nature of my work as Charge Nurse… there is no difference between us, but my duty always on A-shift, and I receive patients. Usually, I receive side with a practical nurse or staff nurse, and we do a normal routine that include bedding and vital signs, and normal nursing care that we provide to patients" (AB3 interview).*

Some nurses mentioned that hospitals should take action regarding SPGs non-compliance in order to improve practice. The sanctions they highlighted a warning letter, and conducting investigations of nurses who persist in not following the guidelines. It seems that nurses gave another excuse, because a professional must be able to practice without rules. It is nurses' responsibility to do the job properly not someone else.

> *"If the sister from infection control team inform the ward supervisor about failure of compliance many times, the supervisor may send warning letter to the nurse or send report to the hospital administration. This will*

reduce the infection rate in the ward and enhance infection prevention"
(CA5 interview).

*"There must be rules that every nurse needs to abide by. If, for instance,
there is a possibility that a nurse might infect patients, or the opposite,
there must be strict rules that nurses need to follow. If the nurse fails to
follow rules, there must be penalty for that" (EA5 interview).*

However other nurses stated any sanctions needed to cover all healthcare professionals
as presently, physicians who violate SPGs are immune from action even after repeated
violations.

*"Nobody can complain or report complains to the management.
Sometimes, even the team supervisor cannot. Even when reports are
made, there is usually no response. However, if nurses do that they will
get a warning letter or fired from the work" (AB3 interview).*

STRUCTURE AND DESIGN OF HOSPITAL BUILDINGS

Some nurses mentioned that the structure and design of hospital buildings and
departments affected compliance with regulations. For example, compliance is
improved if the department possesses separate rooms (single capacity), and double and
triple rooms to accommodate patients with different needs. Many rooms hold six to
eight patients. Nurses claimed that they became overwhelmed in these crowded rooms.

*"Also, if there are many separate rooms (one room for each patient), the
infection rate will decrease. I mean, when you care for three patients in
the same room, you may use Sterillium or hand washing outside the room,
but inside the room, unfortunately, you will not wash your hands between
patients. In the separate rooms, you will wash your hands before entering
the room" (EA1 interview).*

Other nurses described that the building was did not support compliance with
guidelines. For example, some departments were not prepared to receive paediatric
patients, because they had additional needs in comparison with adults such as a play
room *(a separate room for children's leisure activities).*

*"I am talking about enhancement within hospital ability, I mean provide
us with the minimum or medium standards, to protect ourselves and our*

patients, and it is difficult to ask the hospital to build contagious rooms (interviewee words), and negative pressure rooms. We do not have these rooms… they will not build them, because the building is not prepared for that, or the cost is high" (EA1 interview).

ENVIRONMENTAL CLEANING AND HYGIENE

It is widely accepted that thorough environmental hygiene in all hospital departments is important for the prevention of HCAI. This subcategory mainly discussed the importance of environmental cleaning, the housekeeper's role in infection control practice, and waste products management.

Nurses mentioned that limited cleaning resources means that ineffective cleaning takes place in patients' rooms, as well as of equipment such as monitors, and medical devices such as sphygmomanometer and the blood pressure cuff. Housekeepers cleaned patients' rooms, but nurses thought that this was not effective, as this is based on manual cleaning and sterilisation (no machines are provided to do this so no deep cleaning takes place). In addition, nurses sometimes are forced to use a different type of alcohol for cleaning (Sterillium) which they feel is inappropriate for use.

> *"The equipment is not effective in cleaning … when the patient is discharged we clean the room, I mean the bed and equipment, but I think the housekeepers do not do the sterilisation properly" (AA4 interview).*

Many nurses identified that the housekeeper role was the main factor in infection control practice, and, generally speaking, it was viewed as a barrier to good infection prevention and control practice. Nurses mentioned that housekeepers had low educational levels, and were unaware of cleaning and sterilisation principles. Nurses felt there was limited good cleaning of patients' rooms, and on patient discharge from isolation rooms, no deep cleaning routines took place. Nurses complained of a lack of follow-up for housekeepers, and they suggested that nurses should supervise housekeepers especially for isolation rooms (there are no special machines for sterilising and cleaning isolation rooms).

> *"One of the important things that we not mentioned, and may increase infection rate, is cleaners level who work in the hospital and their degree*

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lower than a bachelor, for example, other than staff nurses and doctors"
(AA1 interview).

"Even cleaners, for example, they are unaware how to clean the room"
(AB3 interview).

"So, someone should follow up housekeepers, but I do not remember if
there is anyone follows up them" (EA1 interview).

Nurses often challenged the practice of housekeepers. However, sometimes housekeepers did not accept nurses' infection control advice on the necessary precautions and this permeated right through the ranks to the head of housekeeping.

"When I prevent the housekeeper from entering the incubator if he/ she
not wear the protective barriers ... they ask why, do I have any
problem ... he/ she is not aware that this procedure is required to protect
him/ her and protect the patients who have low immunity. Last week I
argued with the head of housekeeping, because I had asked housekeepers
to use protective barriers" (BA3 interview).

Six nurses mentioned the issue of waste product management. Even though there was a policy for waste management, it was not applied properly. Healthcare professionals did not use this policy properly, and housekeepers placed all bags with each other in a one large bag, which is considered a dangerous practice. Nurses mentioned that they sometimes do manual separation of waste products, so they placed each type of waste in its designated bag.

"Even as medical waste products, each type has a special protocol of
disposal" (CA1 interview).

"We separate the waste by our hands, then the housekeepers simply tie
the bags and put them in a one large bag. So, you increased my
awareness, but you did not do that for housekeepers ... we try to observe
them all the time when they manage the waste products" (BA3 interview).

INFECTION CONTROL TEAM ROLES AND RESPONSIBILITIES

The majority of participants identified the infection control team as being a key factor in enhancing nurses' compliance with Standard Precautions. The participants described

that the infection control team's responsibility was to educate, audit and monitor compliance, support and advise on infection control matters.

> *"… Infection control team organised an excellent educational activity; they brought a hand washing detection machine. They asked us to do hand washing, then checked on the machine if we did the procedure appropriately … This activity was a good opportunity to improve our compliance"* (EA4 interview).

> *"They release the infection ratio in our department every three months"* (AA1 interview).

> *"They do regular rounds on a daily basis and follow up the HCWs' practice of the infection control"* (EA5 interview).

> *"They update our knowledge about new cases suffering from infectious diseases, also they conduct studies and follow up the patients' lab results"* (BA6 interview).

One participant described the infection control team as being credible, and members were appropriately knowledgeable.

> *"… Infection control team know their job even this done correctly or not. So I do not confront them, I think we should do that, but we do not do it"* (EA1 interview).

However, another two participants said that the role of the infection control team should be evaluated, and the team members needed to update their knowledge, so they could do their job properly.

> "… They (infection control unit) should do an update for themselves about existing infections, and the way of transmission" (AA1 interview).

Half of the participants described the composition of the infection control team. It usually included nurses and physicians, and usually the head of the team was a physician. The number of infection control team members was thought to be insufficient to follow up the practice of infection control properly and cover the hospital infection control requirements. Moreover, there were no infection control link nurses in each department, and sometimes one of the ward nurses was assigned to do that in addition to

his/ her duties. One nurse said that the infection control team was not approachable, and its members did not have time to communicate with nurses.

> *"They are two nurses make rounds for all departments, and infection control officer, and consultants from different specialties" (EA3 interview).*

> *"I think two members are not enough for a large hospital that need more observation" (EA1 interview).*

> *"As I said it is better to have an infection control unit or nurse for each Ward or two Wards, so they can improve observation and follow-up" (CA5 interview).*

> *"I remembered a situation when I need to contact infection control team, but I did not feel that they are approachable especially on B and C-shift ... one of our patients used by mistake her aunt insulin pin, the aunt, had hepatitis B disease, so I was looking for advice from infection control team" (CA2 interview).*

Some nurses identified that the infection control team had authority to challenge and monitor the practice of nurses and technicians but not that of physicians. Nurses also stated that the infection control team procedures were not enough, and that they needed to do more to improve the practice of infection control.

> *"... We convey the message to the infection control team about this consultant, but they cannot challenge his practice ... However, if he is a nurse he will get a warning letter or fire out from the hospital, this is clear in our hospital" (AB3 interview).*

> *"... We have someone monitor our practice ... Moreover, this is applied for housekeepers, but there is no interaction between infection control team and physicians, so the infection control matters are not clear for them" (EA5 interview).*

> *"... Their procedures are not enough" (CA5 interview)*

> *"The performance of infection control team should be better than the current situation" (AA2 interview).*

Equipment issues

Equipment provision was mainly considered a barrier to compliance with SPGs. For example, nurses mentioned that they were willing to use precautions to protect themselves and their patients. However, nurses reasoned that they could not use these precautions when the equipment was limited or unavailable. Equipment was mentioned as a barrier in all types of Jordanian health sectors. The public-sector hospitals suffered more than other sectors from limited resources. All participants considered the lack of resources as the main barrier influencing their infection control practice and it was a recurrent code in all interviews and within the same interview. These resources include mainly personal protective equipment such as gowns, gloves and hand hygiene equipment (e.g. soap, alcohol gel dispensers). Also, medical devices (e.g. sphygmomanometer, pulse oximeter) were important in infection control practice, because nurses were forced to share the same device between patients.

Nurses claimed that they could not comply with SPGs if equipment, such as hand hygiene agents and protective barriers were unavailable, even if they have good education and training. Despite having very limited supplies, nurses did their best to ensure that Standard Precautions were followed. Nurses said that sufficient resources improved their compliance with SPGs.

The following quotes from nurses' interviews transcripts are example of these concerns:

> *"It's difficult for any hospital to improve infection control without enough resources" (EA1 interview).*

> *"...Not always available, face mask sometimes unavailable, latex gloves unavailable... How you can use these precautions when the equipment is unavailable, so for sure there are limitations" (AA5 interview).*

> *"Sometimes equipment is unavailable such as a gown, so we enforced to work without it" (AA2 interview).*

> *"If a patient is admitted to isolation room as contact isolation case, and gown is unavailable, how I can use this gown" (AA4 interview).*

> *"Availability of equipment is important, and public hospital different than private hospital different than JCIA (Joint Commission International Accreditation) accredited hospital"* (EA1 interview).

> *"Nurses aware that unavailability of equipment can increase the risk of infections for patients and themselves ... sometimes you can find simple things like gown or gloves, but for example for H1N1 virus you cannot find special mask"* (interview AA5).

Lack of medical devices or poor maintenance was viewed as a problem in several departments.

> *"Between patients we use same blood pressure cuff, just we clean it with Sterillium (alcohol swab), so this will negatively affect infection control"* (AA2 interview).

> *"Auxiliary nurses take vital signs for all medical and surgical patients using same sphygmomanometer cuff, even for isolated patients, so they transmit infections among patients. We use only one sphygmomanometer ... and there is no private thermometer for each patient"* (AB2 interview).

> *"I remembered that for last ten months, we requested a pulse oximeter many times without response. We used same pulse oximeter that was maintained many times without benefit"* (AB2 interview).

Another challenge was the lack of hand hygiene requirements such as sinks, tap water, soap, and alcohol hand gel. For example, some nurses claimed that they could not perform hand washing because there were too few sinks in the department, or that these were not close to patients' rooms. Additionally some sinks needed maintenance.

> *"Yes, we do not find close sinks, except patients' sinks that not contain liquid soap. It is difficult to use (bar soap) and it is not clean, so we enforced to go to treatment or investigation room"* (EA3 interview).

> *"Some sinks are not working, and also these Sinks for patients, not staff ... So, you are enforced to go to the treatment room to do hand washing"* (EA1 interview).

Some nurses mentioned that soap bars (a potential source of infection) were sometimes used. Liquid soap and Sterillium (alcohol gel) also caused skin irritation.

> *"Imagine, before they were providing us with bar soap that can transmit infections between people. After that they provided us with liquid soap bottles"* (BA6 interview).

> *"We got skin irritation because this soap is not prepared for hand washing, it is similar to the soap that is used to clean floors … I mean if the skin is irritated by using alcohol gel or soap, it will expose us to more infections (skin injuries), so I prefer to reduce their usage"* (CA2 interview).

Other nurses mentioned that sometimes soap and alcohol gel were unavailable, and occasionally there was no water to wash their hands.

> *"Sometimes soap becomes unavailable, so how you will wash your hands"* (CA1 interview).

> *"Imagine that they disconnected water for a period"* (CA3 interview).

> *"Once or twice during my duties, water was unavailable, I do not know why. We used instead of water-alcohol gel and sterile water for washing"* (CA2 interview).

A few nurses mentioned that it was difficult sometimes to get access to equipment such as gloves, and searching for required equipment needed much time and effort.

> *"If you need gloves you should go to the store, bring them and return to your patient. So, if there are available gloves boxes outside each patient room, you will use them easily"* (EA1 interview).

The nurses argued that not all gloves sizes were available.

> *"Sometimes gloves are large, and you cannot find a suitable size for your hands"* (CA3 interview).

Another problem mentioned by participants is that using gloves interfered with their skills in specific procedures such as venepuncture.

> *"I cannot move, so I cannot insert cannula with these gloves… I mean I cannot work with gloves I am willing to wash my hands many times, but not using gloves"* (CA3 interview).

However, nurses tried to adapt and comply with SPGs even with limited resources. For example, they borrowed equipment such as masks, gowns, and gloves from other departments or requested them from the storekeeper. In addition, nurses bought soap and small bottles of alcohol gel or brought them from home to use in their department.

> *"We can get them from other departments (help or borrows), or I will give up to the real situation. I will use disposable gown, and disposable gloves" (AA5 interview).*

> *"We inform the ward manager that it is not available, and we may take action by filling small containers so that alcohol gel will be available for everyone. ... The main barrier is the soap quality, and now my perspective is changed (after the interview) I will buy soap or bring it from my home to use it in the hospital, and this is may be a solution" (CA2 interview).*

Staffing issues

All nurses raised three main factors related to staffing. These factors were inter-connected and included high workload, shortage of staff members and limited time. Half of the participants reported that when working in emergency and Cardiopulmonary Resuscitation (CPR) situations, there was simply not enough time to use the SPGs properly.

SHORTAGE OF STAFF MEMBERS

Mainly nurses mentioned that staff numbers, patient numbers and the nurse to patient ratio was a major hindrance to their compliance with SPGs. For example, one of the nurses said:

> *"In general, here in Jordan we have a high staff shortage. Here they conduct once lecture, and they said that the ideal percentage for departments is 1:5, so we do not have this in our Wards, there is no place (in Jordan) has one staff to five patients" (EA1 interview).*

One PICU nurse said that she would comply better with precautions if the number of patients were lower and the staff to patient ratio was either 1:1 or 1:2

> *"Also, staff to patient ratio 1:2 (paediatric ICU) it is not rationale, but maybe if the ratio is 1:1 these things will be better" (AA5 interview).*

> *"There was a period when the number of staff members was low, so the compliance with Standard Precautions was suboptimal, but when the staff to patient ratio had increased to be 1:2, the compliance was slightly improved" (AA2 interview).*

It is recognizable that shortage of staff leads to high workload, and nurses sometimes cannot manage to provide care to many patients and comply properly with SPGs.

> *"These factors will decrease the provided care quality to the patient, it will need more time and efforts … for example, as result of shortage of staff members some days on A-shift I received 21 patients alone and also on C-shift … these problems increased my stress level" (AB2 interview).*

> *"Workload affect but this is not mean that they are not doing the right deliberately. I understand what you mean, workload not means I should finish quickly, or I do not want to use precautions (faster), but sometimes it is right" (AA5 interview).*

HIGH WORKLOAD

Seventy five percent of participants considered high workload as a major barrier to their infection control practice. Nurses were aware that high workload increased the infection rate. Nurses' lack of time caused forgetfulness because nurses tried to finish their duties, and junior nurses (fresh nurses) saw themselves under pressure to do many tasks at the same time and so ignored some aspects of infection control measures.

> *"Current workload, so it is difficult to cover everything when I receive 30 patients who may suffer from Gastroenteritis and dehydration or diarrhoea and vomiting. So, the patient needs observation because the patient case may develop to renal failure when they assigned me alone to work with those patients, it is difficult not to make mistakes even if I am careful" (BA3 interview).*

> *"Sometimes with high workload, you may feel that you did not provide a competent care. You may do more than two tasks in the same time, and you need just to finish your work. Especially juniors do not care if the procedure is sterile or not, they only want to finish their work" (AB3 interview).*

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> *"We have a high workload here, so if there is an error in handover for one patient, and you receive another demanding patient, so you just need to complete your duties that lead to forgetfulness or ignorance of some aspects of Standard Precautions" (AA4 interview).*

A few nurses thought that HCWs such as nurses, physicians, respiratory therapists, lab technicians and others, rationalised their failure to comply with precautions by their high workload.

> *"… High workload, because this is the main justification of nurses, physicians, and other HCWs such respiratory therapist and laboratory technicians to not comply with Standard Precautions" (EA3 interview).*

Nurses mentioned that high workload prevented them from providing psychological support for children and playing with them, which would facilitate treatment and cooperation from children.

> *"We cannot play with children and provide emotional support with this load of work. We try to play with them at morning but at time of medication administration and other loads, we just try to explain to the mother what we will do for her child" (EA4 interview).*

> *"In the ICU when you receive two critical patients, sometimes you need to use protective barriers when you are providing care each five minutes, and this will affect the compliance, so yes the high workload" (AA2 interview).*

Nurses mentioned that they were aware of the consequences of high workload, but they do not deliberately fail to comply with the precautions.

> *"It is simple, but with the load you may enter one room to give medication for one patient, and then you may go to give another patient medication without washing your hands, without scrubbing your hands, and we know the consequences" (EA1 interview).*

> *"… When the staff receives 20 or 25 patients, gives them medications, chemotherapy, and IV fluids, they will not work as ideal, you want to finish your duties, and give your patients their medications, to stabilise them. You cannot do more" (EA1 interview).*

Nurses gave examples of the way that being too busy affected their practice:

> *"Sometimes you are enforced not to comply with a high workload and a large number of patients. For example, when you care for a patient with neutrophilia, you may enter the room without a mask, and also to care for a meningitis patient who admitted before two days" (EA6 interview).*

Nurses argued that they could work comfortably and comply with precautions if there was no high workload.

> *"In the case of normal workload and less pressure than other wards, I can comply properly with Standard Precautions easily and comfortably" (EA5 interview).*

Nurses could adapt to a high workload by cooperation in completing their tasks, so that if nurses worked as a team, they could complete their tasks appropriately.

> *"With cooperation we can manage and control the problem, my experience here in this hospital is better than the previous one" (AB2 interview).*

One nurse mentioned that nurses' absenteeism without replacement from other departments exacerbated the workload problem (there are no part timer or bank nurses in Jordan). Some nurses were non-cooperative to cover the shortage of staff members.

> *"… If one of the staff members absent, the workload will increase, so instead of receiving ten patients who are a reasonable number, you will receive 20 patients" (BA6 interview).*

TIME

Nurses found themselves busy as a result of their high workload, and they used this to justify their sometimes poor implementation of SPGs. Many nurses said that non-compliance is easier than compliance and saves time. For example, nurses who received a large number of patients, twenty or thirty, need to finish their duties quickly, even by reducing their use of precautions.

> *"The person may need to finish quickly, especially when you receive 20 to 30 patients so that the reason can be saving time" (CA5 interview).*

Nurses were aware that non-compliance with SPGs would increase the infection rate and stress, but they justified this by saying that the matter was out of their hands. With limited time, some nurses failed to protect themselves when they worked with isolated patients or in emergency situations.

> "... We not always have time to wear gown and mask to the care of patients, because we assigned to the care for many patients… and not in all situations.For example in a cardiopulmonary resuscitation situation, you do not have time to use mask or gloves even if the patient need contact or airborne isolation" (AA3 interview).

> Some nurses do not care to protect their patients, by non-compliance with hand hygiene or changing gloves between patients "Saving time, washing hands between patients require leaving the room to do the procedure and return, so no I will complete my work quickly instead of going inside and outside the room" (CA2 interview)

USING PRECAUTIONS DURING CPR AND EMERGENCY SITUATIONS

Many participants perceived resuscitation and emergency situations as a major barrier to following SPGs. They said that saving the patient's life was the priority and was more important than compliance with SPGs. Therefore, they did not care to protect themselves, even if this meant that they would be exposed to serious infectious diseases such as tuberculosis. Other nurses mentioned that they made many mistakes in resuscitation and emergency situations, but these mistakes were not serious in comparison with saving a patient's life. The nurses argued that this was not the right time to use precautions.

> "Certainly, saving a life is more important (than infection control). Also, it is a priority; it is important to save lives. Sometimes in CPR you can find many problems (mistakes) in intubation, and cannulation. In these situations, the most important thing is saving a life, and infection control will not be a priority more than saving life" (AA5 interview).

Other nurses mentioned that there was limited time to use precautions in emergency situations because they needed to work quickly to save the patient's life, rather than to think of Standard Precautions. However, if healthcare professionals have time to use precautions and the patient's situation did not deteriorate quickly, they will use these

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precautions. This decision was based on the nurses' experience and their evaluation of the situation. Nurses sometimes forgot to use precautions during emergency circumstances, because they wanted to manage the situation immediately.

> *"Personally, at the time of emergency I do not use precautions even if the patient has hepatitis and I suppose to use precautions to protect myself. In a CPR situation I immediately take care of the patient and start the procedure steps, may I remember to use precautions' at the middle of the procedure when someone come to help me such as the responsible doctor, but as a charge nurse I will work regardless to the case" (E A 4 interview).*

One participant mentioned that using precautions depended on each person. Some professionals did not use precautions during emergency situations, even if they would be exposed to blood and body fluids. Other professionals tried to use precautions properly to protect themselves.

> *"This depend on each person how he/ she want to protect themselves. I sometimes noticed that medical staffs' even medical doctors do not care at all to protect themselves, they enter the room and start working, even if they exposed to blood, they do not care. On the other side, there is some staff care of themselves even in CPR or similar situation. For me, I'm trying to be one of those who protect themselves, this is my personal trait" (EA1 interview).*

However, some nurses said that even in resuscitation and emergency situations, there were basics that should be done such as hand washing.

> "It is not rational to the care of the isolated patient, and then to go to help in cardiopulmonary resuscitation immediately and your hands contaminated with microorganisms … yes, the time is a problem, but how much time the hand washing will take" (CA3 interview).

Interestingly, six nurses mentioned that sometimes, they simply forget to wash their hands or using personal protective equipment. This mainly happened during life-saving situations like CPR or with high workload or stressful situations.

> *"But sometimes in stressful situations, and workload, you may forget these things" (AA5 interview).*

"Also with workload you may forget because you will work quickly without concentration (AA5 interview).

4.4 Chapter summary

Four themes emerged from this study. These themes highlighted the major barriers and facilitators to compliance with SPGs in the paediatric clinical area. The findings suggest that most paediatric nurses are willing to comply properly with SPGs, but they fail sometimes to achieve this. Some nurses comply properly when the risk of exposure to microorganisms is high and to protect themselves; they justify their non-compliant behaviour in other circumstances. These nurses were fatalistic and or orientated to keeping themselves and their family safe. Some nurses used non-scientific and non-logical problem-solving methods. They considered the complexities of compliance with SPGs in a limited resource environment, as they face many challenges such as conflicting policies, poor hospital infrastructure, limited equipment, understaffing and lack of education.

The majority of participants considered religious beliefs, conscience, and attitude as facilitators of compliance with SPGs except in a few circumstances, while habitual practice and risk perception were considered either a barrier to or a facilitator of compliant behaviour. Nursing children was mainly viewed as a facilitator of nurses' compliance with SPGs, except in some circumstances such as children's play behaviour, while families' role in infection control practice was viewed as a barrier to compliance with SPGs.

Chapter Five: DISCUSSION

5.1   Introduction

This chapter discusses the key findings to address the thesis question: 'Why do paediatric nurses sometimes fail to comply properly with SPGs, and how do they explain their behaviour?' Specifically, the study sought to explore: (1) Nurses' personal belief systems regarding contamination and infection and the nature of the culture of nursing as it relates to the cultural understanding of contamination, infection and the use of Standard Precautions; (2) How the peculiarities of child nursing may affect nurses' decision-making about whether or not to comply with SPGs.

The study provides an in-depth review of nurses SPGs practice. The study demonstrates the significant challenges faced by nurses when dealing with the practicalities of infection control and prevention. Worryingly the findings highlight nurses' reluctance to proactively initiate change to combat issues of non-compliance with SPGs. A major finding was that nurses lacked a sense of autonomy and power to challenge poor practice. This was reiterated throughout the findings by nurses feeling unable to deal with the challenges of power imbalance, the work environment (e.g. conflicting policies, organisational structure).

This perceived lack of autonomy was reinforced by the local nursing culture which defined nursing as a discipline subservient to Medicine. Medicine itself had a concomitant belief in its own hierarchical superiority. Nurses' belief in their lack of professional autonomy was also supported by the local cultural belief in the subservience of women; almost all paediatric nurses were female because of a cultural belief that nursing children should solely be the responsibility of women. In this way, key societal and occupational factors triangulated against nurses accepting their full professional responsibility to seek improvement in practice.

It might be easy to think that these nurses should simply 'pick themselves' up and act in a fully professional manner to initiate change with regard to SPGs but in practice, this

would be almost impossible to do in these circumstances. Such a nurse would inevitably be criticised by other nurses and other staff at the hospital. Indeed, such a nurse would probably be considered professionally and societally aberrant.

It might be considered that these nurses were ignorant of the need for change but this study finds that they were not ignorant and that they were fully aware of their practice deficiencies. The nurses sought endlessly to excuse their poor-quality practice with regard to SPGs. It is suggested here that the degree and variety of excuses does not so much demonstrate an inherent weakness in the professional strength of these nurses but rather that it demonstrates the dilemma in which these nurses were placed. They knew what they should do but the social world around them forbade them from doing it. This last caused the nurses stress which was ameliorated by their 'excuses', the 'rationales' they adopted, that there was not enough equipment, policies etc. and that other occupational groups ignored their pleas for cooperation.

Nothing discussed here should be seen to play down the very real importance of the lack of resources available to the nurses. There was a shortage of gloves; policies were sometimes unclear, there were insufficient infection control nurses. However, this situation is perhaps to be expected in a developing country. It would also be expected that nurses would work improve the situation. It should be noted that indeed some nurses did try to improve things, by for example, bringing soap in from home. The central issue here, however, is that nurses could not work with doctors and administrators to improve the resource issue. The nurses reported issues but that was all they were empowered to do.

Previous research has found some minor benefit in further training and information regarding infection prevention and control (Askarian et al., 2005). However, these nurses were knowledgeable and it is hard to see how they would have benefitted from further educational input and it is hard to see how this could possibly have changed anything. However, it is suggested here that in these studies, it was not the education that caused the effect but the sessions themselves, the 'important' people who ran them and the consequent message that 'practice was changing', there was a new 'authority' to

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change practice. The short-term effect of these studies is that the educational intervention was built on a fabrication of 'truth'. The social milieu in which the nurses practiced, had not changed in any way; the limits to nurses' professional autonomy and freedom were still rigorously in place.

As a result of their inability to challenge the status quo, nurses continued to practice semi-professionally, rather than striving to fully professionalise and adhere to the nursing code of practice, with which they were all familiar. In this way, the nurses were skilled operatives but they were not in control of their working environment. The clinical areas were shaped variously by the needs of doctors and other health care staff and even by the child patients and their families. Children would leave the isolation room and would wander around the clinical area, led, and supported by their mother who would refuse to accept the advice of the nurse, largely because of the latter's obvious lowly status.

This situation is similar to a motor car workshop, where skilled mechanics worked skilfully and were motivated to do the right thing with the motor cars they sought to mend. However, their workshop was run by people who painted cars and by people who put in new car radios. The mechanics had to work in between radios being fitted and the cars being taken away to have the new paint baked on. It did not matter how important or urgent the mechanics work was because they did not run the workshop. The result, if not quite anarchy, was that some cars were not properly mended and the mechanics' work was severely dysfunctional. In all of this, we should recall that the mechanics were knowledgeable, skilled and well-motivated.

According to Fantahun et al. (2014, p. 2) professionalism denotes, "*the conceptualization of obligations, attributes, interactions, attitudes, and role behaviours required of professionals in relationship to individual clients and to society as a whole*". Begley (2010) has a slightly different 'take' on 'professionalism' and suggested that they attributes are autonomy, accountability, advocacy and assertiveness. However, it does not benefit the discussion to argue whether or not a nurses' orientation is similar in character to an architect, a lawyer, a priest or a doctor. Indeed, perhaps the established

professions can now only very loosely be regarded as 'professions' in the traditional sense. Perhaps, 'professional' no longer has the meaning it used to have. Perhaps the traditional characteristics of the professional are not even valued as they once were. Nevertheless, one aspect of the modern professional role still holds its value today, the ability to work, not perhaps 'autonomously' but in a manner that is respected by others and where the person in question is given sufficient 'room' to exercise their craft. This study has found that the nurses were not respected by doctors, administrators and even by the child patients and their parents. Furthermore, nurses were prevented from improving even their own practice; they were given insufficient 'space' to practice their craft.

A key finding of this study is that until nurses are given the 'room' they need to practice their own craft and until they are properly valued for the contribution they make, then full compliance with SPGs will forever remain elusive.

The following section discusses a theoretical model derived from the key findings of this study.

5.2   Theoretical model

The model below illustrates the theory derived from the key results of the study.

Figure 5-1 Theoretical model explaining the cause of the failure to fully implement SPGs in Jordanian clinical practice.
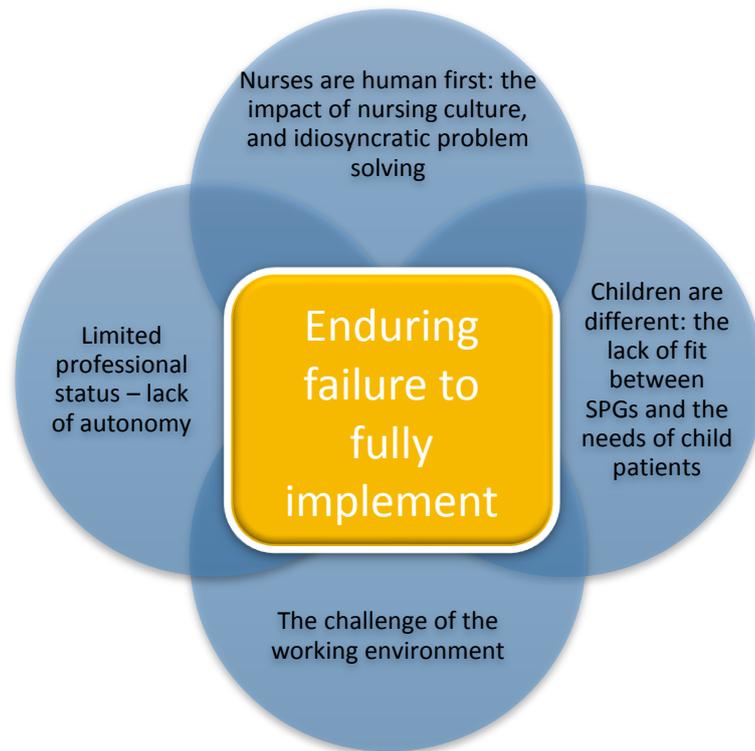
There has been an enduring failure to fully implement SPGs. This is evidenced by the plethora of studies that aim to increase compliance of hand-washing and other aspects of SPGs compliance. This enduring failure to ensure full compliance with SPGs has not been understood. For example, many studies measure the effectiveness of an education programme in a situation where nurses are generally well-trained and are knowledgeable about infection control. The above theoretical model is based on the findings of this present study; the model explains the enduring failure to achieve full SPGs compliance by nurses who both understand infection control and are motivated that their patients, themselves and their families should stay safe from the threat of infection. The theoretical model will be discussed in the following sections.

5.3 Children are different: the lack of fit between SPGs and the needs of child patients

Most nurses in this study believed that working with child patients influenced their compliance with SPGs. This influence was sometimes positive and sometimes negative but was always present.

The nurses experienced maternal feelings towards the child patients. It is clear that this encouraged the nurses to 'do the right thing' for the children. However, this did not always mean that SPGs would be practiced in full. Where the nurses had taken the decision not to comply fully with SPGs, they would sometimes pray for the children instead, knowing that Allah would understand and would protect the children. At other times, they would rationalize their decision by arguing to themselves that (for example) a mask would frighten the child or that they had practiced this way many times before without any adverse consequences.

The nurses did care for their child patients; this 'care' was emotional in quality and came at least close to 'love', much as they loved their own children at home.

These findings are not unexpected and they concur with a study by Pittet (2004) who noted the maternal role of paediatric nurses, and that of Posfay-Barbe et al. (2008) who described how nurses recognised children as having immature immune systems and also that their emotional needs required consideration.

The nurses were influenced by the knowledge that children were afraid of the appearance and use of personal protective equipment. This mattered to the nurses because they 'felt for', were empathic, towards the children. The nurses were not fully able to be dispassionate in a way that would often have been possible with adult patients.

The nurses' recognised that children were frightened of nurses' personal protective clothing because they associated them with pain and injections, and with 'bad people'. So even though the majority of nurses were aware they should use the Standard

Precautions (and should be 'cruel to be kind') in practice this was not the case and instead the nurses rationalised about not wanting to distress children. This is a known phenomenon, Kirkland (2011) and Efstathiou et al. (2011a) found that nurses sometimes chose not to use personal protective equipment to avoid making the child anxious.

It is well undertood that adult nurses are more likely to use precautions when nursing a dirty patient than when nursing a clean patient. The same effect is seen in paediatric nursing, except that almost all the child patients are physically clean. In this study, children were also seen by the nurses as being 'pure' and 'innocent'. The nurses frequently made the argument that such 'innocent' children could not be carrying dangerous pathogens. It is worth recalling how most parents, perhaps especially mothers, will willingly and spontaneously help their sick child, endangering their own health and will do this with no inhibition or concern for their own welfare. It it not surprising then, that these female nurses often behaved in much the same way with their child patients. This effect links with another element of the model, that of nurses being 'human first'. Paediatric nursing was different to adult nursing in at least this respect, nursing children was an emotionally charged activity and was at least as close to motherhood as it was to Medicine.

The nurses conisdered that blood-bourne infections were more severe than other forms of infection and that because children tended not to suffer from AIDS or Hepatitis B or C, whatever infections they did have would be minor in nature. One of the nurses said that children in Jordan are unlikely to get blood-borne infectious diseases such as AIDS or hepatitis B or C, as the community is conservative and the risk of children acquiring these diseases is low. This is not new information, Kirkland (2011) found that nurses claimed that children were less likely to acquire HCAI than were adult patients. Furthermore , Efstathiou et al. (2011a) reported that some nurses believed children are too innocent and pure to be capable of transmitting a serious infection. What perhaps has never been made clear before now, is that paediatric nursing is different to adult nursing in respect of the way that nursing children in an emotionally charged activity and that there are important consequences of this. Adult nurses work professionally and

they care about what they do; they care about their patients. Nevertheless, adult nurses are usually able to remain objective and to practice in an emotionally detached way. In contrast, child nursing is a fundamentally emotive activity. It is suggested here that paediatric nurses reason emotionally and value this; they do this, despite their scientific knowledge and their ability to problem-solve objectively when they choose to do so.

How children normally spend their time is also different from adults. Children play, they are active, they play with other children, they interact much more easily and to a much greater extent than to most adults. The nurses pointed out that child patients wanted to play with other children and often fought against being in isolation. The children also played with toys that were often shared with other children. Child patients tend to be less hygienic when they go to the toilet and wash (Randle et al. 2013). In this way, child patients more easily spread infection. Playing (interacting) with other children is a clear developmental 'need' that children have. Mothers in hospital with their children recognised this need and wanted their children to be happy. Even though mothers were asked to sign an agreement to keep their child isolated, they would frequently encourage their child to mix with other children. This seemed partly to be due to the embarrassment of having a child with an infection.

> *"Sometimes we argue patients not to leave their beds, but they usually walk around despite our orders" (CA3 interview).*

> *"Sometimes the families and/ or the mothers of the sick children will carry them and sit at the bedside of other sick children with different diseases (i.e. gastro infection)" (EA3 interview).*

Dement et al. (2004), Randle et al. (2013) and Riet et al. (2014) all highlighted the risk of exposure to blood and body fluids as being higher in paediatric units because of childrens' physical contact with their fellow patients. Children's need for play, their lack of understanding of the transmission of infection and their tendency to disobey adults, poses a challenge when trying to minimise the transmission of infection in paediatric settings.

The nurses suggested that appropriate playrooms run by play leaders were needed for child patients who were not at risk of acquiring or causing infection in others. The nurses' thought that playrooms were important for children and suggested using brightly coloured uniforms to make the children feel comfortable. This is interesting because it shows that the nurses were attuned to the children's developmental and emotional needs, whereas, their commitment to SPGs compliance was less well developed.

Communication and collaboration between nurses and paediatric patients and their families are important to provide effective care, and enhance infection control practice. Families are often anxious, stressed and fearful of the consequences of their child's illness, Nurses need to inform parents about the treatment their child is receiving and why it is necessary. In Jordanian hospitals, mothers are the main caregivers and are directly involved in their child's care, accompanying them during the day and night (except in PICU departments (where parents are not allowed to accompany their children in Jordan). Neal et al. (2007) recognised this aspect of family involvement arguing that families are the main source of support for their children and involving them in the care process is important to reduce children's anxiety. Children and their parents are more amenable to the treatment plan if they are well informed. This aspect was recognised by the nurses' in this study as the following quotes demonstrate:

> *"… Families when they come to the hospital, they like that someone stay with them, assure them, and explain what's going on. If this not happen, families will be uncomfortable" (EA1 interview).*

> *"If families understand that infection control guidelines are important to protect them and their children, they will… follow these guidelines" (EA2 interview).*

It can be seen that the child's family, especially the child's mother, is a central part of the care team. However, family members often failed to cooperate with nurses' advice around infection control. The nurses' stated that the reason for the families' non-compliance revolved around their failure to accept nurses' advice, their lack of education and knowledge and their lack of awareness of the risk of exposure to infectious diseases. An important factor here is that mothers simply did not believe what

they were being told by nurses. Nurses were seen to be near the bottom of the hierarchy of health care staff, and they were female. It is the case that even mothers viewed nurses negatively because the nurses were female. Mothers were sensitive of the child's emotional needs and so discouraged the use of gown, masks etc. even when asked to use them by nurses. Mothers did not want their child to be in isolation or for masks and gowns to be used, partly because they knew that other parents would be fearful of the child; they would assume that the child had a dangerous infection. Such mothers might be ostracized by the other parents.

The nurses' outlined the need to practice health education on the patents, to equip them with fundamental knowledge about infection transmission. Nurses considered health education as part of their role, however, they justified their failure to fulfil this role by blaming the challenging conditions of their work, such as, the lack of clear policies, resources and autonomy and the time to perform it properly. Another issue for nurses was that hospital policies forbade nurses from discussing the patient's condition with them (or their parents). This made any health education somewhat difficult to do because excuse reported by nurses was outlined as the fact that policies prevented them from disclosing information to the parents would ask questions which the nurses were not allowed to answer. Physicians had the exclusive right to disclose medical information (AbuGharbieh & Suliman, 1992). Nurses would ask families to wash their hands and wear gowns and gloves, but they did not deal with educating patients on cross-infection because this would have involved discussing the child's condition.

The overall level of educational attainment for rural Jordanian families meant that getting the message about infection control and prevention across to patients' families was challenging. Nurses highlighted that sometimes it was futile to try to offer explanation to families as they would only take notice of the physicians.

> *"Not all people have trust of medical and nursing staff and especially nurses suffer from this point. When a doctor tells people to follow certain procedures before getting into contact with their patients, they would follow the doctors' orders ... while nobody trust the nurses..." (AB3 interview).*

5.3.1 Summary

There has perhaps been a tendency to think that the principles of infection control are inevitably the same for children as they are for adults. After all, micro-organisms have no regard for the age of the person they infect. However, it is now clear that children as developing creatures, their families and the nurses who care for these children, are indeed very different from the people found in adult medical areas of the hospital. These people exist in an emotionally charged environment, these children are their parents' most precious possession and their relationship is cemented in love with which the nurses too become bound up. A failure to take these differences into account will have negative consequences on SPGs compliance in paediatric areas.

Paediatric nursing is an emotive discipline. It should not be assumed that nurses will always practice in a detached and objective manner. Nursing children is different. Being dedicated to one's work and acting professionally, in no way means that one will think like a scientist or that one will be deaf to the child's cries and suffering. Paediatric nurses are human before they are nurses.

These Jordanian nurses were at the 'bottom of the pile'. They suffered from being nurses, a discipline clearly subservient to Medicine, and whose work was confined to 'caring'; they were also female. Even children's mothers had a poor regard for the nurses and frequently ignored their pleas to comply with good infection control practice.

The nurses in this study were aware that the guidelines that govern infection control practice are identical between adult and paediatric departments. But they were also aware that paediatric practice is different, not least in that working with children and parents presents significant challenges to the control of infection. This concurs with the work of Wichaikull (2011) who complains that there is no specific infection control protocol for paediatric patients. Children are not small adults and adult care cannot be applied to them without due consideration of the relevant developmental and psychological consequences.

The nurses' role was viewed poorly by doctors and administrators. Rules existed to prevent nurses taking to the parents about their child's condition. Perhaps nurses could not be trusted, perhaps there was no meaningful dialogue between doctors and nurses. In any case, this situation was dysfunctional, clearly nurses need to be able to discuss the patient's condition with them. It is likely that some of the nurses were using this as an excuse not to practice health education with parents. Even accepting this last, this is not an excuse that it should have been possible for the nurses to use.

It can be seen that paediatric nursing is fundamentally different from adult nursing. Paediatric nursing deals with the same micro-organisms which spread in the same way as is the case with adult patients; nevertheless, almost everything else is different. It is surprising then, that no paediatric specific advice on infection control exists in Jordan or elsewhere. Indeed, it hardly makes any sense at all to seek to implement adult-orientated infection control policies in a paediatric area.

It is clear, that we can expect no useful progress in the implementation of SPGs until women are viewed as equal to men and nurses are taken seriously as having important and useful skills. We should always have known that it is useless to put tiles on our roof, before we have built the foundations of our house.

5.4 Nurses are human first: the impact of nursing culture and idiosyncratic problem solving

The nurses' practice was shaped by their skills and knowledge, as one would expect. However, their practice was also shaped by their culture, by nursing's micro-culture and by their belief system.

Most of the nurses had a mainly positive attitude toward compliance with SPGs. Nurses mentioned that they were willing to comply properly but at the same time, offered a range of reasons for their compliance being sub-optimal. Nurses knew what needed to be done, but sometimes felt under pressure to practice SPGs in a sub-optimal manner. The nurses were able to rationalise this last by referring to standard practice in their clinical area and by referring to their belief in Allah. These nurses did not act alone, their practice was shaped by that of more senior nurses and by how the majority of nurses practiced SPGs. The nurses' religion did more than comfort them for the inadequacies of their practice, it provided a 'loop-hole' which made just about any practice acceptable. Allah would forgive them because he knew the constraints within which they worked. Allah would also keep their child patient and the nurses free from infection.

The nurses were aware of their need to protect themselves and their patients, their decision to comply was affected by their assessment of the risk of exposure to blood and body fluids. This assessment might fail in some situations. For example, nurses spoke about patient cleanliness being a key factor in whether they chose to fully implement SPGs. The nurses tended to comply properly with SPGs when they provided care to patients who were considered to be 'dirty'. Nurses also tended to comply with SPGs when the patient had a 'serious' condition, whether or not this was associated with infection, for example if a patient was admitted with convulsions. Efstathiou et al. (2011a) found that personal appearance affected nurses' compliance. For example, nurses complied better with untidy and unclean patients because they thought that these patients were more likely to be infectious than were the cleaner patients. Foreign

patients were also considered to be more likely to have an infection (Cutter & Jordan, 2004; Gammon et al., 2008; Al-Hussami et al., 2011; Cutter & Jordan, 2012).

Some more experienced nurses failed to comply with SPGs because previous exposure to pathogens had been uneventful. These nurses knew that there are many factors in the transmission of infection, however, their problem solving operated in two separate domains, scientific and (for want of a better word) 'idiosyncratic'. It should be noted that we all find it difficult to problem solve objectively and dispassionately in difficult circumstances, for example, when our child is ill. Arguably, educated parents all over the world can be found in pharmacies, purchasing cough medicine for their sick child, while possessing the full and certain knowledge that the 'medicine' could not possible have a beneficial effect on their child's cough. What is interesting, however, is the degree to which these nurses were able to usurp scientific knowledge with subjective or idiosyncratic knowledge. This indicates that these nurses were 'human first' and their reasoning was sometimes illogical.

The nurses were bound by the mores of their nursing subculture. Indeed, the nurses pointed out that they could be compliant with SPGs 'if' all the other nurses were and if it was accepted by the culture of the clinical area or hospital in which they worked. The nurses said that they could comply with SPGs if doing so became part of the 'routine'.

The nurses were even clear about how SPGs compliance could be incorporated in the routine. For example, posters could be used to remind nurses about SPGs, there could be training courses and infection-control nurses could be employed to visit the clinical areas and remind staff to comply with SPGs. It is doubtful, however, that these changes would have the desired effect; culture is notoriously difficult to change and the mere existence of the nursing culture, with its rules at variance to hospital rules, shows just how resilient culture can be.

The hospital rules and the rules of their professional organisation tell only a small part of the story. Indeed, it would not be possible to discern what the nurses did by looking at the hospital and professional rules. The nursing sub-culture had its own rules and

nurses were not free to break these rules. The rules of the nursing sub-culture super-ordinated rules handed down to them from outside their sub-culture.

Nurses did not function alone, they were social beings, bound by the rules of their social group. It was not only permitted for them to omit to wash their hands between patients or wear their gown and mask; the times when these could and could not be done were prescribed socially. Clearly, this limited the degree to which nurses could think and act independently, and the degree to which they were able to comply with SPGs. Like any culture, the nursing sub-culture was remarkable resistant to change. These finding mock the notion that SPGs compliance can simply be changed by more education of nurses or any single intervention. The issue here is complex, very complex and deeply multivariate.

It should be noted that these nurses have not regarded their nursing sub-culture as a 'secret' organisation; indeed, they have been open and clear about how their sub-culture worked to define what the nurses were permitted to do.

The nurses' adherence to the mores of their nursing sub-culture, effectively prevented them from fully professionalising and achieving an independence of practice. In this way, these nurses do not so much need to be 'empowered' to act as full professionals, arguably, they are already empowered to do this. These nurses are social animals and it is perhaps this that is preventing their full professionalisation. It is surely easier to comply oneself to one's closest social group, than it is to adhere to the far more distant 'profession of nursing' or to one's own professional body. How much more difficult it must be to separate oneself from one's immediate sub-culture with which one's work is so intimately associated, and to work independently, making one's own decisions and casting aside what one's close colleagues are doing and of their criticism of one's own practice. It can be seen that it would be naïve to expect these nurses to be 'empowered' to become full professionals at the tick of a box, or to 'pull their socks up' and start acting as full professionals.

The issues here are complex and multivariate; they should not be regarded as simple. Nurses were not only a member of their nursing sub-culture, they also had an identity at

home and in their local community. Arguably, no-one leaves that identity behind when they go to work. The nurses often spoke about their 'conscience' which was bound up in their Islamic faith and which caused them to want to do what was right for the sick child. Their conscience tended clearly to lead them to want to practice SPGs as fully as possible. The nurses felt accountable to Allah for their practice. This notion of 'conscience' goes beyond the Western, professional sense of 'responsibility' partly because Allah see everything they were doing and knew what they were thinking. The consequence of acting against one's Islamic-bound conscience could be terrible, influencing not only the nurses' relationship with Allah but also the physical welfare of their child patient, their risk of acquiring the infection and of passing it to their own family.

The nurses' Islamic faith was bound up in their national identity and the mores of wider society in Jordan. From the data, there appear to be two main effects of the nurses' Islamic faith:

1. 'Conscience' - knowing that one had to do the right thing in front of an all knowing God, a far deeper concept than either 'responsibility' or 'accountability';

2. A sense of what has sometimes been called 'fatalism', the idea that practice can be excused if one asks Allah for forgiveness. This is matched with the notion of Allah being an interventionist deity; Allah could (indeed 'would') make the child better, would prevent infection from taking place. This was more likely to happen if the nurse prayed to Allah for the child. The nurses did pray to Allah for the child patients and for themselves and their families. This last was seen to ensure their welfare.

To refer to point '2' above as 'fatalism' is to denigrate the nurses' faith in God. The nurses' faith was a positive aspect of their lives and was often the reason they had become nurses and the reason they 'cared'. The nurses' faith was a deep and enduring part of what they were as people, as human beings. Their faith mattered, it enriched

their lives, perhaps indeed it was their life. In the West, nurses have to be told about responsibility and accountability; these Jordanian nurses had no use for these concepts because they had 'conscience' and were accountable to Allah.

It can be seen that the nurses were a part of their nursing sub-culture and bound by its rules. The nurses were also subject to the laws of Allah and to their relationship with Allah. Arguably, this left rather little 'space' for additional sets of rules from their hospital and other agencies. In any case, their faith, their belief in an interventionist deity and their need to comply with the nursing sub-culture, both superordinate any other rules. Infection control had to take its place in the hierarchy.

Religion is a key factor influencing individuals' attitudes and behaviour. Islam is the official religion in Jordan, and hand hygiene is a usual practice in Muslim daily life. Nurses in this study reported that following the rules and regulations of Islam facilitated their compliance with SPGs. They felt that a lack of religious beliefs would lead to ignorance and so there was less likelihood of SPGs compliance. Hence, nurses needed to balance faith and action. However, people are seen as having the freedom to choose between right and wrong, and are responsible for their deeds (the Islamic concept of *tawakkul*).

> *"...Because we're accountable in front of Allah and we are conscientious enough to feel the responsibility of giving as much as we can to the patient..." (BA3 interview).*

> *"For sure, our religion encourages us to be clean and tidy and it talk about hygiene practices" (CA3 interview).*

> *"Lack of religious faith, what I can say for you" (EA1 interview).*

Hygiene practice is a part of the Islamic holistic belief system,(as taught by the Prophet Muhammad); Muslims have used hygiene practices for more than 1400. Cleanliness is mentioned in the Holy Quran, as Allah Almighty said *"Truly, God loves those who turn unto Him in repentance and loves those who purify themselves"* (Holy Quran 2:222), and also in the tradition of the Prophet Muhammad (Vangaurd, 2014). These same hygiene practices are the basics of infection control. For example, cough etiquette is a

part of Islamic tradition; Muslims are expected to cover their nose and mouth when coughing and sneezing, which is applied now in SPGs. Furthermore, Islam insists on several practices to keep the body fresh and clean. Being clean before prayer is mandatory, and prayer will not be accepted without this, so Muslims perform ablution at least five times a day. This includes washing hands, face (including rinsing mouth and nose), arms, and feet. Hands must be after using the toilet, before and after eating, and upon waking up in the morning (Mishra et al., 2013).

The nurses were clear that Islamic cleanliness should always be practiced. Without this, Allah would not be satisfied with them and there were consequences for the Day of Judgment. This accountability was considered as more important than accountability to the administration.

The nurses thought that Allah protected their patients and themselves when they failed to comply properly with SPGs. The nurses also felt that Allah would protect the patient during resuscitation and the nurses did not have time to fully comply with SPGs. In these situations, rather than comply with SPGs, the nurses would pray for protection. In this sense, nurses were fatalistic to perhaps a greater degree than one would find in the West. However, these ideas are a misinterpretation of the concept of *tawakkul*, which means perfect trust in Allah's plan and reliance on him alone. This should be properly accompanied with obedience to Allah's commands and regulations to remove all causes of the problem (Tanveer, 2015). Nurses here were using their faith as an excuse for poor practice. Science of course, is important, and within Islam, nurses are called to do everything possible to protect their patients' safety.

Nurses discussed using personal protective equipment with headscarves (Muslim head coverings) or veils (head and face covering). Nurses use different headscarves, one for their duties in the hospital and another outside the hospital. Nurses do this to protect their patients from infection transmission from outside, and to protect their families from getting any infections from the hospital. Indeed, in Jordan, health care professionals do not wear their uniforms outside healthcare settings. There is a debate in

the literature about whether there is a link between wearing the uniform outside the hospital and transmission of HCAI (Loveday et al., 2007).

Nurses in Jordan usually use long-sleeved gowns for isolated patients. However, there are a limited number of disposable gowns available. Some nurses felt uncomfortable with these gowns, but they used them to protect themselves and their patients. Nurses in Jordan are not aware of the 'bare below the elbow' policy because it is not used there. There is a debate in the literature about the effectiveness of using this policy to prevent transmission of infections (Willis-Owen et al., 2010). This policy raised problems for some religious groups in the UK. For example, for female Muslims HCWs who usually wear a *Jilbab* with long sleeves, it is not appropriate (their faith) to uncover their arms (McHale, 2013). Therefore, policy makers in the UK provide alternative solutions, such as using disposable sleeves over the arms. This may solve this problem, but it is an expensive solution.

5.4.1   Summary

Culture and indeed religious beliefs are important determinants of compliant behaviour. Paediatric nurses complied with the norms of their culture and complied with the regulations of their religion. These 'rules' were considered not only superordinate to those of the hospital and health care agencies but to be sufficient. This is clearly an issue for the compliance with SPGs and any other regulation. It will have been noted, that simply reinforcing the regulations around infection control may have little effect in these circumstances.

These nurses did not tend to practice in a fully professional manner; there practice was not autonomous and they often made excuses for poor practice, rather than spend energy finding solutions where problems existed and accepting responsibility for this. It has been seen here, that these nurses were social creatures who 'belonged' to a sub-culture of nursing. In doing this, they fully accepted the mores of that sub-culture. Where conflict between those mores and SPGs regulations existed, the nurses fell back firmly on the mores of the sub-culture.

Nurses are sometimes criticised for not have the autonomy or the confidence to practice professionally. The argument has been made in this document that nurses need to be 'empowered' to act in a fully professional manner. However, for these nurses, those arguments appear particularly naïve or even irrelevant; empowering such a thing would probably make no difference. Pre-professional nursing, even in the West, emphasised team-work and cooperative working. That very team-working is acting here as an important block to progress.

Importantly, these nurses are human before they are anything else. The nurses are social creatures with a faith in God that frames their life. These nurses often failed to 'think' logically, objectively or scientifically. Arguably, they allowed themselves to operate at a more basic (idiosyncratic) level. However, we should pause before being critical. We are no different. We all go to the pharmacy to purchase cough medicine for our ailing child, not because cough medicine works (we know it doesn't) but because we love our child very dearly. Indeed, we are all human first.

5.5   Limited professional status- lack of autonomy

It has already been argued that the concept of 'professionalism' has changed over the years. We do not expect the notion of professionalism in nursing to be that of the traditional professions of (for example) Law, Medicine and Architecture. Nevertheless, the professions remain demarcated by the characteristics of 'relative autonomy' and accountability to the client and to the relevant professional body. Professionals work relatively autonomously, rather than wholly as a team; each individual professional is responsible for their own performance even where they work in a team. Even where a professional works as a member of a team, they remain individually responsible to the client and to their professional body. In practice, this limits the degree to which a professional can offer excuses for poor practice, rather, if something has not gone well, we expect them to be open about this, to inform their client and to work out a way of making things better. This plan to make things better, may involve other people, but the individual professional is still responsible, on a one-to-one basis, to their client for any shortcomings. So, professionals do not tend to make excuses, and especially, they do not blame others when things go wrong.

If we accept the argument given above, we should also recognise that life, even for professionals, is not perfect and it is common for 'professionalism' to be a little lacking in places. Lawyers may sometimes elect to prioritise their fee, over the interest of their client. When things go wrong, doctors may openly criticise their long working hours and how tired they were when the unfortunate event occurred. On the other hand, a skilled and knowledgeable car mechanic may act in a manner almost indiscernible from that of a professional. However, the notion of 'professionalism' and 'profession' remain meaningful and valuable to most people. Most of us can discern professional practice when we experience it as a client.

The nurses in this study made it clear that SPGs were often and routinely put aside. Hands were not washed between patients, masks and gloves were not always worn, children were often allowed to mix with other children when they were supposed to be in isolation. Importantly, they repeatedly made many excuses for this failure in their

practice, many of these excuses were directed at other nurses and other occupation groups. It will be clear, that the nurses felt impotent to deal with the issues and make the changes that were necessary to fully comply with SPGs. This section will consider these 'excuses' and the factors that limited their professionalism. It will be seen that many of these facts lie well outside the nurses' control.

'Excuses': rationale for incomplete SPGs compliance

The nurses blamed a number of factors on their inability to fully implement SPGs, including:

- Not having sufficient resources (not enough gloves);
- The fact that children were different and a paediatric form of SPGs was needed;
- The fact that they had reported issues but that nothing had been done;
- That other professional groups, especially medical and cleaning staff did not comply with SPGs and refused to cooperate when asked to do so;
- Doctors were hierarchically superior to nurses and so did not respond to being challenged;
- The cleaning staff had their own management and so again, nothing could be done except to report this issue;
- In some situations, there simply wasn't time to practice SPGs, or there were other priorities;
- It was legitimate to expect Allah to keep patients and staff free from infection as long as the nurses prayed for His intervention.

The nurses all argued that issues had been reported but that most of their complaints had not been acted upon. It was not clear how many times or when the issues had been reported. Nurses stated they tried to discuss issues with their managers but responses were negligable. Nurses thought that their leaders (head nurses, supervisors, and nursing managers) themselves had limited authority to address the problems. Nurses also felt unable to confront poor SPGs practice by physicians, whom they regarded as enjoying a higher status than themselves.

At this point, it is not clear why the nurses had failed to address these issue themselves. They must have known their senior physicians reasonably and so it is not clear why they could not have persuaded them to listen and to work together to deal with the issues.

One of the key 'excuses' the nurses gave for incomplete SPG implementation related to the lack of training and continuing education in infection control, This is worth looking at closely because of the number of studies that have tried to improve SPG compliance by introducing training programmes in infection control. The nurses discussed many barriers to education in hospitals, these barriers included:

1. The long interval between lectures, so that there was a lack of updates and refresher courses for nurses and other HCWs;

2. Not all nurses had the opportunity to attend infection-control lectures, because the timing of the lectures was not appropriate for their duty, especially if they worked on late or night shifts;

3. Continuing education in Jordan is not mandatory, and is an unpaid activity; sometimes nurses could not attend on a busy shift;

4. The lectures in the orientation programmes are not sufficient (one or two lectures) to equip new employees with the required skills and knowledge in relation to infection control practice;

5. The method of providing education and training was not appropriate (did not use new technologies and effective learning techniques).

6. A long time elapsed after the initial training without updates.

Interestingly, one nurse asserted that infection control knowledge is common sense, and everyone should know it, while other nurses stated that they learn by experience. This is discussed in a study by Nichols and Badger (2008), who reported that tacit knowledge is understood without being stated and is expressed in using skills. This knowledge can be attained through practice experience, by working alongside senior nurses. These nurses claimed that they had sufficient knowledge of infection-control. They would also have worked with other nurses with more experience and would have been observed by doctors and others. It is therefore hard to understand how the nurses could have 'needed' further training, even if that training might have been desirable.

Professional development and training is a nurse's responsibility and they have a duty to ensure that they are up to date on practice processes. There is evidence in the findings that some nurses initiated these activities (e.g. departmental seminars), but there was very of this happening. Even if there was a need for further training, there would seem to be no reason why the nurses could not have organised this themselves. There is no indication that nurses had the initiative to attend workshops and conferences outside their hospital where these were not available in their own hospital.

Again, at this point, the nurses appear to be acting in a sub-professional capacity. They seem to need someone to tell them what to do, someone else to deal with their issues. Even more simplistically, it might appear that the nurses need more training. However, it will be seen that the situation is not as simple as it seems. Indeed, as has already been pointed out, the issues here are complex and multivariate.

5.5.1 Hierarchy

In Jordan, physicians are more highly respected than are nurses (Mrayyan & Acorn, 2004). The nurses in this study felt they had limited autonomy in comparison with physicians and this made it difficult for them to initiate change, especially in matters that were considered core to nursing practice because physicians were less interested in these situations.

In this study, communication between nurses and physicians was shown to be largely innefective and a barrier to good infection control practice. Nurses related this to the lack of autonomy of their profession and the hierarchical power of physicians. Nurses were reluctant to challenge the sometimes poor infection control practice of physicians. Nurses explained that physicians would not accept a challenge from nurses because they had more authority than nurses. This is consistent with Efstathiou et al. (2011a), who found that nurses were influenced by physicians' behaviour toward compliance with SPGs, and sometimes copied their non-compliant practice. The perceived power differential between the nurses and physicians, made it impossible for them to work in a

professional way, use their initiative and be proactive to protect the patient's safety and to deal with the sometimes poor practice by physicians and others.

Jordanian literature suggests that physicians have greater power than nurses, being honoured more highly by the hospital administration. Physicians in Jordan also have a higher level of prestige in the community and have a much higher salary (AbuGharbieh & Suliman, 1992). This unequal distribution of power between nurses and physicians has existed for a long time (Oweis, 2005). Furthermore, nursing leaders too, are still nurses and so also have limited authority (Shoqirat, 2009).

The causes of Jordanian physicians' power and nurses' lack of autonomy, include:

- Nursing education in Jordan was influenced by the medical model until the late 1990s, physicians were involved in designing and teaching nursing programs (Shuriquie et al., 2007). As a result, nursing practice is still influenced to some degree by the medical model.

- Physicians occupy higher managerial positions in the Jordanian Ministry of Health and within healthcare facilities (Shoqirat, 2009). Therefore, decisions which govern the medical and nursing practice and any related issues are made mainly by physicians (Hamaideh et al., 2009).

- Female nurses dominated nursing in Jordan until the late 1990s. Recently, the number of male nurses has increased and is now approximately equal to females. However, in paediatric nursing, almost all nurses are female. In Jordan, females are often seen as having less authority than males. Nursing in Jordan is identified as a female occupation, and nurses in managerial positions are female; senior male nurses prefer to emigrate to the Arabic Gulf nations and Western countries to achieve higher salaries and better positions (Mrayyan & Acorn, 2004), or to complete their postgraduate studies in western countries. This problem leaves Jordan with more female senior nurses because Jordanian families usually do not permit females to live abroad alone. This situation might

clarify the limited power of nursing leaders in Jordan, as females in Jordan are considered to have less power than men and almost all nurses in paediatrics and in management are female.

The nurses felt that nursing leaders had more power to manage problems arising from the lower status of employees such as housekeepers, but as has been seen, this was not the case. Even so, nurses tended to defer to their nurse managers even though there was no evidence of anything being done as a result of their complaints.

Healthcare professionals varied in their compliance with SPGs. The nurses claimed that their compliance was better than other HCWs, and that physicians were the least compliant group. Physicians focused on the patient's diagnosis and treatment, and often ignored infection prevention and control practice. Gershon et al. (1995) found that physicians had long been reported as being less compliant with infection control measures than other HCWs. Berhe et al. (2005) reported that when physicians were compared with registered nurses, the physicians were less compliant with hand-washing practices. Cutter and Jordan (2004) argued that in comparison with other HCWs, nurses were more willing to follow SPGs guidelines.

The nurses sometimes blamed housekeepers and other HCWs (e.g. physicians, physiotherapists, and dieticians) for non-compliance with infection control measures, but they failed to effect change. The nurses did not see that it was their role to apply pressure on other occupational groups, rather, this was seen as the proper role of the nursing managers. However, the nurses' thinking here was logical, if nurses had managers, surely it was their role to negotiate with those higher up the hierarchy. It is interesting to think whether, if the nurses had not had nursing mangers, whether they would have addressed these issues themselves. Managers are employed to manage, after all. It is interesting that most other health care 'professionals' do not have managers but only senior clinicians. In this sense, perhaps it could be possible that the nurse managers were holding the nurses back from professionalising and from dealing with issues themselves. As professionals, nurses should be confident to address these issues and develop ideas to improve practice. It is only by challenging poor practice that nursing

codes of ethics can become entrenched in practice. In this sense, perhaps for as long as nurses are seen to need 'managers' they will never professionalise.

5.5.2 Autonomy

The nurses claimed that they had little if any autonomy. They were not allowed to make decisions themselves. They could practice within their routine but not outside this. Indeed, the nurses felt that they could practice SPGs fully but only after it had because accepted as routine practice. Another clear example of the nurses' lack of autonomy is that they were not allowed to talk to the child patients or their parents about their condition. This had rendered health education inoperable. These were dictates from other operational groups on what nurses were and were not permitted to do. These were dictates which adversely affected nurses' ability to perform a key function of their role.

It should be understood that today, and perhaps rightly, no professional is utterly autonomous. Doctors are responsible to hospital managers; broadcasting (news) agencies are happy to take up a clients' case to the point that professionals can feel that they are subject to trial by media. However, professionals are still more autonomous in practice that other occupational groups and that autonomy is seen as an important aspect of their role. We do not expect a surgeon to have to leave the operating table to discuss his next intended move with a committee. Unfortunately, these nurses did not feel autonomous and indeed to a great extent, they are not autonomous.

Jordanian literature (AbuGharbieh & Suliman, 1992; Oweis, 2005; Shoqirat, 2009) support this finding, with Jordanian nurses feeling that they held a position with limited autonomy – nurses were largely not 'authorised' to make independent decisions. In this present study, nurses simply didn't have the authority to initiate the changes that were required.

5.5.3 Summary

The degree and the ease with which the nurses made 'excuses' for their failure to perform SPGs consistently feels distinctly sub-professional[14].

It is clear that nurses need to be good communicators and negotiators to fulfil their duties professionally and to communicate effectively with other HCWs to address any issues in practice (AbuGharbieh & Suliman, 1992). Nurses' also need to take responsibility and be accountable for protecting patients. However, it is also clear that this would be an enormous task for nurses, a task that would bring them into conflict with their managers, with doctors and to a degree, even with their community.

Arguable, nurse education in Jordan claims to prepare Jordanian nurses to be change agents, advocates for patient rights, health educators, and to become critical thinkers. However, it has been seen that this is not yet reflected in practice; there is a gap between nursing education and actual practice (AbuGharbieh and Suliman, 1992). The findings show a distinct difference between physicians' and nurses' authority status. Nurses are unable to initiate change and to relate on an equal basis with doctors. It is interesting that the nurses had also failed to communicate professionally with the cleaners. Even the cleaners failed to respect the nurses.

It perhaps remains unclear whether the nurses 'could' have initiated the changes to fully implement SPGs and to ensure other occupational groups did the same, and whether the nurses could have practiced health education by re-interpreting the rules to confine them to the provision of the initial diagnosis to the patient. Perhaps the nurses just needed more courage and more determination. However, courage and determination are not well-regarded characteristics of women in Jordanian culture. In fact, we need to see that it would have been very difficult for these nurses to become change agents. To achieve this, they would have needed to defy Jordanian culture, their nursing culture and the expectations of both doctors and nursing managers.

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[14] At no point in this thesis is the argument made that the nurses were 'unprofessional'. Far from this, the nurses often worked in difficult circumstances with the welfare of their child patients and their families always at the forefront of their practice.

The nurses in this study highlighted the role of knowledge and education in professional development and their influence on the practice of the infection control. Evidence from literature supports this; Kermode et al. (2005) and Wichaikull (2011) reported that appropriate knowledge and education can improve compliance with SPGs, while insufficient knowledge and lack of training in relation to infection control practice are identified as barriers to good infection control practice. However, this present study finds that this is simply not the case, for the issues here are indeed complex and multivariate. These nurses recognised the importance of infection control, but felt powerless to deal with the issues properly.

In this study, most nurses were aware of the risk of exposure to blood and body fluids, and recognised the danger and consequences of HCAI. They stated that this knowledge was important to improve practice, provide safe care to the patient, and make appropriate clinical decisions, yet sometimes when there were breaches they felt powerless to make changes. In terms of knowledge and education, nurses thought they were well trained and had good knowledge of the risks associated with infection. The nurses also felt they were generally motivated towards the patient's interest and the safety of their working environment. However, despite all this, they recognised that they continued to fail to fully implement SPGs.

It is widely accepted that effective communication and good relationships between staff members in hospitals can improve the practice of infection prevention and control, and protect patient safety. However, these current findings show that lack of communication between HCWs was a barrier to compliance with SPGs.

In general, physicians' compliance has been reported as lower than that of other HCWs. This was supported in previous literature (Gershon et al., 1995; Efstathiou et al., 2011a). Sometimes physicians were identified as being out of the infection control loop, because their emphasis was on patients' clinical treatment. Physicians in Jordan have the authority, acquired from hospitals' policies, to control patient care decisions over nurses in areas such as admission, discharge and putting patients in isolation care.

Nurses should be able to address the challenges of effective communications between HCWs and find a way to solve the problem of lack of collaboration. The differences in power and authority status between nurses and physicians needs to be addressed in order to enable nursing to be controlled by nurses.

Two arguments have been made several times in this chapter, that the issues here are complex and multivariate and that before we plan to put tiles on our roof, we need to build our foundations. Attempting to address the issue with SPGs compliance by focussing on one aspect, such as 'education' will always fail because the matter is not univariate. Encouraging nurses to simply 'be' autonomous will fail until women can be autonomous.

5.6 The challenge of the work environment

The experience and perception of nurses in this study demonstrated the complexities of compliance with SPGs in a limited resource environment.[15] Nurses experienced difficult working conditions such as conflicting policies, understaffing, lack of equipment and lack of appropriate hospital infrastructure (e.g. buildings, ward design, the placement of sinks). These factors probably did have a negative influence on the nurses' ability to comply with SPGs.

It is also important to acknowledge the nurses' efforts to provide safe, high-quality nursing care. Cole (2015) suggests that staff are aware of the importance of compliance with hand hygiene, but sometimes when working with low resources, nurses may feel unable to comply with SPGs.

5.6.1 Policies and evidence-based practice

The Jordanian Ministry of Health (MoH) has a remit to provide free healthcare in respect of hospital care, public health and of course infection prevention and control. In pursuance of this, the MoH has approved policies and guidelines for infection control in practice settings. As in other developing countries, these policies were developed, based on standard international policies from organisations such as WHO and CDC. These policies were adopted in all Jordanian health sectors (public hospitals and primary health care centres, private health sector, military health services, and Universities' affiliated hospitals). Mrayyan (2005) suggests that these international policies do not always transfer over to Jordanian society because their applicability is compromised by the scarcity of resources as well as by cultural issues.

Despite the existence of MoH policies and their international legitimacy, nurses in this study claimed that they did not have time to read them, and that they were not readily available. Moreover, nurses were concerned about the different versions of policies and guidelines, some of which were not evidence-based and therefore questioned why they

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[15] A clinical environment where there is an acknowledged lack of staff and material resources.

should use them. This issue was noted by Fournier et al. (2007) and Reda et al. (2010), who claimed that unless experienced nurses were involved in developing the policies, there was the risk that implementation difficulties might not be recognised. It should be understood, that as a small developing country, Jordan has limited resources and a limited budget to provide health care to its people and to ensure that all its policies are clear and up-to-date.

The nurses in this study practiced infection control based on their previous experience, which itself was not always evidence-based and was resistant to change. Nurses acknowledged that it was difficult to undo learned practice in relation to infection control. This is a recognised phenomenon and is described in behavioural theories such as the health belief model, in which individuals need to feel confident and able to adopt the required behaviour to effect change (Roden, 2004).

Furthermore, there is evidence that nurses working in complex work environments give more priority to medical and technical interventions (Goethals et al., 2010) than to compliance with infection control measures. However, most of the nurses mentioned that they complied properly with SPGs while working with barrier-nursed patients, and that better equipment was often available for the isolation room than in the rest of the department.

Poor working conditions can lead to job dissatisfaction and burn-out. Staff mobility is another issue, as when staff become more experienced, they are more able to seek new career opportunities overseas. Jordanian nurses leave the country to seek out these opportunities in the Arabic Gulf and Western countries, or continue their postgraduate studies in Western countries (Zahran, 2010). This adds pressure on the remaining experienced nurses.

The nurses reported that nurse managers were very reluctant to agree to nurses being on sick leave, consequently, nurses tended to continue to work even when they were ill. This pushed nurses into a situation where they felt obligated to work despite knowing that their illness could be passed to patients, especially patients who were immunocompromised. It was difficult for the nurses to have faith in infection control

policies when their management had such a cavalier approach to infection control themselves. This situation added to the stress experienced by the nurses (see also AbuAlRub et al., 2009).

5.6.2   Leadership and administration

Accreditation programs had recently been applied in Jordanian hospitals. This was to help nurses gain access to lectures, workshops, and infection control training. However, the nurses reported that once accreditation was acquired, the new resources were withdrawn. There is some evidence that this added to the nurses' lack of confidence in the hospital management and their policies. This may have led to nurses working according to their own intuition and experience rather than integrating hospital policies into their practice.

The nurses clearly wanted good quality, effective management. Leadership roles were acknowledged as important in enhancing infection prevention and control practice and in providing essential support for staff. Observations, monitoring processes and follow-up of practice were seen to be central aspects of administration and were valued but were seen as not being present. Lymer et al. (2004) found that charge nurses who were committed, knowledgeable, approachable, and able to organise people could improve the safety culture and increase nurses' compliance with the recommended guidelines. The nurses felt that they did not get sufficient support from their nurse managers and hospital administrators; it is perhaps not surprising that that they 'withdrew', to base their practice on their own experience, intuition, and the mores of their nursing sub-culture.

Nurses described inconsistencies in the type of redress applied for non-compliance with policies, as physicians were treated less severely than nurses if they did not comply properly with infection control precautions. Administrators felt powerless to confront physicians as they were considered to be hierarchically superior. This sense of hierarchy, prevented team-work from developing and so led to the fragmentation of decision-making and the lack of mutual respect between (especially) nurses and doctors.

The nurses felt that there were few incentives available for nurses to improve, such as courses, workshops or financial rewards, and no acknowledgment of nurses' efforts in maintaining infection control either at senior or junior nurse levels. Moreover, Jordan has only a limited career structure for nurses, and the status of experienced nurses is only slightly more privileged than that of new graduates (Mrayyan, 2007). Jordanian literature has addressed the fact that there is no minimal wage legislation in Jordan, and salaries are very different between institutions and between healthcare sectors (e.g. salaries in teaching and private hospitals are better than in public hospitals) (Zahran, 2010). There is evidence in the literature that incentives can change the attitude and behaviour of HCWs toward evidence-based practice (Dyson et al., 2011).

The design of hospital buildings was viewed as a challenge to compliance with SPGs. Some patients' rooms contained more than eight patients with only one toilet, one alcohol gel sanitiser and one sink. Nurses mentioned that they were overwhelmed with patient overcrowding and sometimes they failed to comply properly with hand hygiene and using personal protective equipment because of the number of patients they have to deal with in a confined space. Moreover, the distribution of rooms and sinks in the wards was seen as being poor, and the buildings were not suitable for paediatric patients.

The nurses spoke of barriers to environmental cleaning, such as a low educational level and knowledge deficit among housekeepers, so that even after instruction, on occasions the level of cleaning was inadequate in isolation rooms. Nurses reported a few circumstances in which they had to undertake the training of housekeepers to ensure cleaning was carried out to the highest standard, especially in isolation rooms. The nurses found that they could report difficulties to their nurse managers but that this had had no useful effect.

The role of the infection control team is another issue of organisational structure. Nurses acknowledged the important role of the infection control team in enhancing the practice of infection prevention and control. They described the infection control team as knowledgeable and stated that they were viewed as a legitimate voice in the infection

control area. However, the number of infection control team members was seen to be insufficient to meet all the tasks required. The team was not able to follow up the concerns raised by the nursing staff or to run training programmes. The infection control team was sometimes viewed as unapproachable and they were often not available even to discuss urgent infection control issues. O'Boyle et al. (2002) in a Delphi survey study found that limited resources and the wide range of responsibilities assigned to infection control personnel were the main reasons for them not completing their tasks.

For the nurses in this present study, there was no official job title of 'infection control link nurse', instead, on a day by day basis, managers assigned a senior nurse to do this role in addition to their other roles.

The nurses felt that the infection control team had the power to confront nurses' practice, but it did not have the authority to confront physicians' practice.

In general, the nurses felt that their nursing management was not working well for them. Issues that had been reported were not addressed. The nurse managers were hierarchically 'inferior' to the doctors and were unable to challenge them or work cooperatively with them. Again, the system of hierarchy and control was dysfunctional, it simply stopped things happening. Importantly, it prevented team-work, and cooperative working. The infection control team was largely unavailable and needed greater input from nurses. This is especially so because most of the infection control issues were those with which nurses had to deal.

5.6.3   Equipment issues

The issue of equipment was viewed as a barrier in all healthcare sectors in Jordan, but at various levels. For example, the public sector suffered more than other healthcare sectors from insufficient equipment because of the limited budget available. This budgetary constraint is mainly reflected in public hospitals' supply of essential equipment and resources for patient care (Shoqirat, 2009). Several studies (Gould & Ream, 1994; Gershon et al., 1999; Nderitu, 2010; Efstathiou et al., 2011a) noted that

poor provision of sinks, and lack of personal protective equipment and hand decontaminants were viewed as a major barrier to compliance with SPGs.

Nurses in this study explained that they had to make practice decisions based on balancing patient need against limited equipment. These judgements were based on prioritisation with equipment allocated to the neediest patients (using gloves in isolation rooms).

The nurses reported that even when equipment was available, it was often stored in an exterior store and difficult to access. The size of equipment and its quality were sometimes viewed as inappropriate. For example, sometimes gloves were provided in one size only, and some nurses explained that they could not use the gloves.

The respondents also pointed out other issues such as inappropriate types of soap being supplied: either bar soap that was considered as a source of infection, or liquid soap that can cause skin irritation. Moreover, even liquid soap was not always available, and additionally sinks were not functioning, or were sited too distant from patients' rooms. In these situations, nurses were forced to rely on hand gel for cleaning their hands.

Nurses used different strategies to deal with resource issues. For example, they brought soap from home. The nurses in this study were eager to point out that they felt infection control measures were important for all practice environments, but were critical when dealing with patients in isolation rooms.

5.6.4   Staffing issues

The demand for nurses has increased over the last few years in Jordan as the number of hospitals and patients have increased. Jordan has a good medical reputation and a developed healthcare system within the Middle East, and as such attracts many patients from other countries. Although these patients bring additional funding to hospitals, especially private ones, they also increase the load on understaffed wards.

The ratio of nursing personnel to population in Jordan was estimated in 2003 to be 29.5 per 10,000, which is low in comparison with the ratio in developed countries such as the

UK, USA, and Australia (JNC, 2003). Gershon et al. (1999) found that compliance with SPGs is high where the hospital employs sufficient staff. Understaffing is associated with an increased risk of HCAI (Hugonnet et al., 2006).

Developed countries have estimated the minimum required ratio of nurses to patients in different clinical areas. For example, the ratio in critical care units is 1:2, in medical surgical wards 1:6, and in paediatric wards 1:4 (JNC, 2003). Jordan, like other developing countries, has a lower ratio than this standard. In Jordan, the ratio of registered nurses to patients is around 1:10 and may reach 1:20, especially in public and teaching hospitals. In the PICU, the ratio is 1:2 and usually there are no auxiliary nurses. These ratios may drop on late or night shifts and at weekends and holidays. Where wards are short staffed, managers cover them from other wards. There is no bank or agency nurse system in Jordan because of the restricted hospital budget. Under these stressful circumstances nurses try to finish their primary duties (e.g. medication administration, taking observations), and may view the issue of compliance with SPGs as less of a priority.

It is recognised that insufficient staffing levels, combined with a high workload, means that sometimes nurses do not comply properly with SPGs. Nurses in this study claimed that they undertook many tasks whilst on duty and that they did not have enough time to comply properly with SPGs even when they would be willing to do so. In other studies, high workload and lack of time to use precautions were the main reasons for non-compliance with SPGs in both routine practice and emergency situations (Madan et al., 2001; Ferguson et al., 2004; Cutter & Jordan, 2012). Pittet et al. (2006) found that the lack of staffing is associated with higher levels of HCAI.

However, nurses have a responsibility for the welfare of patients, self and other staff. Argably, nurses need to become more assertive when dealing with the lack of staff and to gain the courage to challenge the hospital's administration when facilities are not available. However, this study finds little indication that the nurses' concerns would count for much. The nurses found that managers failed to act on their concerns and their relationship with the medical staff was not sufficiently cooperative. Developing

countries are likely to have health-related resource issues and not all of these will be capable of being addressed. Nevertheless, there is evidence here that nursing resource issues are not likely to be addressed until nurses are accepted as important members of the health care team. A more team-based and cooperative approach to patient care would also ensure that issues were shared by the whole team with the result that issues would be more likely to be addressed.

5.6.5   Summary

This section brings us down to earth; these nurses worked in a resource limited environment. These nurses were challenged by low staffing, poor buildings and insufficient equipment. It has been mention before that the nurses often rationalised their failure to comply fully with SPGs on the basis of the limited resources available to them. The fact is, however, that they had a valid point. It is hard to do good practice with limited resources and limited time. The theoretical model incorporates 'the challenge of the working environment' so as not to belittle this reality and because such challenge was indeed a central facet of the nurses' day-to-day life in the hospital.

It is understood, that resource challenges are not confined to developing countries such as Jordan. Indeed, they are arguably, an everyday facet of nursing in the UK and in many other countries in the West. Nevertheless, there is a difference if you have to bring your own soap with you to work and if the gloves that are sometimes available are never available in a size that will fit your hands, if there is a sink but not necessarily where the patients are. Credit is due, to all those nurses in every corner of the developing world, who work without the right tools and yet still do the best they can for their patients, and do so, not just once or for one day but every day and for little reward or recognition. This section brings us down to earth so that we don't theorise so much, that we forget that nurses need resources to comply with SPGs.

There are, however, things that can be learned from what the nurses have told us about their working conditions, things that go beyond the rarity of gloves. The nurses had little respect for their nursing management because management had failed to deal effectively

with issues around cleaners and physicians poor compliance with SPGs. Nurse managers themselves were female and they were nurses. The managers' hierarchical position meant that even though they were managers, they were still unable to challenge doctors or engage them in one-to-one conversation about the issue. Nurses were not involved in policy-making and perhaps consequently, policy on infection control had failed to account for nursing and for child-patient issues. It is perhaps not surprising that the nurses had recoiled to the mores of their own nursing sub-culture, to their routine and to their experience, their intuition and to their beliefs.

Health care was not delivered by a team working together for the benefits that derive from sharing skills and experience. Instead, physicians worked independently. Nurses worked independently. As a consequence, nurses and physicians failed to respect each other, reinforcing the lack of communication and cooperation between them. The lack of team-working was dysfunctional and purposeless. Had health care workers worked together, they would have been able to share each other's challenges and worked together toward a solution. In fact, there is so much that could be gained from working cooperatively together, that it is hard to see any cognitive or logical point in failing to do so. Physicians make an important contribution to patient care but so do nurses, indeed, so does the cleaner and we should respect them all.

We have seen once again, that the issues around SPGs compliance are indeed complex and multivariate. We have also seen, again, that it would be stupid to try and put tiles on our house before we have built the foundations. Staff need to work together and they need to respect each other, whatever their station in life and whatever their sex. Who knows what might be achieved if this were the case.

5.7 Discussion summary

The study's theoretical model

This thesis provides a new understanding of paediatric nurses' views and perceptions concerning compliance with SPGs.

Although the paediatric nurses had a positive attitude towards providing good quality care to the child patients, they failed to consistently comply with SPGs. They related this failure to a variety of factors such as conflicting policies, lack of equipment, understaffing, lack of education, cultural and social issues, and lack of communication with other HCWs. In this study, paediatric nurses were aware of the deficiencies of infection control practice, but they blamed other occupational groups such as

housekeepers, physicians and the infection control team. They provided many excuses for their failure to comply with SPGs.

It is clear that paediatric nurses were reluctant to be proactive and initiate change in the work environment. They did not deal with difficult issues in relation to infection control practice, and they made minimum efforts to raise these issues with their nurse managers or the medical staff. Sometimes they accepted poor practice with regard to SPGs as the norm and they justified this by arguing that they were unable to change it. The nurses' 'routine', their compliance with their nursing sub-culture, was the final determinant of what they could and could not do. It is expected that paediatric nurses as professionals are able to influence decisions concerning patient care in the work environment. However, the nurses behaved semi-professionally in their outlook to their responsibilities and their obligation to protect patient safety. It has been seen, however, that this was not their fault. The nurses were unable to change their semi-professional outlook even though both their professional body and their initial nurse education had declared nursing a full profession. This is because nurses were seen by 'everyone' as being subservient to Medicine. Nursing was not seen, within the hospital or in wider society, as an 'initiating' discipline. In addition, paediatric nurses were women, initiating change was not considered to be a female's proper role. In this way, the idea of a female-only profession would be untenable to Jordanian society. It is important to understand that this view of nursing and of women was held not only by doctors and managers in the hospital but also by wider society in Jordan. This resulted in the paediatric nurses feeling that (knowing that) they did not have the professional autonomy or authority to challenge existing practice or seek to improve it.

It is acknowledged that paediatric nurses work in a resource-limited environment and experience many difficult challenges. Many nurses referred to feeling overwhelmed by the number of patients, understaffing, conflicting policies and guidelines, financial constraints, management and safety issues, and power imbalances. These challenges negatively influenced nurses' attitudes and behaviour toward compliance with SPGs.

Culture and indeed religious beliefs are important determinants of compliant behaviour, and policy makers need to take these into consideration when producing new policies and guidelines. This is because nurses are unlikely to comply properly with policies that contradict their culture and religious beliefs. In the same way, policies have to be operational within a paediatric environment if they are not to be ignored by clinical nurses. To avoid this issue, policy making needs to have child nursing input. Unfortunately, this could not happen because nurses (especially female nurses) were too hierarchically inferior for their views to be valued.

The nurses were shown here to be human before they were professional or semi-professional. The nurses complied properly when they considered that there was a particular need to protect themselves or their families (when the patient had a 'serious' illness or when the patient looked unclean). The nurses were influenced by their religious beliefs and by their sub-scientific intuition. Arguably, the nurses 'quietly forgot' the difference between science and faith; they held fatalistic ideas about compliance, referring everything to Allah's will. All these factors contributed to the problem of non-compliance with SPGs and are further examples of the way that the nurses were subsumed by their culture; they were social creatures who complied with their social mores, prioritising these before other ways of thinking and problem-solving. One of the nurses despaired at the thought of a non-Muslim practicing paediatric nursing, she could not see how that could be possible. However, it would not be right to blame the nurses here for being 'unscientific' as well as semi-professional, for at our core, we are all human-first. Perhaps the real issue is that these nurses' sub-culture was acting on its own, there was no professional infrastructure in which it could fit. The nurses did not have clinical nurse experts available to them, only nurse managers who failed to address issues and whose 'management' of the nurses was itself outside a professional model. It is not surprising that the nurses 'recoiled' to their nursing sub-culture and their routine and that their practice was therefore so resistant to change.

Nursing children was different from nursing adults. Firstly, many families were viewed as having insufficient awareness about the risk of exposure to infectious diseases and nurses felt there was insufficient health education in the hospital to inform them of the

risks surrounding infection control. Nurses considered health education as part of their role, but they do not perform it because physicians had dictated that they were not permitted to talk to parents about their child's condition. Families did not trust the information given to them by nurses and often disobeyed the nurses.

It can now be seen why there is an enduring failure to fully implement SPGs. It can be seen that the issues here are complex and multivariate and some rest deep in the culture of health care and of wider society. To address these issues, it will be necessary to 'go deep' into the culture of nursing but also of medicine, health care and the general culture of Jordan. These are Jordanian issue but it is argued here that many of the issues are present in other societies and in the West. It can be seen that it would be illogical to try to resolve the issue of non-compliance with SPGs before we set right the issues affecting the core of nursing's identity and indeed, even the role of women in society. This is a new understanding of SPGs compliance and a new contribution to our knowledge.

The following chapter provides an overview of the study main implications.

Chapter Six: IMPLICATIONS

The results of this study have a number of significant implications for understanding why paediatric nurses sometimes fail to comply properly with SPGs.

6.1 Professionalism and nursing autonomy

In Jordanian universities, AbuGharbieh and Suliman (1992) suggest that nurses are prepared to become change agents, critical thinkers, health educators and advocates for patient rights. However, evidence from this study shows nurses fall short in these areas regarding infection control and compliance with SPGs. A major problem revolves around nurses' professional standing in the medical hierarchy and their ability to confront staff seen to be non-compliant. Begley (2010) outlined four main attributes to becoming a professional nurse: autonomy, accountability, advocacy and assertiveness. However, these attributes for Jordanian nurses were not fully reflected in this study.

These shortcomings are evident around the issue of professional autonomy and nurses' ability to undertake their professional responsibility in clinical areas. If nurses choose to be autonomous and fully professional, they would become more aware of their decision-making processes and actions and this would help them to demonstrate their accountability within the hierarchical healthcare system. This empowerment would then enable them to question and confront poor practice and ultimately lead to enhanced patient safety, job satisfaction (Wade, 1999) and lead them into a commitment towards driving nursing professionalism forward in Jordan. In this study, Jordanian paediatric nurses felt they had limited professional autonomy and this was also reflected in the Jordanian literature which describes social, cultural and educational factors influencing nursing autonomy (Mrayyan & Acorn, 2004; Shuriquie et al., 2007; Hamaideh et al., 2009).

Cultural aspects are embedded in traditional Jordanian 'norms' where the relationship between male and female is a patriarchal one. In Jordanian culture a man is viewed as the head of the family (the male breadwinner) with responsibility for covering the cost

of living to meet the needs of the family members. The female is viewed as the carer and responsible for childcare, care of their spouse and for housework duties. Despite fundamental societal changes occurring in Jordan, mitigating against the perspective of male breadwinner/female carer, females are still considered to have less power than men in politics and other managerial positions in Jordanian institutions (including healthcare organisations).

Even though nursing in Jordan is a female-dominated profession there are an increasing number of males entering nursing (Oweis, 2005). Nevertheless, nursing in Jordan is still identified as a female role, especially in the paediatric clinical area, as male nurses tend to work in other clinical areas for cultural reasons (e.g., mothers stay with their children in hospital and are involved in their care). Furthermore, senior male nurses prefer to emigrate to the Arabic Gulf and western countries to obtain higher salaries and better working conditions (Mrayyan & Acorn, 2004), or alternately go on to complete postgraduate studies in western countries. This means that in terms of nursing personnel, the Jordanian cultural expectations causes the profession to remain female-dominated.

This cultural patriarchal perspective of female and male roles and responsibilities helps to explain the professional relationship between physicians (predominantly male) and paediatric nurses (predominantly female) in terms of the nurses being able to speak out when witnessing poor practice. Jordanian literature describes the power imbalance between physicians and nurses, with physicians being favoured via income, by the community, and by hospital administration (AbuGharbieh & Suliman, 1992).

In addition to the cultural perspective to nursing, physicians occupy higher managerial positions in the Jordanian Ministry of Health and within healthcare facilities (Shoqirat, 2009) and govern decisions concerning medical and nursing practice (Hamaideh et al., 2009). Hence these organisational and hierarchical systems, a predominant feature in Middle East facilities, help reduce female as well as male nurses' engagement in decision-making (Mouro et al., 2013). This in turn reduces the authority of nursing

leaders in the Jordanian healthcare organisational bodies such as the Jordanian Ministry of Health.

Despite this power differential between nurses and physicians, challenging poor practice is a requirement of the nursing code of ethics to protect patient safety. Also, nurses need to 'fight for' their professional autonomy so that they are enabled to influence decision-making processes within the healthcare system and make improvements towards challenging poor professional attitudes toward nursing practice.

Although there are many work deficiencies in the Jordanian healthcare system (e.g. limited resources, conflicting policies), nurses need to stop blaming other professions and the existing system for these deficiencies. They should rather promote nursing professionalism within the healthcare system in Jordan so that change can occur in order to improve the quality of nursing care. Unless nurses stand up for their profession and challenge and question existing practices and organisational barriers, then the status quo will remain and infection control measures will remain incompletely implemented.

To accomplish this, however, nurses need to become empowered within the healthcare sector, and this raises questions and implies the need for change around infrastructural and cultural issues in the organisation. Nurses need to become empowered enough to be able to demonstrate their professional accountability to promote good practice, alongside being able to motivate nurses and other HCWs to become more responsible for their actions. Nurses need to know their rights and responsibilities and adhere to a professional standpoint so that clear professional boundaries are set into clinical practice (Wade, 1999). This in turn will help to establish their authority and outline their resposibility to act to make the necessary changes (themselves) to improve practice.

Mrayyan and Acorn (2004) indicated that Jordanian nurses suffer from unclear role expectations (which are different from those learnt in initial training), and the absence of, or lack of clarity in job descriptions. Effective communication is important between nurses and the administration to confirm that roles and job descriptors are clear. It might help if job descriptions were clearly written in line with professional standards; this would help to provide a clear picture of the professional standards expected of the role.

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Nurses can then use these descriptors to clarify their position when communicating and using negotiating skills to address problem areas within policies and practice in infection control.

Another problem with accountability in Jordan is that until now there has been no active medical and nursing law, and malpractice issues have previously not been addressed according to standard procedures (Okour et al., 2014). Therefore, HCWs may not act according to the regulations if those regulations are unclear or not evidence-based. It was argued by Dr Hammory (President of the Private Hospitals Association in Jordan) that it is difficult to apply a medical accountability law in Jordan before filling the gap in the healthcare system regulations and guidelines (Malkawi, 2013). Nurses need to understand that accountability law is important and it could help with the empowerment of their profession. Nurses need to become involved in the process of making policy to raise quality of care issues and to enable them to place pressure on stakeholders to be aware of nursing's professional standards (JNMC, JNC). Oweis (2005) highlighted that nurses' participation in the activities involving their regulatory bodies is low and needs to be increased to address working environment deficiencies (infrastructure, human, physical, intellectual, and environmental resources, as well as taking into account societal cultural and religious aspects).

It is widely accepted that competency and education are paramount features for professionalism and can improve the feeling of belonging and pride in the profession, which in turn aids empowerment. However, this requires continual professional development to keep up to date with the professions changes. However, the paediatric nurses in this study reported that few refresher courses for infection control practice were available. After undertaking their initial nurse practitioner programme where mandatory nursing competencies have to be met, there are no follow-up programmes to enhance clinical competencies in Jordan. Some nurses' give lectures in their departments, but these are insufficient to equip staff with advanced skills in their practice. Hence nurses need to become more assertive and proactive in creating opportunities for professional development and in seeking out workshops and conferences in other hospitals to improve their skills and knowledge. Additionally,

healthcare stakeholders need to emphasise the need for nurses' and healthcare organisations to embrace a standard for professional development to maintain high level competencies.

In Jordan, traditional nursing education is task-focused and doctor-led rather than being patient-centred care approach (Shuriquie et al., 2007). As a result, nuring maintains a medical-model approach to care. This approach needs to change and nurses in Jordan need to give 'care' a higher priority. Part of the problem is that in Jordan, the nursing curricula were adopted from Western countries, these do not take into account the cultural and social factors of Jordanian people, and thus, gaps exist between the theory and practice. There are many Master of Science nursing graduates who have developed higher level advanced nursing skills but as yet their status in practice has not been acknowledged, and because of this, they have yet to make an impact on practice (Zahran, 2010). The resulting frustration is demonstrated by the number of nurses leaving practice to pursue positions in academia or continuing education departments where they think they may be able to make a difference. In the current study, only one participant had a Master of Science degree, and that was not in nursing.

Another important fact is that in Jordan there is no specialised training for paediatric nurses. Nurses who work in paediatric clinical areas attend only one course (theory and clinical) in paediatric nursing before graduation. Following their graduation, nurses have to gain experience in paediatric nursing through hands-on practice, but without continuing professional development being offered they are unlikely to remain and so seek further opportunities inside or outside the country and this leaves practice to less experienced, junior nurses. This 'brain drain' means that those with high-level skills and with experience of infection control, are not on hand to train the junior staff.

Another attribute of the nursing profession is that of advocacy for patient's rights. Nurses need to be compassionate and committed to caring for patients, in order to empower patients and their families (Begley, 2010). Advocacy is connected with the relationship between nurses and patients and other HCWs. Nurses need to be proactive and assertive with any issues that may influence their patients' safety and this is

especially the case with infection control measures. Staff need to be assertive in challenging poor practice and tackling poor infection control practice so that issues can be dealt with robustly.

Yet another important health education factor in paediatric clinical areas in controlling the spread of infection is the working relationship between HCWs, patients and families. This is because families are the main source of support for children and are able to encourage or discourage the relationship between their children and the HCWs (Yacoub et al., 2013). Nurses have a duty to educate families to facilitate their understanding about what happens to their children and what is expected from them during hospital stay. This facilitates families' and children's cooperation and compliance with treatment regimens and any other required procedures (e.g. keeping children in their isolation rooms). However, the family-centred care approach is not addressed in Jordanian literature (Yacoub et al., 2013), and to date, in Jordan, its use is limited.

According to Wade (1999, p.316), "*nurses who successfully integrate the behaviours associated with professional nurse autonomy into their belief system, perceive that they are in control of the work environment and ultimately their profession*". According to the professional attributes described above, nurses as professionals need to feel empowered and apply a positive proactive attitude to initiate change and take decisions to fulfil their professional obligations toward patient safety. To ensure the compliance of others with SPGs, nurses need to become assertive and empowered in their working environment. To do this they need to be proud of what they are doing and appreciate the way that nursing is a unique provision and that not everyone can do it; to appreciate their unique contribution to practice. Additionally, nurses need to be self-confident enough to share their expertise and competency with other professionals regardless of any supposed status or hierarchical position, in order to provide quality and safe patient care.

6.2 Religion and culture and science

Jordanian hospitals like other hospitals in developing countries, adopt policies developed and designed in Western countries. These policies may need modifications to allow them to conform to Jordanian cultural, religious and resource issues. These policies may influence nurses' compliance if they contradict their cultural and religious beliefs. However, nurses need to understand that science is important and they need to communicate their cultural and religious beliefs and their professional responsibility and accountability to stakeholders and religious figures to discuss conflicting issues and evaluate how these can be resolved.

The nurses in this study frequently discussed culture and religious beliefs in the interviews as an important determinant of compliant behaviour. Religious faith and conscientiousness were viewed as facilitators of compliance with SPGs. These attributes encouraged nurses to comply even in the absence of good monitoring and follow-up. However, some ideas, like referring everything to God (fatalism), may negatively influence compliance with SPGs. Nurses need to balance clinical practice action and faith by doing whatever they can do to protect their patients, whilst at the same time recognising their own trust in God's plans.

6.3 Confused standards

In the last few years, Jordanian hospitals in different healthcare sectors have striven to obtain national and international accreditation to prove their excellence in providing competent patient care. This motivation reflects the high reputation of Jordanian medical care in the Middle East region, attracting people from different countries to visit Jordan for medical tourism. However, nurses indicated that during the time of this accreditation process hospitals provided enough equipment and more training for staff to acquire the certification. This behaviour by the hospital administration contradicts the main objective of gaining accreditation, as the focus of this should be on their ability to continue to fulfil their profession obligations in providing safe quality patient care.

Despite the fact that there were issues that hindered nurses' compliance with SPGs in the paediatric clinical area (e.g. behaviour, nature of disease), the majority of nurses in this study asserted that nursing children was a facilitator of compliance with SPGs. This is reflected by a recognition that compliance with SGPs in paediatric wards was better than other departments. This finding is supported by Randle et al. (2013) who found that the rate of compliance with hand hygiene in paediatric wards was high, more than 70%. However, nurses indicated that there were no guidelines to deal with specific issues in paediatric nursing practice and nurses sometimes used subjective assessments to resolve some situations.

Family centred care is still developing in Jordan. Nevertheless, families are present in paediatric areas and they do take part in the care of their child. However, family members are often ignorant of the relevant SPGs or refuse to practice them.

Paediatric nurses identified that infection control link nurses are not available in Jordanian hospitals and sometimes nurses performed this role as an additional task to their normal duties. Infection control link nurses could usefully be introduced in Jordanian hospitals.

The findings show that nurses only occasionally used SPGs in emergency situations because they place saving patients' lives over their own, and others', safety. However, it is important that nurses understand that it is possible to resuscitate patients in a way that protects them from infections, as the first objective in resuscitation is safety.

6.4 Compliance is a complex behavioural phenomenon

The results suggest that paediatric nurses are willing to comply with SPGs, but they fail sometimes to achieve their goal. It is apparent that nurses make complex decisions in the practice of infection prevention and control. These decisions may be based on subjective assessment rather than evidence based practice.

Despite the fact that nurses identified a number of constraints that negatively influenced their compliance with SPGs (e.g. understaffing, limited equipment), they complied

properly in other situations where the risk of exposure to microorganisms was high, and in order to protect themselves (e.g. when taking care of isolation patients). Compliance was viewed as a behavioural and complex phenomenon influenced by various determinants. Many behavioural determinants in this study have been addressed in the literature, for example, knowledge, self-efficacy, attitude, culture, work environment deficiences, perceived benefits, behaviour consequences and communication. Understanding these determinants is the first step to designing effective interventions to promote infection control practice. It is suggested here that a single intervention strategy like educational intervention is unlikely to succeed and that concerted multimodal interventions based on our understanding of these determinants is a better strategy to induce positive change in infection control practice.

The behavioural determinants and the position of the current study fit well with behavioural change models such as the health belief model and the Theoretical Domains Framework. The Theoretical Domains Framework was designed by a group of health psychologists in the UK to simplify using behavioural theories during the implementation of evidence-based practice; it includes 12 constructs developed from 33 behaviour change theory (Michie et al., 2005). Using this framework in future research may facilitate more understanding of compliant behaviour so that change can take place through designing infection control interventions according to the framework constructs. Whatever theoretical approach is used, it needs to be understood that compliance with SPGs is a complex, multivariate and sometimes non-scientific issue. Nurses are human before they are nurses; like all humans, nurses' plan and problem solve but they may do so using mental strategies that can appear illogical and idiosyncratic.

6.5 Summary

The chief implication of this study is that unless nurses feel empowered to stand up for their profession and challenge existing practices and organisational barriers, infection prevention and control is unlikely to improve. Paediatric nurses need to develop to become autonomous and fully professional to undertake their professional

responsibilities in clinical areas. However, this is not going to be easy to achieve in a health care culture that views the nurse in much the same way is it views a household maid. The wider Jordanian culture also needs to change so that it comes to see nurses as professionals. It is hard to see how nurses can make this change themselves when few will listen to them. Females too, need to begin to be seen as capable as men are, to make decisions and to problem solve.

Compliance with SPGs is a complex, multivariate and sometimes non-scientific issue. Nurses are human first and they sometimes problem solve based on subjective, religious and emotional arguments. The nurses held fatalistic ideas about SPGs compliance and 'quietly forgot' the difference between science and faith. The nurses were bound by the mores of their nursing subculture; this effectively confined them to the nursing routine. It is difficult to see how this could change. Jordan is a deeply religious country and faith is taken very seriously. It is suggested here, however, that nursing has little choice but to recoil to routine, to its sub-cultural mores. Nurses do not meet other nurses, go to conferences, 'see' nursing outside their ward or hospital. Nursing management is concerned with 'management' and not leadership; it is not there to move nursing forward and to break new ground but to see that rules are obeyed. Nursing in Jordan needs a new infrastructure of advanced clinical nurses who can act as role models and advanced clinical supervisors. This would improve practice and would help to provide the nurses with a new vision of what can be possible. The world of nursing has to be larger than each hospital department.

The nurses found that standards and policies were confused and did not easily apply to paediatric nursing and the needs of sick children. Nurses first need to be valued and they then need to join policy groups so that the voice of paediatric nursing can be present in the fashioning of new policies. First of all though, nurses need to be valued and their craft needs to be valued for the important contribution nursing does make to the care and treatment of child patients and their families.

This study has identified the causes of the enduring failure of nurses to comply fully with SPGs. It must be understood that these are complex and multivariate. Trying to

improve SPG practice by improving one variable (e.g. education), will fail, as it always has done. Perhaps the first place to start is to professionalise nursing; that would need to be a nationwide exercise which would need to involve the Jordanian government, Medicine and other agencies. It would not be easy.

Lastly and had been said before, the foundations need to be built before we seek to put the tiles on the roof. Fundamental issues such as the role and value of women and of nursing as a craft, needs to be addressed. There is no point in expecting people without value to give themselves fully to any task or to expect a largely ignored 'profession' to have the energy and enthusiasm to strive to make things better. These 'professionals' do work hard and do care but they have (again) recoiled into their own domain where they feel safe. These nurses need to be let out to change the world.

The following chapter summarises the thesis and provides an overview of its contributions and limitations, and offers recommendations for practice and future research.

Chapter Seven: CONCLUSION

7.1 Introduction

The study investigated how the experience of nursing children affected nurses' decision-making regarding compliance with SPGs. The study also identified paediatric nurses' understanding of factors affecting compliance and ideas they had about means to increase compliance. The literature search evidence demonstrated that previous studies do not fully address the views and perceptions of paediatric nurses concerning infection control practice, and the factors that influence their compliance with SPGs. The discussion chapter highlighted the fact that nurses failed to act as change agents when dealing with issues that impacted on good infection control practice. In this sense nurses appeared, at times, not to be fulfilling their professional obligations to implement infection control protocols.

This study used an adapted constructivist grounded theory approach to achieve a better understanding of the factors affecting compliance with infection control precautions among paediatric nurses. It also provides further explanations in an attempt to remedy the incongruence of spreading infection whilst undertaking a caring role.

The main research question for this study was:

'Why do paediatric nurses sometimes fail to comply properly with SPGs, and how do they explain their behaviour?'

This chapter is divided into four sections. The first summarizes the thesis chapters. The second presents the study's unique contributions to knowledge. The third section discusses the study's limitations. The fourth section offers recommendations for practice and future research.

7.2 Summary of the thesis chapters

The thesis is presented in six chapters. Chapter one outlines the study background, the significance of the study and briefly describes the Jordanian context. Also, it presents the problem statement, the study purpose, and the research question. In chapter two a comprehensive review of the literature was undertaken to identify the current understanding of the infection control processes and procedures. A range of databases including CINAHL, Medline, Academic Search Premier, PsycINFO and Cochrane were searched to retrieve data within the parameters of 2000 to 2016 to elicit up to date information. The outcome themes were presented with particular focus on the understanding of the factors influencing compliance with SPGs among paediatric nurses. The literature demonstrated that the reliable use of Standard Precautions can prevent the transmission of HCAI and enhance patient and healthcare safety. However, in spite of this, compliance with SPGs among HCWs is suboptimal. Existing studies have assessed compliance rates and investigated factors, such as insufficient time and lack of equipment as being influential in determining the level of compliance with infection control guidelines across clinical areas. However, these studies did not fully address paediatric nurses' views about and perceptions of infection control practice and influences on their compliance with SPGs. The purpose of this study and research question were derived from this review and the gaps identified in the existing studies . The gaps in the literature were examined by using a modified grounded theory approach.

Chapter three provided the philosophical assumptions underpinning this adapted constructivist grounded theory study, and outlined the methodology, design, and method. The rationale behind using the adapted form of grounded theory was justified. Also, using 'face-to-face' semi-structured interviews as the main method of data collection was consistent with the study's philosophical assumptions to explore both nurses' views and perceptions in relation to infection prevention and control practice. Moreover, reflections on the analysis process using the constant comparative method were outlined. Other methodological considerations such as interviews being tape-recorded, transcribed, and translated, along with the limitations of this, were discussed.

Ethical considerations were addressed, and the measurements used to enhance the quality and trustworthiness of the study were described. These included external audit, member checking, peer debriefing, prolonged engagement, reflexivity, and negative cases analysis.

In chapter four, the data summary from the interviews revealed factors that influenced compliance with SPGs among paediatric nurses. These factors are presented in four themes that included: 'children are different: the lack of fit between SPGs and the needs of child patients', 'Nurses are human first: the impact of nursing culture and idiosyncratic problem solving', 'Limited professional status- lack of autonomy', 'The challenges of the working environment'. The data suggests that paediatric nurses are willing to comply properly with SPGs, but they fail sometimes to achieve their goal. However, it was also notable that nurses complied fully if the risk of exposure to microorganisms was high and they needed to protect themselves, but they justified their non-compliant behaviour in other circumstances. Nursing children impacted both positively and negatively on infection control practice.

Chapter five discussed the key findings and their components and compares them to those in the existing literature. It provides a new understanding of paediatric nurses' views and perceptions concerning compliance with SPGs. Compliance with SGPs was viewed as suboptimal in paediatric departments, but better than in other departments. It was clear from the findings that nurses were reluctant to be proactive to improve practice and they failed to initiate change and deal with the issues that influence infection control practice. Nurses' semi-professional orientation influenced their compliance with infection prevention and control guidelines. However, compliance was viewed as a complex behavioural phenomenon and influenced by various determinants that affected nursing roles' around infection control.

Chapter seven discussed the main implications of this study. Unless nurses feel empowered and stand up for their profession and initiate change, then the status quo will remain and infection prevention and control is unlikely to be implemented.

7.3 Contributions to knowledge

Most studies regarding infection control practice are quantitative and have identified some barriers to good infection control practice and concentrated on one aspect of Standard Precautions that of hand hygiene (Gershon et al., 1999, Chan et al., 2002, Kermode et al., 2005, Golan et al., 2006, Berhe et al., 2005, Parmeggiani et al., 2010, Efstathiou et al., 2011b). However, these studies do not explain why and how those factors affect compliance with SPGs by paediatric nurses'. Neither has the literature provided a clear and fundamental rationale for the lack of compliance with infection control guidelines.

This study has examined and analysed Jordanian paediatric nurses' views in relation to infection control practice. Few studies (Purssell, 1996; Moore, 2001; Posfay-Barbe et al., 2008; Wichaikull, 2011; Randle et al., 2013) have been predominantly conducted in the paediatric clinical area in relation to infection prevention and control practice. However, these studies did not address the views and perceptions of paediatric nurses in relation to infection control practice, nor did they provide a rationale about the factors that affect their compliance with SPGs.

Furthermore, studies that were conducted in the Jordanian context, did so using a quantitative approach based mainly on biological analysis of bacterial spread (Khuri-Bulos et al., 1999; Hassan et al., 2009; Darawad et al., 2012). Additionally, these studies focused on the compliance of Jordanian nurses with infection control guidelines but did not discuss the extent of compliance with different components of Standard Precautions. As a result of the quantitative methods used, these studies did not investigate nurses' experience and perception about compliance with SPGs, nor why sometimes they fail to comply properly with the guidelines. Also, the reductionist nature of quantitative research limited the creation of more in-depth 'rich' data being obtained around the topic to improve practice. Consequently, a qualitative approach was used in this study to elicit data to address these concerns. This led to an understanding of factors influencing compliance with SPGs, and how these factors affect paediatric nurses' decisions on SPGs compliance.

The key contribution of this study is that infection control is not going to improve until paediatric nurses feel empowered to initiate change and deal with the practical difficulties that have an impact on good infection prevention and control. They need to make infection control a priority and deal (themselves) with the issues that cause infection control to be less good than it should be. This means that nurses should work in a 'professional' manner, accepting responsibility as something that characterises the professions, by being prepared to take decisions concerning infection control practice and be accountable for their decisions. This is a new approach for Jordanian paediatric nurses which has been overlooked in the Jordanian context. Until nurses in Jordan fully professionalise, the issue of incomplete SPGs compliance will remain and will prove intractable.

It was clear from the findings that paediatric nurses were reluctant to act as change agents in their clinical area, even though they were aware of the problem of non-compliance with SPGs and recognised it as an important issue. Despite this awareness, paediatric nurses failed to deal with many obstacles in their clinical area, this raised doubts around their professionalism and how they acted out their responsibilities and obligations to protect patient safety. Part of the reason for them failing in their professional duties was their inability to make autonomous decisions (as autonomy in decision-making was viewed as being the physician's realm of responsibility). This led them to become less challenging and less questioning, as questioning the established hierarchy was considered to be outside their role. The nurses' position here, remained, even though challenging poor practice (physicians' and other HCWs) is a nurse's professional responsibility and a requirement in the nursing codes of ethics. Nurses had to decide whether to comply with their culture or their professional code. The problem this caused them can be seen in the many 'excuses' they made for not ensuring good SPGs practice. In the end though, nurses had no real alternative than to comply with their culture and their lowly status as female nurses within the hierarchy of health care staff.

This study is therefore useful because it explains why improvement in SPGs practice has so far been unsuccessful. The findings are relevant to Jordan as well as to other

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countries worldwide like the UK, the USA and Australia and are also transferable to adult nursing. Nursing is similar in character, all over the world.

This study provides paediatric nurses with an opportunity for their voice to be heard. The study offers insight into Jordanian paediatric nurses' experience and perception in relation to compliance with SPGs. It is the first study to tackle nurses' experience regarding infection control practice.

Another main finding that nurses were 'human first'. In this way, they did always use problem solving but this was not always scientific. The problem solving was sometimes religious in nature, sometimes it related to how dirty the patient was (etc.) and that child patients were inherently 'clean'.

7.4 Limitations

This study provides a valuable contribution to existing knowledge, but it was not without some limitations.

Although semi-structured interviews provided a 'rich' description of what happens in actual practice in relation to compliance with SPGs, the researcher witnessed some disagreement between participants. This led the researcher to carry out more interviews to reach saturation point. The researcher tried to discover the reasons behind disagreements by probing participants. The study interview guide involved many prompt questions which were used by the researcher to ensure that deeper and more meaningful responses from participants were secured.

The use of focus groups was considered in the planning of this study but was rejected after due consideration, as the use of this data collection method can threaten the confidentiality of participants (Pope & Mays, 2006). Additionally, because of the nature of nursing in Jordan (high workload, understaffing), it was difficult to bring nurses together at the same time to participate in a focus group study. Further research may consider focus group study to explore different views of paediatric nurses and probe any disagreements.

This study was undertaken in Jordan because the researcher wanted the results to be relevant there. This last notwithstanding, it should be of interest around the world and useful in other settings with similar conditions. It is suggested here that the study's focus and findings are also relevant to the USA, the UK, Australia and other countries. However, the social and cultural factors may differ in developed countries. Jordan is a developing country and as such has limited resources and has different cultural and social values. Moreover, paediatric departments seemed to be different from other departments in the hospital, so one recommendation for future research would be to conduct a study in paediatric clinical areas in UK using the same approach to compare the results and see if the culture and resources make any difference. Another area for further research is to include other departments in the hospital and establish whether the difference in nurses' views on compliance between paediatric and adult departments is truly reflected.

The researcher conducted this study in different paediatric departments including paediatric wards and paediatric intensive care units. However, only one hospital had a separate team assigned to work in its PICU, while other hospitals PICUs were staffed by the same teams as the paediatric wards. Therefore, it was difficult to compare the results between PICUs and paediatric wards.

Only three males participated in this study because their number is limited in paediatric clinical areas, and they mainly work in PICUs. So, the data was not enough to see whether there is any difference in compliance between male and female nurses.

The purpose of this study was to gain the experience and perceptions of paediatric nurses (who are the largest group of professionals caring for patients) around infection control and compliance with SPGs. Their perspective and descriptions of non-compliant behaviour may be different from those of other HCWs such as physicians. Therefore, future studies could involve other HCWs to obtain different perspectives and more understanding about non-compliant behaviour.

This study did not involve parents of sick children who are an important part of the caring process as they are the main link between nurses and children and can persuade

their children to accept the treatment regimen. It would therefore be worthwhile to involve parents and children in a future study, to explore their perspectives about infection control practice.

Three transcripts were fully translated into English and the quotes used were also translated into English, which increased the study load. The translation of the contexts between two languages is considered a limitation, however, the researcher did perform a translation and back translation to check that the translations reflect the Arabic language used by the participants.

Although using NVivo 10 software was valuable to manage the large set of data, the researcher found many difficulties during data analysis. For example, in the beginning of the analysis one file was corrupted and some data was lost. Also, the software does not support Arabic and the researcher used many techniques to import Arabic transcripts to NVivo. In the event, however, using NVivo presented rather too many obstacles to be fully usable, especially where Arabic is used.

7.5 Recommendations

This study provides suggestions for best practice and recommendations for future research in the infection control area. It also provides valuable information about the practice of infection control in the paediatric clinical area from a paediatric nurse's perspective.

Some of the barriers discussed in this study may be outside the nurses' control such as issues in the organisational infrastructure of health care in Jordan. It is suggested here that hospital administrations consider safe practice within the work environment as this is a crucial factor in infection control and in ensuring policy documents and job descriptions are fully operationalised. Hospital administration personnel are responsible for providing safe working conditions (clear policies, good supervision, good leadership, and enough resources) and a safe environment, monitoring infection control practice and intervening with non-compliance.

It is expected that nurses, as professionals, have the ability to influence decisions concerning patient care in the work environment. Therefore, nurses need to work in a professional way, to use their initiative and be proactive to protect the patients' safety and not follow the poor practice of other HCWs. Also, nurses need to be proactive and eager to ensure that the required equipment for good infection control practice is available.

Professional nurse autonomy should be encouraged in healthcare settings, so nurses become accountable for their decisions, and that they feel empowered, and positively influence professional practice. Nurses need to become politicised to highlight the dilemmas of maintaining infection control. They need to become active participants in decision-making, especially in relation to patient safety issues. Nurses should become fully absorbed into local, national and international policy-making in infection control. Nurses need to become self-confident, have courage and good communication skills, and take ownership of decision making processes. Therefore, nurses need to recognise that blaming other professions and making other excuses for poor practice should no longer be considered acceptable. Nurses should deal themselves with the problems of poor infection control practice and take responsibility for this, even where doctors and other staff are involved.

It is suggested that nurses apply pressure to stakeholders to change the current situation of infection control practice by lobbying their organisations and the Jordanian nursing regulatory bodies (JNMC, JNC) and ensure that change is acted upon. Currently, nurses' participation in the activities of their regulatory bodies is low (Oweis, 2005). Also, involvement in regulatory bodies is important to address other deficiencies in the work environment.

Effective communication and good relationships between nurses and other HCWs such as physicians, is important to improve the practice of infection prevention and control, and to protect patient safety. This can be achieved by creating open forums, collaborative workshops, and group discussions. It is a nurses responsibility to ensure that any untoward infection control behaviour be addressed promptly and action taken

to ensure public health safety. Also, nurses should address the challenges of effective communication between HCWs, the lack of collaboration and differences in power and authority between nurses and physicians.

The findings show that there is no official role of infection control link nurse in Jordanian hospitals, but some experienced nurses perform this role in addition to other nursing tasks. It is suggested here that a full-time infection control link nurse position is important in the hospitals to improve the practice of infection prevention and control, and facilitate collaboration between all those concerned.

Infection control team members need to be flexible and supportive in addressing infection control problems in the hospital departments to encourage nurses to accept constructive feedback to change their behaviour. Further studies are required to evaluate the role of the infection control team in Jordanian hospitals and identify the importance of developing the position of infection control link nurse.

Culture and religious beliefs are important determinants of compliant behaviour, and policy-makers should consider them either when they release new policies and guidelines or are implementing multifaceted approaches to promoting compliance with SPGs. Nurses, stakeholders and religious leaders should discuss issues that contradict the culture or religious requirements to find resolutions that promote safe practice.

Nurses suggest that designing appropriate playrooms controlled by play therapists are important to facilitate children's cooperation and help children to understand what is happening to them. These playrooms are described as insufficient or unavailable in some hospitals as they may increase infection transmission. However, hiring play leaders without a play room can solve the problem.

The findings show that compliance is considered as a complex behavioural phenomenon influenced by various determinants. Hospitals should consider all the behaviour determinants to enhance the compliance of their HCWs. For example, compliance may be improved by enhancing knowledge accompanied by changing attitudes and behaviour and considering other factors such as conflicts of interest,

perception of risk, social pressure and role modelling. It is suggested that using behavioural models such as the theoretical domains framework may facilitate more understanding of compliant behaviour change and design infection control interventions according to the framework constructs.

It is recommended to conduct further studies in paediatric clinical areas in developed countries using the same approach to compare the results and see if the culture and resources make a difference. Also, further research may include other departments and HCWs to obtain different perspectives and more understanding of non-compliant behaviour.

Child patients and their parents are underrepresented in the infection control literature, and it is important to explore their perspectives about infection control practice, and the factors that prevent them from prompting HCWs to use hand hygiene whilst undertaking caring roles.

7.6 Disseminating results

The researcher intends to publish at least two papers from this study. One will be the literature review for which the manuscript had already completed. The other will focus on the research findings which will be published where it will be read by Jordanian nurses and policy-makers. This last will be ready in a few weeks. The researcher has already had an invitation to submit in an online journal. An attempt will also be made to submit a paper to a high impact journal.

The abstract of this study has already been published in a number of reputable journals such as *Journal of Infection Prevention*. Also, the results have been disseminated by oral and poster presentations in several local and international conferences (see appendix 7).

The researcher intends to conduct a focus group study to explore different views of paediatric nurses, and then based on the data that emerge, an instrument will be built based on a modifiable version of the theoretical domains framework. This instrument

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will be used to conduct a large scale study to examine the factors that influence compliance with SPGs in Jordan.

If the researcher has an opportunity, a new study using focus groups will be undertaken in a developed country such as the UK to compare the results between two different countries in relation to culture, non-scientific problem solving and effect of professional status on SPGs practice.

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Appendix 1 Summary table of the articles that included and reviewed

	Author\ date	The aim of study	Target group and setting	Methodology Design/ method	Findings	Comments
1	Alex-Hart and Opara (2014)	- To identify doctors' and nurses' hand-washing practice in two critical-care paediatric wards in a specialist hospital	- 86 doctors and 64 nurses on all shifts (early, late and night). - Specialist hospital in Nigeria	- Cross-sectional observational study	- Doctors' hand washing practice was low before patient contact (17.4%) compared to 64.0% after patient contact - Nurses' compliance with HH guidance during simple procedures was on average 13.24% before procedures and 59.04% after procedures	- This study raises an important point that nurses and others may discern risk associated with the procedure whereas studies may have regarded all procedures as equal
2	Al-Hussami et al. (2011)	- To determine the application status of hand washing information given within the context of infection control measures in the practice area	- All health care professionals, including, physicians, nurses, and technicians working in large acute-care hospitals in Amman Jordan	- Cross-sectional descriptive correlation survey	- The HCWs perceived the risk of contacting patients or exposure to blood and body fluids, and this encourage them to comply with HH to protect themselves, while protecting their patients were considered as less important	- Used a relatively large sample size from a variety of HCWs in several hospital departments. However, the study took place in only one hospital in Jordan and that it used a self-report approach to measure compliance
3	Al-Khawaldeh et al. (2015)	- To examine nursing students' hand washing knowledge, attitudes, and beliefs and their self-reported compliance with hand washing practice	- Student nurses in one Jordanian public university	- Cross-sectional survey study	- The student nurses acknowledged that HH was beneficial and necessary, but they thought that it was not soothing or reassuring which negatively influenced their compliance with HH	- It is possible that these students had been taught good HH techniques and had at this time, not been subsumed by nursing practice culture with its reduced emphasis on HH
4	Al-Rawajfah (2016)	- To assess Jordanian registered nurses' compliance with SPGs in	- Critical care registered nurses in twenty one Jordanian hospitals	- Cross sectional descriptive survey study	- 43% of nurses reported that they did not use or rarely used eye protection when it was	- The study used a relatively large sample size from different regions in Jordan, which arguably makes

					needed. Only one third of the nurses ever performed recapping of used needles - Twenty-five participants claimed to always share equipment between patients without sterilisation	the study generalisable, at least to Jordan
5	Al-Rawajfah and Tubaishat (2015)	- To assess Jordanian student nurses' knowledge of and practice with SPGs	- Student nurses from ten Jordanian universities	- Web-based survey	- Half of the nursing students had 'excellent' knowledge of SPGs - 35.7% of nursing students reported that they always performed needle recapping (unsafe practice), and less than half washed their hands before providing non-direct care to patients	- The reported association here between education on infection-control and claimed good practice might indeed be spurious
6	Al-Rawajfah et al. (2013)	- To evaluate the compliance with infection control guidelines among Jordanian registered nurses	- Sample of registered nurses from 22 Jordanian hospitals	- Cross-sectional national study - Proportional-multistage probability sampling	- Nurses who worked in teaching hospitals reported higher compliance when compared with nurses who worked in other types of hospitals	- This was a large-scale study in Jordanian hospitals - Using a self-report method might have overestimated the real compliance rate
7	Askarian et al. (2005)	- To assessed knowledge, attitude and practice among Iranian healthcare workers.	- 8 Iranian hospitals - 1,048 healthcare workers	- Quantitative approach - Questionnaire survey	- No significant relationship between nurses' knowledge and compliance with Standard Precautions	- Not only knowledge may affect the compliance with guidelines, but also, attitude are an important part of changing practice
8	Barrett and Randle (2008)	- To assess student nurses' knowledge of HH practices and potential barriers to HH compliance	- Ten pre-registration student nurses - UK	- Qualitative interpretive study - Semi-structured interviews	- Participants emphasised that they need to fit into the clinical area by following HCWs models especially in HH compliance	- The influence of role models in shaping infection control practice should not be underestimated

9	Berhe et al. (2005)	- To assess HCWs' perceptions of adherence to infection control practices and measure motivational factors for compliance	- ICU HCWs at an 820 beds, 9 ICU, tertiary care medical center in the USA	- Quantitative approach - Questionnaire Survey	- Health care workers were motivated by personal safety to comply with guidelines rather than patients safety	- Educational programs for infection control should be tailored according to the occupation
10	Chan et al. (2002)	- To examine the nurses' knowledge of and compliance with SPGs	- 306 nurses in acute care hospital. - Hong Kong	- Cross-sectional survey	- Compliance with HH was 86%, gloves 79%, masks 46%, eye goggles 25% decontamination of surfaces and equipment 51%, gown/plastic apron 45%, sharps use was 100%	- Nurses were selective in using infection control precautions components
11	Creedon (2006)	- To explore healthcare workers hand hygiene practices from a behavioural perspective	- Nurses, doctors, physiotherapists and care assistants - Intensive Care Unit in Ireland	- A quasi-experimental design - Non-participant observation and survey methods	- Multifaceted HH program significantly enhanced compliance with HH guidelines - Also, there was a significant change in HCWs attitudes, beliefs and knowledge	- The future researcher needs to investigate compliance with HH as a behavioural issue. - Multifaceted interventions are required to improve compliance with HH
12	Cutter and Jordan (2004)	- To identify strategies to minimize professional risks of acquiring blood borne infections during the exposure-prone procedure	- Surgeons, scrub nurses and midwives, in general, operating theatres and delivery suites (n=200) - Two NHS hospitals in UK	- Quantitative study - A cross-sectional survey design	- HCWs in operating theatres were selective in adopting compliance with SPGs that expose them to unnecessary risk - There is a difference in compliance between HCWs	- The real reason for non-compliance with guidelines still not explored - There is a need to develop strategies that enhance compliance with SPGs and reporting inoculation injuries by all HCWs
13	Cutter and Jordan (2012)	- To examine the difference in compliance with SPGs in operating theaters - To identify strategies to minimize professionals' risks of exposure to blood-borne infections	- Surgeons and scrub nurses and senior infection control nurses in a six UK NHS trusts, between January 2006 to August 2007	- A mixed method studies: a cross-sectional survey and interviews	- Perceived risk of exposure to blood and body fluids is important to motivate or inhibit compliance behaviour	- There is an evidence of selective adoption of compliance with SPGs based on patients appearence

14	Darawad and Al-Hussami (2013)	- To explore nursing students' knowledge, attitude and practice of infection control precautions	- Nursing students in a large Jordanian university	- Quantitative cross-sectional survey	- Only a positive attitude toward SPGs was significantly correlated with the students' compliance - The students' knowledge was less than desirable	- Instructing nurses on how to practice may not be effective. - Nurses' attitudes and beliefs around practices may be key determinants of compliance behaviour
15	Darawad et al. (2012)	- To examine nurses' HH beliefs, attitudes, and compliance - To examine the predictors of their HH compliance	- Nurses and nursing assistants in governmental hospitals in Jordan	- Quantitative cross-sectional study. - Multicenter survey design	- Nurses had a positive attitude toward compliance but with the lack of knowledge about infection control precautions - Beliefs are a good predictor of compliance	- Interventions need to take beliefs and attitudes change strategies into considerations
16	Dyson et al. (2011)	- To examine barriers and levers to comply with hand hygiene guidelines, and evaluation of theory-based instrument to assess HH behaviour	- Healthcare practitioners and patients at three NHS trust in the north of England	- Mixed methods study (Interviews, questionnaires, focus groups)	- Some of barriers and levers previously identifi ed in literature - Other unique findings include habit/routine, emotion and incentives	- Further research is needed to explore compliance with other parts of standard precautions using behavioural theories
17	Efstathiou et al. (2011a)	- To explore the factors that affect the compliance of nurses with SPGs to prevent occupational exposure to blood-borne infections	- 30 nurses in two biggest hospitals in Cyprus	- Qualitative study - Focus group approach - Using HBM as a theoretical framework	- Factors that influence nurses compliance could be applied to one of the main domains of the HBM; benefits, barriers, severity, susceptibility, cues to action, and self-efficacy	- Further studies with larger samples and mixed methodologies could be conducted in different geographical location.
18	Efstathiou et al. (2011b)	- To examine the extent to which Cypriot nurses in five main hospitals complied with SPGs	- 668 Nurses work in five main hospitals in the Republic of Cyprus	- Quantitative - A cross-sectional Survey, convenient sample	- Compliance with SPGs is low. Only 9.1% of participants were reported as fully compliant with all components of SPGs	- Nurses implemented only selected aspects of Standard Precautions in an acceptable manner
19	Erasmus et al. (2009)	- To determine the factors influencing hand hygiene compliance among HCWs	- Sixty-five HCWs in ICUs and surgical departments in a five hospitals	- Qualitative study - Focus groups interview	- HH was usually done after tasks that were perceived as dirty.	- Further studies are required to achieve a better understanding of HCWs beliefs toward compliance

			- Netherland	- Face to face interviews	- Personal protection was the main motivation for HCWs to comply with hand hygiene rather than patient safety	with SPGs
20	Erasmus et al. (2010)	- To examine the observed and self-reported compliance rate with HH guidelines among HCWs in hospital settings	- The review included 96 studies, most of which (65) used from intensive care units	- Systematic literature review	- They found the overall median compliance rate to be 40% (30-40% in ICUs, and a 50-60% rate in other settings). Interestingly, 48% of nurses were compliant to HH whilst only 32% of physicians' were compliant	- Nurses might find it hard to comply when working with other health care practitioners who routinely fail to comply with SPGs
21	Gammon and Gould (2005)	- To identify the current knowledge and compliance with universal precautions and evaluate the used interventions to improve compliance - To highlights the areas of limited knowledge and aspects of universal precautions that need to be further investigated	- Studies listed in CINAHL database was conducted from 1990–2003	- Systematic literature review	- Compliance with universal precautions is an effective mean to protect patients and staff and infection prevention Knowledge of universal precautions is insufficient and compliance suboptimal. Some interventions like education, are influential in enhancing knowledge and compliance	- Future research needs to understand how the attitudes and beliefs of HCWs can be changed to improve adherence to universal precautions - There is no evidence that the benefits of compliance interventions will persist for a long time, and which barriers are more influential on HCWs decision to adopt SPGs
22	Gammon et al. (2008)	- To examine the extent to which practitioners adhere to SPGs and the influential issues on compliance. - To evaluate the strategies that used to induce a positive behaviour change toward compliance among HCWs and their effect	- Using many electronic databases, from 1994 to 2006.	- Systematic literature review	- Reasons for non-compliance include insufficient time, poor risk assessment, the conflict between self-protection and patient care, forgetfulness and lack of awareness - HCWs valued the various types of SPGs practice (gown, mask etc.) differently	- Compliance with SPGs guidelines is internationally suboptimal. - HCWs are selective in their using of the recommended practice - There is no evidence in the literature that identify how long the intervention affects HCWs compliance

23	Golan et al. (2006)	- To test the impact of use gown requirement on hand hygiene compliance rate	- HCWs - Two intensive care units at New England Medical Center in the USA	- Quantitative study - A cross-over design - Observation study	- They found that compliance with hand hygiene was 10% before care was given and 36% after any care procedure, while compliance for glove and gown use was 62% and this rate is low and consistent with previous literature	- Using gown did not necessarily improve hand hygiene compliance - Nurses motive to comply is personal safety rather than patient safety
24	Hassan et al. (2009)	- To assess Jordanian nurses hand hygiene behaviour, attitudes, and beliefs using a theoretical framework (Theory of planned behaviour)	- 150 Registered nurses in one hospital in Amman - Jordan	- Quantitative cross-sectional study	- Nurses intention to perform hand hygiene was associated with the beliefs about outcomes, social norm and perceived behavioural control	- There is a need to achieve a better understanding of infection control practice in the Jordanian healthcare settings. Also, using the theoretical framework is important to understand the behaviour
25	Jelly and Tjale (2003)	- To determine HH practices of HCWs in the paediatric wards	- Paediatric HCWs at one academic hospital in Johannesburg/ South Africa	- Quantitative study - Direct observation by using a checklist - Convenience sampling	- Compliance with HH practices was poor. - HCWs comply better with HH after contact with patients in comparison with other moments that required HH	-There is evidence that the main motivation for HCWs to do HH was self-protection. - There is a need for further research in the paediatric clinical area
26	Kermode et al. (2005)	- To describe rural north Indian HCWs knowledge and understanding of UPs and identify predictors of compliance to target intervention programs appropriately	- Conducted in seven rural north India health care settings, during late 2002.	- A cross-sectional survey	- Compliance with SPGs was suboptimal, with only 32% of staff wearing eye protection, and 40% recapped needles	- In addition to knowledge, safety climate in aclinical environment is important to improve compliance with SPGs. Also, there are differences in using SPGs components
27	Kirkland (2011)	- To determine risk factors and barriers for non-compliance with SPGs by	- Nurses (n= 95) who were members of the Massachusetts Nurses	- Unpublished quantitative thesis	- Nurses claim that children are less likely to suffer from HCAI than are adult patients	- Nurses may be reluctant to wear protective clothing for fear of making the child feel anxious or

		nurses in health care settings	Association - USA			because of the belief that children are less likely to carry and transmit dangerous pathogens
28	Loveday et al. (2006)	- To assess the evidence for interventions to combat the transmission of MRSA	- Studies published between 1996-2004 (four systematic reviews studies, 24 non-clinical experimental studies, five economical evaluation studies and one international guideline	- Systematic literature review	- Implementation of a range of interventions on a frequent basis to combat the transmission of MRSA are effective (i.e. surveillance feedback, monitoring, signs for contact precautions)	- Reminding nurses to do something, even if effective, does in fact indicate the existance of a continuing resistance to change. So, the 'effect' seen in studies that repeat their intervention (nurse ducation) is not an effect at all but an indication that the problem is resistant to change
29	Lymer et al. (2003)	- To investigate the factors that affect health care providers' actions about exposure to blood and body fluids	- Nurses and nursing assistants in hospital-based healthcare. - Sweden	- Qualitative grounded theory study - Semi-structured Interviews	- Health care professionals perceive that non-compliance with guidelines may expose them to significant risks such as being infected and transmission infection to the patient	- It helped in understanding the phenomenon from different perspectives (qualitative), as previous literature indicates that there is no single or simple explanation for noncompliance
30	Lymer et al. (2004)	- To examine the different forces that influence compliance with universal precautions and what are the behavioural variations in hospital wards	- Nine Nurses and six nursing assistants - Three hospitals in Sweden	- Qualitative study - Grounded theory - Semi-structured interviews - Theoretical and purposive sampling	- Factors improve compliance include: knowledgeable charge nurses, get access to infection control employees, availability of equipment, awareness of the risk of exposure. - Nurses do not comply properly with using protective eyewear (patients may not accept it, or it is not comfortable)	- Perceived of the risk of exposure among HCWs alone is not enough to achieve compliance goal. Therefore, understanding all the factors that influence compliance is important to design effective compliance interventions
31	Naikoba and Hayward (2001)	- To describe the frequent used improvement strategies to prompt good	- Reviewed 41 studies that were published between 2000-2009	- Systematic literature review	- The effect of education on hand hygiene practices was short-lived. The study also found	- Multifaceted approach that combined education, reminders, and performance feedback has an

		HH behaviour and related determinants of behaviour change			that reminding staff or asking patients to prompt staff to do HH had a modest but sustained effect	increased chance of success in sustaining compliance
32	Naing et al. (2001)	- To assess the compliance of using gloves, and identity factors concerning non-compliance	- 150 staff nurses in Hospital University Science, Malaysia	- Quantitative study. - Questionnaire	- Young nurses, nurses in ICU and operation theatre have more knowledge and compliance with SPGs	- There is a need to understand why and how nurses are selective in using gloves in different wards
33	Nderitu et al. (2015)	- To discover the experiences of Ugandan nurses regarding infection control precautions practices	- Sixteen nurses in a teaching hospital - Kampala, Uganda	- Qualitative study - Focused ethnography - Semi-structured interviews	- Ugandan nurses experienced many challenges that influence their compliance with infection control precautions. These challenges include lack of resources, lack of information, maintenance issues and overcrowding	- It is important to understand how the challenges in the work environment can influence the nurse's decision-making process and attitude toward adopting an appropriate infection control practice
34	Neo et al. (2012)	- To review the current literature regarding the use of protective barriers in the operating room and identify the gap in qualitative research	- Forty articles were retrieved and discussed in this review	- Literature review	- Usually failure to achieve compliance with SPGs justified by pointing to working conditions, high workload and blaming other professional colleagues	- Quantitative studies are unable to achieve a better understanding of the motivations beyond decision-making among HCWs - Using a theoretical framework in qualitative studies can enforce the researcher to discard some themes because they are not fit the framework constructs
35	Nichols and Badger (2008)	- To achieve better understanding of the difference between the espoused and actual SPGs practice among HCWs	- HCWs in a renal unit within a district general hospital - UK	- Qualitative study - Semi-structured interviews, and participants observation	- There is a gap between espoused and actual compliance with IC guidelines	- It is important to consider tacit knowledge in addition to explicit knowledge (e.g. Lectures, workshops) in designing infection control programmes
36	Oliveira et al. (2009)	- To assess the knowledge and behaviour of	- HCWs in a large philanthropic general	- Cross-sectional quantitative study	- SPGs knowledge was not always reflected in appropriate	- Some professionals acted mechanically without undertaking

		professionals working in ICUs about compliance with contact precautions	hospital in Brazil		behavioural practices	their duties with due diligence or by using critical thinking mechanisms
37	Osborne (2003)	- To assess attitudes, beliefs, and the level of compliance with SPGs	- Peri-operative Australian nurses (n= 230)	- A descriptive correlation study using a self-report mail-out survey	- Factors that motivate individuals to adopt compliance are perceptions of risk of exposure, severity of acquiring infection, and perceived benefits	- Using the HBM as a theoretical framework
38	Parmeggiani et al. (2010)	- To assess knowledge, attitudes, and compliance regarding SPGs and associated determinants in the emergency department	- The study was conducting at eight randomly selected non-academic acute general public hospitals in Italy	- Cross-sectional study - Self-administered questionnaire	- HCWs in emergency departments show high levels of knowledge and positive attitudes, but low compliance rate concerning SPGs	- The potential reporting bias associated with the self-administered questionnaire, whether the responses reflect what HCWs do
39	Randle et al. (2013)	- To measure compliance with hand hygiene among healthcare professionals, children and their visitors	- Healthcare professionals, children and their visitors - Two paediatric wards at a large teaching hospital in the UK	- Quantitative study - Observational study	- Compliance was 84% for allied health professionals, 81% of doctors, 75% of nurses and 73% of ancillary and other staff - Compliance rate with HH was high in paediatric wards	- Provide an idea about compliance rate in paediatric wards, but it was only conducted in two wards
40	Scheithauer et al. (2011)	- To analyse HH behaviour in relation to profession, shift, the 5 moments of HH and the relationship with disinfectant usage	- Paediatric and neonatal ICU (19 beds) at the University hospital in Aachen (Germany)	- Prospective observational study - Quantitative study	- In both PICU and NICU compliance rates were higher before patient contact and aseptic tasks compared to after patient contact, body fluids, and patients' surroundings	- There is a positive attitude in protecting infants and children, resulting in the highest compliance rates especially before contact with patients and aseptic tasks
41	Smiddy et al. (2015)	- To achieve a better understanding of the issues that Influence HCWs compliance with HH from a qualitative perspective	- Ten qualitative studies, published between 2000-2014 were reviewed	- Systematic review of qualitative studies	- There are two main concepts that influence HH practice. These are motivational factors (behaviourism) and perceptions of the work environment (structural empowerment)	- Highlighted the need to understand the issues that influence nurses and other HCWs compliance with hand hygiene guidelines from a qualitative perspective

42	Sreedharan et al. (2011)	- Assess the awareness and knowledge of standard precautions among nurses in a university teaching hospital in Ajman, United Arab Emirates.	- Nurses involved in virtually every aspect of nursing duties in The Gulf Medical College Hospital in the United Arab Emirates	- Self-administered questionnaire - A cross-sectional study	- Over 95% of nurses in this hospital in Ajman were aware of standard precautions guidelines, and their implementation was not up to standard	- Authors suggest that nurses awareness of SPs does not mean knowledge of guidelines for each component of SPs, and there is a need for an educational program to improve nurses knowledge on different components of SPGs
43	Ward (2010)	- To understand the experiences of nursing and midwifery students regarding infection control in their practice	- 40 nursing and midwifery students in the UK	- Qualitative study. - Face to face semi-structured interviews	- Nursing and midwifery students distinguished between good and bad infection control practices based on their knowledge background - Some students adopted practices they saw around them	- Health care professionals need to be aware of the effect of their practice on students learning and future practice by adopting a negative attitude
44	Ward (2011)	- To identify the role of education in the prevention and control of infection	- Published studies between 1995 to 2009 (n=39 studies)	- Systematic review	- Education may increase SPGs knowledge, but there is limited evidence to suggest that it may improve SPGs compliance	- Further training might not be the ultimate solution of non-compliance with SPGs problem
45	Ward (2012)	- To examine the views of both nursing students and their mentors toward the role of infection control nurse and to examine the nursing students learning needs regarding SPGs	- Nursing students and nurse mentors - One NHS Trust and one university in the north-west of England	- Qualitative study - Semi-structured interview - Purposive sampling	- Three themes emerged from the study: attitude toward infection control nurse, the effects of infection control presence and preferred qualities in infection control nurse	- Collaboration and communication between nurses and infection control team are important to improve the practice of HCAI
46	Whitby and McLaws (2004)	- To assess any sustained effect on using handwashing by enhanced accessibility to sinks	- HCWs in one hospital in Australia	- Quantitative study - Observation on different occasions	- Despite the rebuilding of an old tertiary hospital with new sinks placed close to patients' beds, compliance to hand hygiene did not improve over nine months	- Many hospitals in developed countries provide a sufficient amount of equipment and appropriate work conditions but their SPGs compliance is still problematic

47	Wichaikull (2011)	- To explore and contrast the factors that contribute to the transmission of infections among children in a variety of paediatric wards in two countries	- Twenty nurses from six paediatric wards in three hospitals in both Thailand and UK	- Ethnographic qualitative thesis - Interviews and observation	- External factors contributing to non-compliance included understaffing, lack of gloves and hand washing facilities - Different cultures influenced nurses compliance with SPGs	- Even in the same hospital, different cultural backgrounds, life style, and religion are important factors that influence compliance with SPGs

Appendix 2 Ethical approval forms

Form 2.1 University of Hull Ethical approval letter

UNIVERSITY OF Hull

Mr Murad Sawalha Faculty of Health and Social Care University of Hull Hull HU6 7RX	**FACULTY OF HEALTH AND SOCIAL CARE** T: 01482 464524 E: j.kelly@hull.ac.uk **OUR REF: 101** 13 June 2013

Dear Murad

Re: Factors influencing compliance with standard precautions among Jordian paediatric nurses: a qualitative study

Thank you for your correspondence addressing the points raised by the Faculty Ethics Committee regarding the above study. Given the information you have provided, I am satisfied that those points have been satisfactorily addressed. Therefore I am able to give Chair's approval for your study as per the Committee's Terms of Reference.

I wish you every success with your study.

Yours sincerely

Dr Janet Kelly
Chair, Research Ethics Committee

cc: file/supervisors

Form 2.2 Ethical approval from Jordanian Ministry of Health

الرقـم   م ب ا / لجنة اخلاقيات/ ١٣٣٦٥

التاريخ

الموافق   ٥ \ ٨ \ ٢٠١٣

مدير تطوير الموارد البشريه

تحيه طيبه وبعد ،،،

اشـــاره لكتـــابكم رقـــم تطـــوير / خطـــط /٧١١٠ تـــاريخ ٢٠١٣/٧/٢١ بخصوص البحث المقدم من طالب الدكتوراه /مراد صوالحه .

بعنـــــوان :

factors influencing compliance with standard precautions among "jordanian paediatric nurses : A qualitative study"

يرجى التكرم بالعلم " بأنه قد تم عرض البحث على لجنة اخلاقيـــات البحـــث العلمي وقد قررت اللجنه الموافقه على اجراء البحث المشار اليه اعلاه "

للتكرم بالاطلاع واجراءاتكم لطفا .

واقبلوا الاحترام

مدير مستشفى البشـــــــير

الدكتور عصام الشريده

ص ب /رس

وزارة الصحة

الرقم: تطوير خطط/٨٦٢٦
التاريخ:
الموافق: ١٢ / ٨ / ٢٠١٣ م

مدير مستشفى البشير

تحية طيبة وبعد ،،،

أرفــق طيــاً صــورة عن كتــاب مدير مستشفى البشير / رئيس لجنــة أخلاقيــات البحــث العلمــي رقــم م ب أ / لجنة أخلاقيــات /١٢٢٦٥ تاريــخ ٢٠١٣/٨/٥ بخصــوص السـماح لطالب الدكتوراة **مراد صوالحة** إجـراء بحـث بعنوان :-

(Factors influencing compliance with standard precautions among Jordanian pediatric nurses : a qualitative study)

وذلك عن طريق إجراء مقابلات مع الممرضين العاملين في أقسام الأطفال والعناية الحثيثة / أطفال في المستشفى .

أرجو التكرم بالإيعاز لمن يلزم تسهيل مهمة الباحث أعلاه .

واقبلوا احترامي ،،،

مدير تطوير الموارد البشرية
الدكتورة فدوى الشوابكه

هـ م

المملكة الأردنية الهاشمية
هاتف:٢٣٠٠٥٢ ٦ ٩٦٢+فاكس:٥٦٨٨٢٧٣ ٦ ٩٦٢+ص.ب.٨٦ عمان ١١١١٨ الأردن. الموقع الإلكتروني:www.moh.gov.jo

337

Form 2.4 Ethical approval from Hamza hospital

وزارة الصحة
مستشفى الأمير حمزة بن الحسين

الرقم ١٩٧٥/٢٢/٢٥
التاريخ ....
الموافق ٢٦/٨/٢٠١٣م

مديــر الدائرة الطبية
مدير دائرة التمريض

تحية طيبة وبعد ،،،

إشارة لاجتماع لجنة اخلاقيات المهنة في مستشفى الامير حمزة والمنعقد بتــاريخ 2013/7/24 م
فقد اطلعت اللجنة على البحث المقدم من الدكتور / **مراد عدنان يوسف صوالحة** دراسة بعنوان

(Factors influencing compliance with standard precautions among
Jordanian paediatric nurses: a qualitative study ")
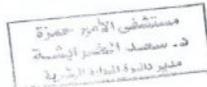
وبعد دراسة مستفيضة حول هذا البحث قررت اللجنة الموافقة على إجراء الدراسة مـــع إطـــلاع
اللجنة على النتائج قبل النشر .

للتكرم بالاطلاع وتسهيل مهمة الباحث في إجراء البحث اعلاه .

وتفضّلوا بقبول فائق الإحترام

مدير مستشفى الأمير حمزه
الدكتور مازن نغوي

نسخة :-
- الملف العام .
ع أ.م / م.أ

المملكة الأردنية الهاشمية
هاتف : ٠٠٩٦٢٦٥٠٥٣٨٢٦ فاكس : ٠٠٩٦٢٦٥٠٥٣٧٩٠ الموقع الالكتروني www.phh.gov.jo

Form 2.5 Ethical approval from Jordan University Hospital

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A-ADM 0112

Ref. _____
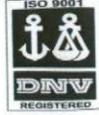
Date: _____

مستشفــى الجامعـة الأردنيــة
Jordan University Hospital

الرقــم : ١٠٠ ب ١ / ٢٠١٣/١٠

التاريخ : ب / ٢٠١٣/٨

الأستاذ الدكتور نائب المدير العام للشؤون الطبية
نــــائب المديـــر العــام للشؤون الاداريــة
مديـــر دائـــرة التمريض

تحية طيبة وبعد ،،،

ناقشت اللجنة التنفيذية في اجتماعها رقم (٢٠١٣/١٧) المنعقدة بتاريخ (٢٠١٣/٨/٦)
توصية لجنة البحث العلمي بشان بحث الطالب مراد عدنان بعنوان:

"Factors influencing compliance with standard precautions among Jordanian Pediatrics nurses: a qualitative study"

وقد تقرر ما يلي:

<u>القرار رقم (٢٠١٣/٢١٠)</u>
الموافقة على اجراء البحث المذكور أعلاه شريطة ذكر مستشفى الجامعة الأردنية.

يرجى التكرم بإجراء اللازم.

مدير عام مستشفى الجامعة الأردنية
الأستـــاذ الدكتـــور أحمد التميمـي

نسخة إلى:
- أمين سر اللجنة التنفيذية

تلفون ٥٣٥٣٤٤٤ – فاكس ٥٣٥٣٣٨٨ – صندوق بريد ١٣٠٤٦ – عمان – الأردن
Tel. 5353444 Fax 5353388 - P.O.Box 13046 - Amman - Jordan

Form 2.6 Ethical approval from Al-Esraa Hospital

مستشفــى الإســراء

حاصل على الإعتماد الدولي

AL-ESRRA HOSPITAL

دائــــــرة التعليــم

Education Training Department

	نموذج طلب إجراء بحث
عنوان البحث	العوامل المؤثرة على الاضطرابات المعارية لدى مرضى الأطفال الأردنيين
الجامعة أو المؤسسة	جامعة هل (بريطانيا)
إسم المشرف	د. جيرل جوب
إسم الباحث	مراد عشاهصواك
عنوان الباحث	الكبرية / عمان
هاتف الباحث	0777875934
أسماء وعناوين المشاركين (إن وجد)	
الدوائر أو الأقسام المستهدفة (حدد)	أقسام الأطفال والعناية الحثيثة الأطفال (بروكب)
الفئات المستهدفة (حدد)	المرضى العاشين ما أمر الأطفال
المواد أو الأجهزة المستخدمة (إن وجد)	مسجل صوت من أجل المقابلات

ملاحظات:
* يجب إرفاق صورة عن البحث
* يجب تزويد المستشفى بنتيجة البحث

توقيع الباحث	تاريخ تقديم الطلب
	٢٠١٣/٨/٢٤

للإستعمال الرسمي

التوقيع والتاريخ	ملاحظات الدائرة المعنية
	لا مانع لدينا من اجراء البحث لعينة لطابية ثانية / أطفال
التوقيع والتاريخ	ملاحظات دائرة الإدارة
٢٠١٢/٨/٢٥	
التوقيع والتاريخ	ملاحظات دائرة التعليم والتدريب
	لا مانع

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Form 2.7 Letter from the supervisor to facilitate ethical application

UNIVERSITY OF Hull
Faculty of Health and Social Care

Dearne Building
University of Hull
Cottingham Road
Hull HU6 7RX

18/06/2013

To whom it may concern:

This is to note that Murad Adnan Yousef Sawalha is a PhD student at the University of Hull. Murad has obtained ethical approval from the Faculty of Health and Social Care at the University of Hull to begin collecting data for his study 'factors influencing compliance with standard precautions among Jordanian paediatric nurses: a qualitative study'.

It is recognised that Murad will also need permission from Hashemite Univertsity and the Jordanian Ministry of Health.

If further information is required, please do not hesitate to contact me.

Yours faithfully

Dr Jeremy Jolley
Senior Lecturer and International Coordinator
Faculty of Health and Social Care
University of Hull
Cottingham Road
Hull HU6 7RX
Email Jeremy.jolley@hull.ac.uk
Tel. +44 1482 464636
Mob. +44 7764 198490

The University of Hull
Demographic questionnaire

Factors Influencing Compliance With Standard Precautions Among Jordanian Paediatric Nurses: A Qualitative study

Dear participant:

Thank you for your willingness to participate in this study. I would be grateful if would complete the following short questionnaire and return it me in the enclosed envelope at the end of your duty or at any other convenient time. I will then contact you to arrange an interview at a time and place of your convenience. This questionnaire will be used to select a sample of nurses with the relevant background for the study.

Let me remind you that this research aims to investigate paediatric nurses perceptions and experiences in relation to infection control measures. It is entirely up to you to decide whether or not to take part. You can withdraw at any stage of the study without giving a reason. All the information you provide will be made anonymous and your name will not be identified in the research report.

Please answer the following questions:

1. What is your age group? Please tick √

A. Less than 25 year's	B. 25–29	C. 30–34
D. 34-39	E. 40-44	F. 45+

2. Which of the following describes you? Please tick √

A. Male   B. Female

3. How many years of experience do you have as a registered nurse? Please tick √

A. Less than one year	B. 1 – 5 Years
D. 6 – 10 years	C. More than 10 years

4. How many years of experience do have as a registered nurse in a paediatric clinical area? Please tick √

A. Less than one year	B. 1 – 5 Years
D. 6 – 10 years	C. More than 10 years

5. Please state the name of hospital you work in: ………………………………

6. Please state the ward/unit that you work in: ………………………………

Please provide your contact details (these will be kept confidential):

Name: …………………………………

Tel: ………………………………   E-mail ………………………………………

Thank you very much for agreeing to participate. If you have any queries, please contact me and I will clarify these for you. My contact details are:

Name: Murad Adnan Sawalha
P.O Box 540718, zip code 11937
City/ Country: Aljubaiha/ Amman- Jordan
Landline Tel: 0096265235648, Mobile: 00962777875934
Email: M.A.Sawalha@2011.hull.ac.uk

Form 3.2 Participants consent form

The University of Hull
Participants consent form

Project title: Factors influencing compliance with Standard Precautions among Jordanian paediatric nurses: a qualitative study.

Name of Researcher: Murad Sawalha
Supervisors: Dr. Jeremy Jolley, Dr. Mary Laurenson

Before the interview commences I would like you to sign this form to indicate that you have read and understand the terms of the interview, and that you do consent to being interviewed. You will be given a copy of this form.

Please tick the box

1. I confirm that I have read and understand the information sheet dated (....................) for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason ☐

3. I understand that the above researcher from the University of Hull who is working on the research project will have access to my personal details. ☐

4. I understand that any data or information used in any publications which arise from this study will be anonymous ☐

5. I understand that all data will be stored securely and is covered by the data protection act. ☐

6. I understand that I am free to ask any questions at any time before and during the study. ☐

7. I voluntary agree to take part in this study. ☐

_____   _____   _____
Name of Participant   Date   Signature

I have explained the study to the participant and he/ she has agreed to take part.

_____   _____   _____
Name of the Researcher   Date   Signature

Name: Murad Adnan Sawalha
P.O Box 540718, zip code 11937
City/ Country: Aljubaiha/ Amman- Jordan
Landline Tel: 0096265235648, Mobile: 00962777875934
Email: M.A.Sawalha@2011.hull.ac.uk

Form 3.3 Invitation letter

The University of Hull

Invitation letter

Dear Nurse,

My name is Murad Sawalha. I am a PhD student in the Faculty of Health and Social Care (nursing department) at the University of Hull. I am conducting a doctoral study, on the factors influencing compliance with standard precautions among Jordanian paediatric nurses.

You are being invited to participate in this study. If you are registered nurse with at least one year experience in paediatric departments, being currently on the working schedule and currently working in one of paediatric departments, you can participate. Participation will entail a single 45- 60 minute face to face interview.

Please take your time to read the information enclosed. If you are happy to participate, please complete the enclosed questionnaire and post it to me using the envelope enclosed. Your participation in this study is highly valued.

This research study has been granted ethical approval through the University of Hull as part of my Doctorate Degree in Nursing Studies, and will be supervised by Dr. Jeremy Jolley (Jeremy.Jolley@hull.ac.uk) and Dr. Mary Laurenson (M.C.Laurenson@hull.ac.uk) at the University.

Kind regards,

If you have any queries, please contact me I with clarify these for you. My contact details are:

Name: Murad Adnan Sawalha
P.O Box 540718, zip code 11937
City/ Country: Aljubaiha/ Amman- Jordan
Landline Tel: 0096265235648, Mobile: 00962777875934
Email: M.A.Sawalha@2011.hull.ac.uk

Form 3.4 Participants information sheet

The University of Hull
Participants Information Sheet for Interview Volunteers

Project title: factors influencing compliance with Standard Precautions among Jordanian paediatric nurses: a qualitative study.

Dear Nurse,
You are being invited to take part in a research study to investigate paediatric nurses perceptions and experiences in relation to infection control measures. This research is part of a PhD in nursing studies which I'm undertaking at the Faculty of Health and Social Care (nursing department), University of Hull.

Before you decide whether to take part in the study it is important that you understand what the research is for and what you will be asked to do. Please take time to read the following information and discuss it with others if you wish. It is up to you to decide whether or not to take part. If you decide to take part you will be asked to sign a consent form.

What the study about?
This study aims to investigate paediatric nurses perceptions and experiences in relation to infection control measures. This will help to understand the factors that influence compliance with standard precautions, and the decision making processes of paediatric nurses in standard precautions compliance and non compliance.

By conducting this study in paediatric clinical areas, it can provide suggestions for best practice in clinical environment and recommendations for future research in infection control area.

Why I have been chosen?
You have been chosen because you are a registered nurse with at least one year experience in paediatric clinical area, being currently on the working schedule; and currently working in one of paediatric departments.

Do I have to take part?
It is entirely up to you to decide whether to take part or not. If you do decide to take part you are still free to withdraw at any time and without giving a reason.

What will happen to me if I take part?
If you choose to take part I will organize a place and time for the interview convenient to you. You will be given an opportunity to ask questions at this time. If you decide to participate you will be asked to sign two copies of consent form (one copy for participant).

The study will involve around 25 registered nurses in a number of paediatric departments at three hospitals in Jordan, who will all be interviewed separately face to face. The interview will take approximately 45-60 minutes.

What are the possible disadvantages and risks of taking part?
- There are no physical risks in participating in the interviews.
- Talking about your experience in relation to infection control measures may be upsetting or embarrassing for you. You are free to stop the interview at any time or take break.

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What are the possible benefits of taking part?
- There is no direct benefit from participation in this study (e.g. payment for participation). However, the findings of the research may improve the standards of care, patient safety, and nursing practice.
- By participating in this study, your voice will be herd by hospital managers and stakeholders to improve standards of care.

Will the information I give kept confidential?
Your interview will be recorded on audio tape and then transcribed onto a computer. The audio tapes will be stored in a locked secure place at all times and the computer data will be protected from intrusion also. The audio tapes will be destroyed at the end of the study. Your response will be treated with full confidentiality and anyone who takes part in the research will be identified only by code numbers or false names.

I will not share the tapes with anyone other than my doctoral supervisors, Dr. Jeremy Jolly and Dr. Mary Laurenson from the University of Hull, and if necessary, my PhD examiners.

What will happen to the result of the study?
The interviews will be analyzed by using a computer package by myself. At the end of the research I will write a report and the results may be published in peer reviewed journals and conference presentations. No research participant will be identifiable from any publications.

Who is organizing and funding the research?
The research is part of a PhD study. The cost of the study is met by a scholarship from Hashemite University of Jordan.

Who has reviewed this study?
This research is reviewed and approved by the Faculty of Health and Social Care Ethics Committee at the University of Hull, and Ethics Committee of each hospital taking part in the study.

What I have to do if I want to take part
Please, complete the enclosed demographic questionnaire and return it to the researcher in the enclosed envelope leave it on the specified box for this purpose in your department. The researcher will contact you thereafter to arrange a convenient date, time and venue for the interview.

If you have any queries, please contact me on so I can clarify these for you. My contact details are:

Name: Murad Adnan Sawalha
P.O Box 540718, zip code 11937
City/ Country: Aljubaiha/ Amman- Jordan
Landline Tel: 0096265235648, Mobile: 00962777875934
Email: M.A.Sawalha@2011.hull.ac.uk

This interview was conducted in a private hospital with a nurse who has experience in other hospitals in Jordan and another foreign country.

I came early to the department before 15 minutes to check the interview room. As Ice breaking technique, I opened a free discussion with the interviewee about nursing, in general, before conducting the interview. This technique facilitated our discussion in the interview.

Murad (the interviewer): In the name of Allah (God), most gracious and merciful, my name is Murad Sawalha; I'm a 2nd year Ph.D. student at the University of Hull in the UK.

As I mentioned, this interview is a part of my Ph.D. study, which talk about the factors that are influencing compliance with 'Standard Precautions' (SPs) in paediatric departments. Firstly, thank you for your acceptance to participate in this study, and give me from your time for the interview. To begin, could you tell me a little bit about yourself?

EA1 (code number of the interviewee): personal details? … Okay, my name is (XXXX), approximately my experience in the hospital (XXXX). I graduated from the University of (XXXX), Bachelor in Nursing, and most of my experience in paediatric.

Murad: Could you tell me about the nature of your job?

EA1: Staff nurse, now (she mean today) wards care. In general, I receive approximately 15 patients, I also receive medication, IV care, and sometimes total care based on the ward situation.

Murad: mmm… could you tell me in general about your experience as a paediatric nurse?

EA1: My experience in paediatric… Firstly, I worked in (XXXX) hospital in surgical oncology ward two sides. The load (work) was high. Also, I provided total care in general because there was a shortage in practical nurses. Then I moved to (XXXX, foreign country) to work in

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(XXXX) hospital, it was a private hospital, also I provided total care but the load was lower than here, and the work was semi-ideal or perfect. After that I returned to this hospital, the total is higher, the load is higher, and not always I provide a total care, there are staff and practical nurses. Work here is better than in (XXXX) hospital, but sometimes the load affect the nursing work.

Murad: Can you tell me what infection control word mean for you?

EA1: It means eee …, safe to patient. If we use infection control, the patient will be safe.

Murad: What your overall perception of infection control in the hospital.

EA1: Asked me to stop recording for one minute *(she was slightly confused from recording, I talked with her, and she continued the interview confidently)*

Return to recording: My experience in this hospital is short, just two years. Infection control needs more practice, follow up, and this hospital needs more. There are regulations but not applicable in this place where I work. The problem is not in the regulations, but the problem in the persons who apply them. I mean some persons are not compliant with these regulations. This needs follow-up, and there is a load on infection control staff.

Murad: Who is responsible for infection control?

EA1: I know the members, (XXXX) and (pause for thinking) I think (XXXX), they follow up, but I think two members are not enough for a large hospital that need more observation. This hospital needs a full team not just two members, based on my experience in Saudi Arabia, the follow-up process was better than here.

Murad: Can you tell me, what is the role of infection control team in the hospital?

EA1: They come to check needles, sharp containers, and any breaches of regulation. For example, these papers and poster that hang wherever. (Pause, eee…) oxygen, suction, and isolation. They come to check isolation patients and follow them when the isolation started, and what is the type of this isolation. They follow patients in a good way, only this I remember now.

Murad: Do you think these procedures are enough?

EA1: I said to you, they are two members as I know; this is not enough because they are two nurses. The team should be larger than this, and there is a need for follow-up more than this because there are existing violations and need a solution.

Murad: Do you have any examples?

EA1: I saw the JCI report that supposed to be in 2008. Then, after one year they mentioned some of the violations still existing in the ward, such as the sharp containers on the floor. This means that there are existing violations need follow up even if they are small. And again two members cover two buildings is not enough, the number is important. I know they are professional, but the number should be more than this.

Murad: Is there a communication between the staff and infection control team?

EA1: yes, it exists and excellent also. If we have any comments, we ask them, and their teaching is good. Also, if they have any new information, they will inform us especially about the isolation. Also, they give us lectures.

Murad: How do you feel about the information that is provided to you by infection control team?

EA1: eee, we can say that it is low because we are staff work three shifts. So if this lecture is given once per month, it will be given to the specific group, and the second group will not take it. For example, we don't have a hard copy that can be placed in the ward, and all staff can read it, or even put it on the system, and staff can read it. But as a staff you should follow it, and this depends personally on the staff (himself/ herself). This mean, for example, staff like me tries hard to finish his/her duties and leave the hospital. It's considered personal thing depends on personal work, what you will do to follow your patient. For example, I request a lecture about isolation and meningitis, and I was interested in attending, but my work was not appropriate for lecture time, and I requested it again, and I'm still waiting for coordination. So, the information is low, we need additional learning, the hospital needs more.

Murad: Are you conducting education inside the department?

EA1: Yes, there was weekly (education). Also, this depends on the available staff and time. And the hospital does that, this means the education here; the continuing education (department) does it approximately each week. But again, this depends on your shift, you may don't have time to attend any lecture during the month, or you may have a chance to attend one or two lecture. There is no reference to return to it; this means that nothing is entered into the system that we can return to it, and read and follow what happens. This means the staffs who attend the lecture benefit from it, and other who not attends the lecture will not benefit from it.

Murad: Do you have existing guidelines in your department?

EA1: mmm, guidelines .., I'm sure we have the quality manual (pause to think, but I can't remember if I see it, I depend on my experience. As a person here, I deal with my experience. In the work, there is a guideline, (pause). We have a policy, but sometimes it will be written but not

مراد :بسم الله الرحمن الرحيم، اسمي مراد صوالحة طالب دكتوراة سنة تانية، جامعة هال، طبعا هاي المقابلة جزء من دراسة الدكتوراه،وطبعا زي ما حكيت في ورقة المعلومات هاي الدراسة بتحكي عن علاقة العوامل المؤثرة على الاحتياطات المعيارية في أقسام الأطفال، في البداية بحب أشكرك على انك شاركتي معي بالدراسة وأعطيتيني جزء من وقتك لاجراء المقابلة.ممكن تحكيلي شوي عن نفسك.

المشارك :انا ممرضة قانونية بشتغل في قسم الاطفال في مستشفى (------) خبرتي يعني انا حاليا بالسنة العاشرة بداوم ع كل الشفتات.

مراد :ممكن تحكيلي عن طبيعة عملك بشكل عام؟

المشارك :بكون اما مسؤولة وردية على الشفت، او اذا في حد اقدم مني بكون رقم2 ، بشتغل شغل الممرض القانوني العادي، توزيع علاج، أخذ العلامات الحيوية، اي اشي بخص المريض لانو احنا بنستلم مريض بشكل كامل بنشتغل فيه من الألف الى الياء .

مراد :في خصوصية لموضوع ال الممرض مسؤول الوردية؟

المشارك :هي الخصوصية انها بتكون بتتحمل مسؤولية المرضى وباقي الكادر الموجود ع الشفت، في شغلات متلا هي احنا عنا هون بطبيعة شغلنا بقسم الاطفال القدام) أصحاب الخبرة (أو مسؤولة الوردية بتكون موجودة لحالات الدخول، بتوزع حالات الدخول، وبتشتغل معاه بتكون موجودة مع الدكتور في حال بدو اي اشي وباقي الكادر بكون يشتغل مع باقي المرضى الموجودين في القسم.

مراد :ممكن تحكيلي عن خبرتك كممرضة أطفال؟

المشارك :انا داخلة بالسنة العاشرة كلها في قسم الاطفال، اشتغلت أول سبع سنين في مستشفى (------) في" (------) مدينة أخرى "في قسم الاطفال برضو طبعا مستشفى-----) (-كانت كلها عبارة عن مستشفى كامل للاطفال فاشتغلت بمختلف الاقسام جراحة أطفال وطوارىء اطفال وقسم تنفسية كمان كان عندهم، وحالات الأطفال العامة والباطني كمان، وهون الي 3 سنين برضو كلها بالاطفال يعني ما اشتغلت باشي ثاني .

مراد :ممكن تحكيلي ايش بتعنيلك كلمة منع العدوى؟

المشارك :يعني اذا كان في مرض معين، كيف الواحد يعني يحد من انتشار مرض معين، أو يقلل من نسبة حدوثة اذا كان موجود، واذا كان مش موجود وقاية منه .

مراد   :ماهو تصورك العام أو نظرتك لموضوع منع العدوى في المستشفى؟

المشارك :انا اللي بعرفه عن منع العدوى، في عنا احتياطات معيارية، وفي عنا يعني احتياطات بتكون لشغلة معينة متلا احتياطات التلامس، احتياطات للأمراض المنقولة بالهواء، حسب المرض الموجود كيف نتعامل معاه، الاحتياطات المعيارية يعني مبدئيا اللي لازم نعملو واحنا موجودين ع الشفت لازم غسيل الأيدي، نلبس القفازات المطاطية، يعني نتعامل مع المريض واحنا يعني لأنو ما بنكون عارفين ايش في عندو يعني بناخد الاحتياطات المعيارية لكل المرضى .

مراد :كيف شايفة منع العدوى في المستشفى؟

المشارك :يعني نص نص مش كتير.

مراد :ممكن توضحيلي؟

المشارك :يعني اكتر شي بحس التمريض ما بغسلو بين المريض والتاني، يعني لما نعطي أدوية مرات بناخد معنا ستيريليوم ومرات لا، اذا كانو مرضى عاديين ما عندهم امراض

معدية يعني داخلين لشغلة خفيفة وهيك يعني هادا الاشي مش كتير احنا ملتزمين فيه، تاني شغلة الاطباء مش ملتزمين كتير لما يمرو الجولة الصباحية ع المرضى ما بغسلو بين كل مريض والتاني، علما بانهم بفحصوهم وانهم يعني بصير تلامس مع المريض، يعني مش هالالتزام الكامل يعني لا من جهة التمريض ولا الاطباء.

مراد :من جهة التمريض في اسباب معينة؟

المشارك :اختصار الوقت احيانا، المواد ما بتكون موجودة يعني احنا بقسمنا نوعية الصابون اللي بجيبوها بتخلينا انو احنا ما نروح نغسل، يعني نستسهل نحط ستيريلويم واحيانا من اللي بصير ع الجلد بتخلينا ما نحط ستيريليوم، كمان يعني بنحاول انو نقلل من استعمالهم الا ازا صار اشي بزيادة بنروح نغسل ونحط ستيريليوم .

مراد :في اسباب تانية؟

المشارك :لا هي هاي بس يعني انها اسرع واختصار للوقت.

مراد :طيب عملتو اشياء معينة حتى تحسنو هذا الاشي؟

المشارك :هو صار في عنا يعني رئيسة القسم هون حطت ممرضة مسؤولة تكون قديمة، تعمل رصد لغسل الايدي من قبل التمريض بدون ما تحكيلهم، ف كانت تراقب مين بتغسل ايديها بين المرضى وهيك يعني، في شغلات احنا من حالنا بنروح نغسل ايدينا بعدها، متلا ركبنا كانيولا للمريض دم وهيك فبنغسل ايدينا اجباري، بس انو بين كل مريض ومريض نروح نغسل وهيك لا ما بنعمل، بس نخلص كل اشي بنروح نغسل مرة واحدة.

مراد :هل بتعتبري هادا الشي صحيح؟

المشارك :لا طبعا بس هي صارت ما بعرف بس بتحس انو ما صار اشي اكتر من مرة ف مشيت انو عادي، يعني ما صار انو مرضنا من مريض، اما ازا الواحد حس حالو انو لمس مريض مش كتير نظيف او اشي بنروح نغسل .

مراد :طيب بالنسبة للاطباء لما تشوفهم ما بلتزمو ما بتحكو معهم بتتناقشو معهم؟

المشارك :لا في شغلات ع مستوى انهم بعملو اجرائين اكتر شي بعملوهم انهم بسحبو من القسطرة البولية وبعملو الخزعة القطنية، مرات نفس القفازات المطاطية اللي عمل فيه بزل قطني بروح يعمل بسبيرتو ايدو وما بغير القفازات وبروح يعمل الاجراء التاني فاحنا بنحكي بقلنا خلص انا حطيت ستيريليوم ما بردو علينا.

مراد :تناقشتو بهادا الشي ع مستوى اعلى؟

المشارك :لا.

مراد :بالنسبة لاجراءات القسم حكيتي في ممرضة مسؤولة بتكون تشرف وتراقب هل بتتعاونو انتو بالشي هاد او بيجوكو نصائح من اللي صار اذا كان في اخطاء؟

المشارك :ما بحس انو كتير مركزين ع هاي الشغلة يعني بنشوف في اخطاء تانية يعني بتأثر ع المريض كتير وبتكون نتائجها بشكل مباشر بنحكي فيها انو متلا ليش يعني بنبه وبنحكي اما انو ع شغلة غسيل الأيدي والاحتياطات المعيارية مش كتير بركزو عليها .

مراد :في شغلات اهم؟

المشارك :لا مش هي اهم بس متلا شغلات متلا مريض عليه حرارة وما راحت شافته واشي بنحكيلها انو ليش ما شفتي المريض وليش ما عملتي هيك بنبه يعني بس، انو شغلة غسيل

الأيدي لا ما عمري شفت حدا نبّه ع حدا عشان غسيل الأيدي الا زي ما حكيتلك لما عملو سياسة رصد غسيل الايدي وهادا الاشي كانت تيجي تحكي انتو ما غسلتو ايديكو وانا شفتكو وهيك بس بعدين لا مش كتير مركزين.

مراد :بتحسي في تعليم لهذا الموضوع؟

المشارك :اه كان في تعليم كانو يعني علمونا تغسيل الايدي بالطريقة الصحيحة وفي خطوات نلتزم فيها عشان نكون غسلنا بالطريقة الصح، بس مش كثير ملتزمين فيها.

مراد :حاسة انو كاف هذا الشيء؟

المشارك :ما بعرف يمكن لو كان كافي كان غير اشي بس ما بعرف اذا ما في اشياء تانية ممكن تنعمل ما بعرف .

مراد :مين المسؤول عن منع العدوى في المستشفى؟

المشارك :في وحدة ال منع العدوى بس ما بعرف همي ايش بعملو بالزبط.

مراد :من ايش بتتكون ايش بشتغلو بالمستشفى؟

المشارك :ما عندي علم بصراحة ، انا بعرف انو في لجنة بس شو بعملو ما بعرف.

مراد :بتشوفوهم هون بحكولكم اشي بتتناقشو انتو واياهم؟

المشارك :انا بالنسبة الي ما عمري شفتهم، يعني مرة صار معي موقف حاولنا انو نوصل للجنة ما حسيت انها موجودة اصلا، يعني صار عندي مريضة خربطتت، يعني خطأ منها من المريضة، خربطتت وجايبة معها ال القلم اللي بياخدو فيه الانسولين تبع خالتها وخالتها عندها التهاب الكبد الوبائي، فاخذت فيه) المريضة (بعدين تذكرت انو هادا مش الها، كان بدو احكي يعني لوحدة منع العدوى على أساس اذا في مطعوم اذا في اشي معين تاخده هاي المريضة بس ما عرفت اوصللهم يعني بالاخر خبرنا الدكتور واخذ اجراءه بالحالة .

مراد :يعني ما وصل لوحدة منع العدوى.

المشارك :لا ما وصلهم يعني انا خبرت ال المشرف، يعني كنا مناوبين يعني مش شفت صباحي وخبرت الدكتور، والدكتور بدوره سأل المناوب الاداري، المهم بكل الموضوع ما كان في اشي اسمه لجنة منع العدوى، مع انو هذا المفروض يكون من ادوارهم.

مراد :هل بتحسي انو القسم هون بشارك بنفس الشي بالاشياء اللي الها علاقة بمنع العدوى بشكل عام؟

المشارك :اه يعني هذا القسم ممكن تعتبره احسن قسم بالمستشفى من ناحية نظافة ، من ناحية شغلات كثير، بس انا بحكيلك بالنسبة الي انا ما بعرف يعني اكتر شي ما بخليني التزم بغسيل الأيدي نوعية الصابون اللي بحطوها، بحسها صابونة ارضيات، بالتالي الواحد بحاول يخفف من التغسيل قد ما يقدر مشان ما يدخل بشغلات تانية، يعني لو بالعكس فيش حدا ما بحب ينظف ايديه بين مريض والتاني.

مراد :وصلتولهم الشي هذا؟

المشارك :وصلنا احنا بنحكي يعني هي شغلة بالاخر شركات يعني شركة التنظيف ايش بتحط وهاي الاشياء .

مراد :هل ممكن يكون هادا السبب الرئيسي؟

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Appendix 6 Tree nodes on NVivo software

Nodes

Name	Sources	References
Benifits of compliance and percieved consequences	18	97
Families and patients satisfaction	2	2
Protection and safety	13	42
Hospital reputation	2	2
Reduce hospital stay	2	2
Reduce hospital treatment cost	3	7
Percieved Consequences of noncompliance and infection transmissions	13	42
Work environment and structure	20	678
IC team and responsibilities	19	91
Using precautions during CPR and emergency situations	10	38
Environmental cleaning and hygiene	14	37
Organizational structure and quality programs	19	160
Follow up and reminder system	19	77
Policies, practice and evidence base	20	275
Culture, attitudes and beliefs	20	337
Religous beliefs and influences	10	31
Habitual practice	7	10
Conscience	9	17
Psychological factors	20	75
Attitude	16	45
IC perception, compliance and meaning	20	156
Self efficacy and ability to use precautions	3	3
Families role and providing nursing care to children	20	281
Families and visitors role in IC	20	131
Providing Nursing care to children	20	150
Resources and professional development	20	510
Equipment issues	19	163
Staffing issues	19	159
Knowledge and education	19	188
Nursing relationships and communications	15	96
Good communication and cooperation will improve IC practice	7	17
Communication between staffs and IC team (inform about noncompliance)	2	2
Bad communication affect IC practice in a negative way	8	20
Physicians power (noncompliance)	7	16
Occupational categories differences in relation to IC	9	38
IC is a collaborative duty between staff (system or cycle)	2	3

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Presentations and publications

During My study I have presented my research project in many distinct conferences like:

- Infection prevention conference in London, 2013 (poster presentation). <u>Understanding the factors influencing compliance with Standard precautions among paediatric nurses: a review of the literature</u>.

The Abstract was published at infection prevention Journal.

- Infection prevention conference in Glasgow, 2014 (poster presentation). <u>Understanding factors influencing paediatric nurses compliance with standard precautions: a qualitative study.</u>
The Abstract was published at infection prevention Journal.

- 14th European doctoral conference in nursing science (EDCNS) in Maastricht/ Netherlands, 12-13/09/2014 (oral presentation). <u>Understanding factors influencing paediatric nurses compliance with standard precautions: a qualitative study.</u>

The Abstract was published at VERPLEEGKUNDE INHOUD Journal (Dutch Journal).

- 15th EDCNS conference in Graz/ Austria, 18-19/09/15 (oral presentation), <u>Jordanian paediatric nurses' perspectives and experiences about compliance with standard infection precautions guidelines: a qualitative study.</u>

- I was a guest speaker in the infection prevention conference which was held in Liverpool in 27th of September 2015. Also, I did poster walk presentation on plasma TV view.

The Abstract was published at infection prevention Journal.

The following link is my profile on infection prevention conference 2015:

http://www.ips.uk.net/education-events/annual-conference/programme/programme-temp/session-14b/

- I was a keynote speaker in the 8th national Aseptic Non-Touch Technique (ANTT) conference which had been held in London in October 2015. I talked about improving compliance to ANTT by understanding healthcare and healthcare workers.

- **Also, I presented in four PhD conferences in the University of Hull, and <u>I got the best poster presentation in 2014 conference, and third place of best poster competition in 2015 conference.</u>**