

**The Relationship between Perceived Safety Culture,  
Nursing Leadership and Medication Errors Reporting (by  
nurses) in a Saudi Arabian Context: A Sequential  
Explanatory Mixed Method Design.**

**by**

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**A thesis submitted in partial fulfilment for the requirements for  
the degree of Doctor of Philosophy at the University of Central  
Lancashire**

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## Student declaration

I declare that while registered as a candidate for the research degree, I have not been a registered candidate or enrolled student for another award of the University or other academic or professional institution

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## **Abstract**

**Background:** Medication errors have significant implications for patient safety and can cause serious harm and even death. Error discovery through an effective leadership and active reporting system uncovers medication errors and encourages safe practices. A positive safety culture and effective leadership likely plays an essential role in improving medication error reporting systems. A review of literature highlighted that no study had previously investigated the effect of safety culture and nursing leadership styles on medication error reporting.

**Aim:** The aim of this study was to explore the relationship between perceived safety culture, nursing leadership and medication errors reporting (by nurses) in adult medical-surgical wards in the Qassim region of Saudi Arabia.

**Methods:** The methodological design adopted for this study was an explanatory sequential mixed methods design; quantitative followed by qualitative in two phases. The first phase began with the collection and examination of quantitative data from four hospitals in the Qassim region using the Hospital Survey on Patient Safety Culture (HSOPSC) (n=218) and the Multifactor Leadership Questionnaire (MLQ 5X) (n=186), along with a prospective audit of type and rates of reported medication errors on these wards. The second, qualitative phase involved face-to-face semi-structured interviews with nurses (n=8) and nurse managers (n=8).

**Results:** The literature review highlighted a lack of studies exploring the relationship between perceived safety culture and nursing leadership styles and medication errors reporting. The findings from surveys showed that 50% of nurses in this study have not made an incident report in the last 12 months. Moreover, less than 10% of nurses report errors in two participant hospitals in the last two years. The qualitative findings revealed that fear was a key causal factor for underreporting of medication errors. Nurses feared punishment and legal action or losing their jobs. In addition, lack of feedback from quality or patient safety offices when nurses did make reports discouraged them from reporting future errors. Further barriers to reporting were personal characteristics, workload or shortage of staff, nursing leadership problems, blame, lack of knowledge or skills, unclear, or noncompliance with policy and safety culture.

**Conclusion:** This is the first study to explore the relationship between perceived safety cultures and nursing leadership styles on medication errors reporting in Saudi Arabia. The findings of the research presented in this thesis contribute new knowledge to the Yorkshire Contributory Factors Framework by evidencing the relationship between nursing leadership and safety culture through statistical methods. Also, the main methodological contribution of the research field has been the first mixed methods study to investigate these relationships. The results of this study offer guidance and present understanding of both the multicultural nurses' and their managers' opinions of improving the medication errors reporting system in Saudi Arabia. In addition, provide valuable local evidence that can be built into appropriate professional education and procedures for encouraging both Saudi and international nurses employed in Saudi Arabian hospitals to report errors. Finally the findings will assist policy makers and hospital managements to develop suitable medication safety education and procedures for encouraging nurses to report errors.

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## **List of abbreviations**

<b>ADE</b>	adverse drug event
<b>ADR</b>	adverse drug reaction
<b>AHRQ</b>	Agency for Healthcare Research and Quality
<b>CBAHI</b>	Saudi Central Board for Accreditation of Health Care Institution
<b>CDSI</b>	Central Department of Statistics and Information
<b>HSC</b>	Health and Safety Commission UK
<b>HFACS</b>	Human Factors Analysis and Classification System
<b>IAEA</b>	International Atomic Energy Authority
<b>IOM</b>	Institute of Medicine
<b>LASA</b>	Look-Alike Sound-Alike
<b>MEs</b>	Medication Errors
<b>MOH</b>	Saudi Ministry of Health
<b>MOHE</b>	Saudi Ministry of Higher Education
<b>OAM</b>	Organisational Accident Model
<b>NCC MERP</b>	National Coordinating Council for Medication Errors Reporting and Prevention
<b>OVR</b>	Occurrence Variance Reports
<b>PSC</b>	Persistent Security Cultures
<b>PSCI</b>	Patient Safety Centre of Inquiry
<b>PSC</b>	patient safety culture
<b>SCHS</b>	Saudi Commission for Health Specialties
<b>SCM</b>	Swiss Cheese Model
<b>TA</b>	Thematic Analysis
<b>TSC</b>	Total Safety Culture
<b>WHO</b>	World Health Organization
<b>YCFF</b>	Yorkshire Contributory Factors Framework

## **Chapter I: Introduction and Background**

### **1.1. Introduction**

Medication errors cause a considerable amount of patient mortality, morbidity and increased healthcare costs. Research estimates that approximately 5-10% of patient admissions to hospitals result from medication errors across the globe, although figures vary from country to country (Nivya et al., 2015). For example, it is suggested that around 3% of mortalities in Sweden result from medication errors, while in Canada half of patient safety faults in primary care are related to medication errors. In the UK, more than 80,000 medication errors occur annually in the National Health Service (NHS), costing up to £2.5 billion (Torjesen, 2014). Medication errors that can be avoided or prevented cost USA hospitals about twenty billion dollars each year (National Priorities Partnership and National Quality Forum, 2010). In Saudi Arabian hospitals, medication errors are one of the most common sentinel events reported (Al-Qahtan, Messahel & Ouda, 2010).

One of the main goals of the Saudi Arabia Ministry of Health is to improve patient safety and reduce medication errors in all medical institution by enhancing the medication-use process. Five major categories of this process have been identified by the United States Pharmacopeia to include: 1. Prescribing; 2. Transcribing/documenting; 3. Dispensing; 4. Administration; and 5. Monitoring (Vogenberg & Benjamin, 2011).

The World Health Organization (WHO) acknowledges three distinct phases of medication use: prescribing, administration, and monitoring (WHO, 2009). Medication use in hospitals is a very high risk and complex process carried out by a number of practitioners in different areas: physicians, nurses, pharmacists and respiratory therapists. A high incidence of patient harm has been proven to be caused by medication errors and adverse drug use and according to Elden & Ismail (2016), medication errors reporting is one of the most effective ways to improve patient safety. Medical errors (including medication errors) have to be reported in

some healthcare organisations, while in others there is no system for recording errors of this sort (WHO, 2013). Unreported adverse drug use is estimated to reach 50% to 60% annually. Despite this high occurrence, the process of reporting medication errors in medical care is often handled informally (Barach & Small, 2000). Without any formal written reports, errors are discussed verbally at mortality or morbidity meetings. Patient safety improvement opportunities are therefore minimised (Claudia et al., 2002). Errors should be reported using effective leadership and active reporting systems, in order to reduce potential harm to patients.

The General Administration of Pharmaceutical Care of the Saudi Ministry of Health (2012) formulated a guideline on medication errors reporting to report medication errors more easily and to encourage the confidential reporting of errors (Saudi Ministry of Health (MOH), 2012). Furthermore, this facilitates the gathering of information about medication errors nationally to allow for the analysis of contributing factors that are associated with these errors. Data can then be utilised to formulate strategies to develop patient safety measures and reduce medication errors.

This study focuses on reported medication errors by nurses in Saudi Arabia and the relationship with safety culture and nursing leadership, particularly as studies in the literature suggest that organisational cultures can promote the reporting of medication errors and enhance patient safety (Paiva et al., 2014).

## **1.2. Overview of the Thesis**

A general overview of the thesis is presented in this chapter, including the research aims and objectives, the context of the study, key terms, and the significance of the study. This thesis comprises of six chapters:

**Chapter I (Introduction and Background):** This chapter provides an introduction to the topic of the study, the context of the study, key terms and definitions, and the significance of the study.

**Chapter II (Literature Review)** provides a review of the literature on the main three items under study; safety culture, nursing leadership, and medication errors in adult general nursing settings. This guides the focus of the study and helps in identifying methodologies which are appropriate to the research question.

**Chapter III (Methodology)** describes the research design and a comprehensive overview of the methodological issues and techniques which were used in this study, as well as the justification for their use.

**Chapter IV (Data Analysis and Findings)** presents the data analysis and findings of the quantitative and qualitative phases of the research. The quantitative phase of data analysis includes descriptive analysis of respondents' profiles and scores for the two questionnaires: HSOPSC and MLQ 5X. In addition, statistics of incident reporting are presented. The qualitative phase of the data analysis presents findings from analysing respondents' answers to the semi-structured interviews.

**Chapter V (Discussion)** This chapter provides a summary of the main features of the findings with regard to the research questions and earlier literature. The strengths and limitations of the current study are also discussed, along with implications for further research into the relationship between perceived safety culture, nursing leadership and medication errors.

**Chapter VI (Conclusion)** The final chapter of the thesis presents the conclusions of the study on nurses' view of perceived safety culture, leadership styles and medication error

reporting, Contributions to knowledge and recommendations for the best way to implement and disseminate the results are outlined.

### **1.3. Context of Study**

In this section, key terms and definitions related to error and medication errors are presented. In addition, theoretical frameworks are discussed in line with presenting theories on safety culture, nursing leadership, and the importance of patient safety and medication safety, for nursing and health providers in Saudi Arabia.

### **1.4. Definitions Relating to Medication Error**

Different definitions describing errors and their ratio are used across the world. It is therefore important to consider these definitions, their meaning and potential impact. There is no single standard definition in the literature of what is considered as medication error(s) (Lisby et al., 2005). However, according to Armitage (2010), definitions of error are usually connected negatively with individuals, concentrating on a person error, and looking to attribute blame. Reason (1990) defined error as "the failure of a planned work to be accomplished as planned without the interference of any unpredictable event; or using an incorrect plan to achieve a target". This definition suggests multiple accidental causes, rather than solely linking errors to human mistakes.

When examining the term 'medication error', a number of definitions are available. For example, the National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP, 1995) defines a medication error as "any preventable incident that may cause or lead to inappropriate medication use or patient harm by any person in the medical care profession, patient, or consumer" (NCC MERP, 1995). A later definition by Aronson (2009) defines a medication error as, "a failure in the treatment process that leads to or has the potential to lead to harm to the patient." The term 'medication error' historically referred only



to administration errors; whereas today, it refers to errors at any stage of the medication-use process. A 'medication administration error' is determined as a deviation of the written prescription in the patient's file, or when registered to a hospital's electronic system. It was reported by the Veterans Affairs (VA) Centre for Medication Safety in the US in 2006 that medication errors might happen through any stage of the medication process. The meaning of medication administration is the process that a nurse performs when preparing and giving medication to a patient (Veteran Affairs (VA) Medical Centre for Medication Safety and VHA Pharmacy Benefits Management Strategic Healthcare Group and the Medical Advisory Panel, 2006).

In the event of a medication error, adverse outcomes may result. An adverse drug event (ADE) is defined as a harm resulting from a medication error or an adverse drug reaction (ADR) and can include either a medical intervention related to a drug (Veteran Affairs (VA) Medical Centre for Medication Safety and VHA Pharmacy Benefits Management Strategic Healthcare Group and the Medical Advisory Panel, 2006). ADR is defined as "A reaction to a medication that is unintended and harmful, which happens at normal doses utilised in patient for the diagnosis, prevention, or therapy of a disease, or for the modifications of physiological function" (WHO, 1972). An ADR is a part of an ADE, and all ADEs are related to patient damage; but not all ADEs are caused by an error (NCC MERP, 1995).

"Preventable ADE" more precisely, is damage caused by the use of a medication as a result of an error (e.g., a normal dose of medication was given, but the medication was contraindicated in this patient) (NCC MERP, 2002). "Non-Preventable ADE", in contrast, is the use of a drug resulting in harm when the medication is used correctly (e.g., anaphylaxis where the patient has no previous history of an allergic reaction). Protection from ADEs and not just ADRs should be looked at by an organisation in order to concentrate on the area

where improvement is possible, as preventable ADEs are more likely to cause serious injuries.

## **1.5. Medication Error Theories and Models**

There are a wide number of research studies on human behaviour, which underpin theories on medication errors and the role of behaviour in accidents. There are many theories and models in this area that endeavour to prevent errors (Hughes, 2008). Human error research, Swiss Cheese and Organisational Accident Models were developed by Reason (1990 & 1997). Since the 1990s this has achieved public acceptance within healthcare. Reason's human error model (1990; 2000) emphasises the prevention of errors by using a systems-based approach and has dominated the discussion of patient safety and particularly of medication errors. Later, the Yorkshire Contributory Factors Framework (YCFF) was developed by Lawton et al., (2012). It includes 20 contributory factors of patient safety incidents, which were specified from 95 international studies. There are two approaches to errors: causation errors and multifactorial errors.

### **1.5.1. Causation Errors**

#### **1.5.1.1. Human Error Theory**

Human error theory has been used to identify the reasons for error and to create policies to decrease their frequency as well as the consequences of their occurrence. This theory examines the process that causes the error rather than the individual who makes it. The human error model is the most frequently used prevention-oriented framework. An underlying assumption of the human error model is that errors can be stopped by creating error-proof working environments. This model considers that, although individuals make errors, there are characteristics of the systems in their place of work that make errors more likely, and difficult to discover and correct (Leape et al., 1995).

There is a model of error causation in each approach, and each model supports quite varied philosophies of error controlling. Understanding differences in management has significant practical implications to cope with the ever-present risk of an incident in clinical practice (Reason, 2000). The systems-based approach recommends specifically that errors should be managed, and that patient safety is better ensured by moving the focus on errors from individuals to the system. Rather than blaming individuals who made errors, this model identifies human factors and system failures as the cause of errors. Furthermore, the human error model also facilitates the implementation of error prevention strategies, which use structural and technological factors such as a computerised physician, or order entry systems.

Armitage (2010) argues a critical philosophical point about knowing a mistake by agreeing its inevitability; therefore recognising the human error. Human error theories have been developed from research in observational studies of errors in daily life, and cognitive and social psychology. It has been proposed that many forms of error or wrong behaviour exist. Our performance in our daily duties is rapid, automatic, and happens without conscious attention (Reisman, 1988). According to Reason (1997), human error is implicated in 80% to 90% of all major accidents. One of the main assumptions is that whenever humans are involved, errors will happen. Reason (1990) first defined human error as a general term involving any incident when a physical or mental planned activity does not accomplish its intended results, and when failures cannot be connected to the intervention of some chance failure. Therefore, he implies here that cognition is a key feature. Armitage (2010) stratifies human performance into three levels: rule based, knowledge based and skill based.

Reason (2009) mentioned that ‘a slip’ refers to “a potentially observable error, which results from a failure in the execution and/or storage stage of an action, regardless of the original plan’s adequacy” (Figure 1). Leape (1995) earlier defined five particular instruments that could be utilised to prevent and design out human error within systems: They include

developing information access, error proofing, standardisation, and training, rather than depending totally on a person's memory. Spath (2011) suggested, "If healthcare is to improve patient safety, systems and processes must be designed to be more resistant to error occurrence and more accommodating of error consequence".

These mechanisms respond to the essential cognitive shortfall, as negligence or carelessness that can result in failures (Leape, 1995). Reason synthesised the knowledge that is available about individual factors and system factors, examining their correlation, and highlighting the difficulty of error and the difficulties in identifying any singular cause. This view is sometimes called "human factors" (Reason, 1990), or human error theory (Lawton & Parker, 2002). It can observe the human errors in two ways: the person approach and the system approach.

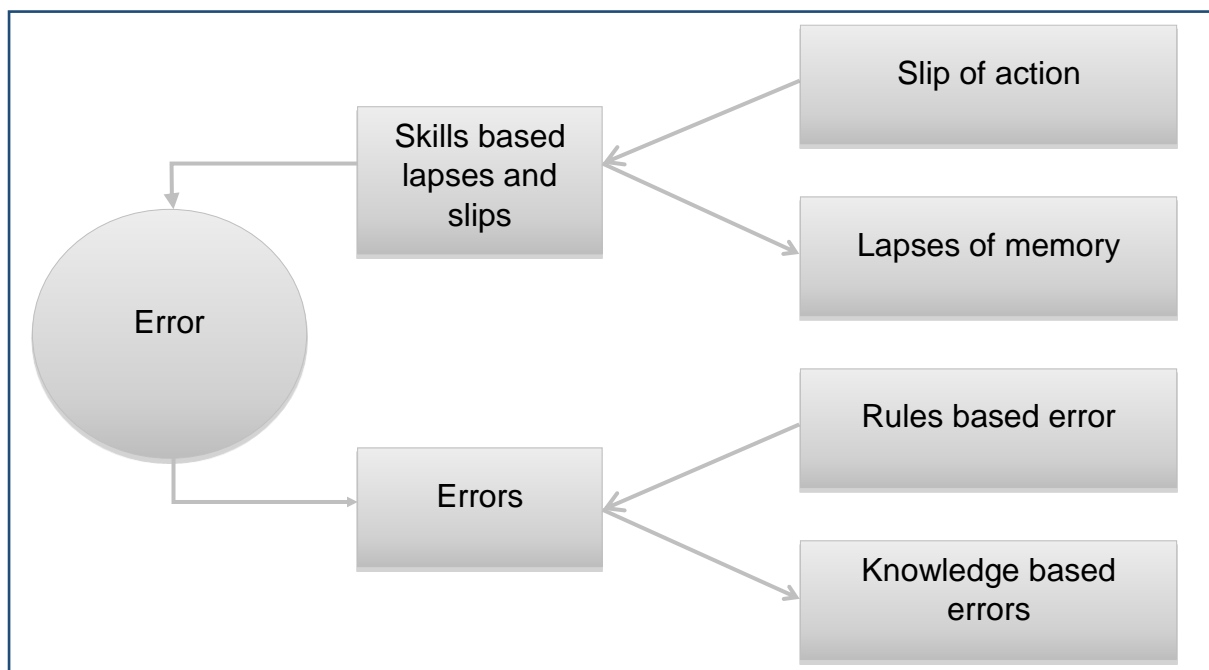


Figure 1. Types of Errors (person approach) (Reason, 1997)

### **Person Approach (Reason, 1990)**

The popular traditional method of the person approach focuses on unsafe acts - errors and procedural violations of the person at the sharp end: nurses, physicians, surgeons, anaesthetists, pharmacists, and any other medical workers. Aberrant mental processes are responsible for hazardous acts which involve negligence, downstream motivation recklessness, negligence, inattention and forgetfulness. Variability which can be seen in human behavior is natural and countermeasures are primarily directed in order to decrease undesirable variability. There are various methods, for instance campaigns through posters that appeal to people's sense of fear, creating new procedures or adding to existing ones, retraining, naming, litigation threats, disciplinary measures, shaming, and blaming. Supporters of this approach are inclined to treat errors as moral issues, assuming that bad things happen to bad people, what psychologists have called the just world hypothesis.

Nevertheless, the person approach has serious shortfalls and is not suitable to the medical field. While, some unsafe acts in any field are egregious, the vast majority are not. Reporting culture should be established in order to have effective risk management. Without detailed analysis of incidents we have no way of discovering repeated errors or accidents, along with near misses. An essential part of reporting culture is trust, which requires an existence of justice culture; in return there should be collective ownership where an important difference is drawn between actions such as blameworthy and blameless. As a result, two important features of human error are often overlooked. Firstly, it is often that most qualified people who are the ones who make the worst mistakes and error are not exclusive to the unfortunate few. Secondly, far from being random, mistakes tend to fall into repeated patterns. Regardless of how many people are involved similar errors can be produced with the same set of functions. The pursuit of increased safety is severely impeded by an approach that does not seek out and remove the error provoking events within the system as a whole.

## **Systems Approach (Reason, 1990)**

The system approach focuses on the circumstances where individuals are working and applying their efforts in order to build defenses so that the effects of errors can be reduced or averted. The system approach uses the critical issue of defenses, barriers, and safeguards against errors. State of the art technology systems have several protective levels: some managed by people (pilots, anaesthetists, operators of control room, surgeons etc.), others are engineered, which includes alarms, automatic shutdowns, physical barriers etc. but others depend on controls of administration and procedures. Their task is to save possible victims and avoid domestic risk. This is done effectively, but there are always weak points. In a perfect world, each protective level would be strong. With less focus on the individual, the basic assumption in the systems approach relates to the fact that no one is perfect and mistakes are prone to happen even in the best organizations. Errors are seen as results rather than causes, and humans are seen as "upstream" systemic factors. These contain repeated errors in processes of organizations or in the workplaces. Hypothesis rely on the counter measures that although we can change the conditions that humans work under, we cannot change the human situation. System defense is the main idea. All technologies that are dangerous have barriers and need protection. Whenever an adverse issue or event occurs a major factor of concern is to identify the reason behind the failing of the defences, not to blame individuals (Reason, 1990).

### **1.5.2. Multi-Factorial Errors**

#### **1.5.2.1. The Model of Swiss Cheese (Reason, 1990)**

Reason (1990) developed the Swiss Cheese Model (SCM) in order to have slices and layers to represent the prevention techniques for error. Currently this is a well-known theory or concept in various industries like aviation, and the airline industry (Hayward et al., 2008). In

the airline industry, this model is used in order to improve the pilot's concentration when they are preparing to fly the plane, in which slices are being used in order to show work process phases. Holes in the defenses are lined up when processes are being unfolded which allows errors to be transferred across the holes as shown in Figure 2.

### Hazards Avoided

### Accident Happened

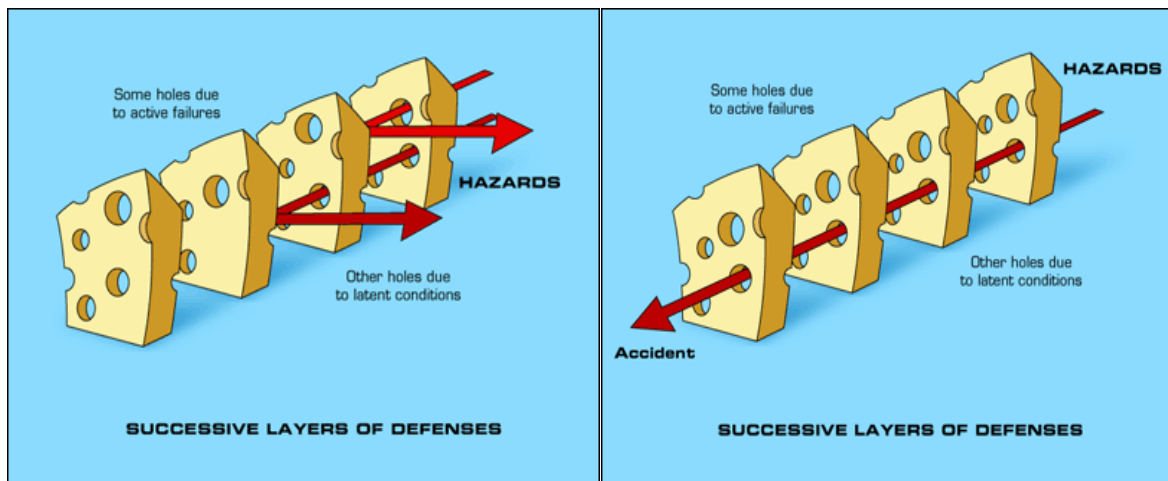


Figure 2. Swiss Cheese Model (Reason, 1990)

Defense holes arise due to two reasons, which are active failures and latent failures. To distinguish between human and system errors, Reason used the terms active errors and latent errors. Active errors always involve frontline staff, and happen at connection points between a larger system and a human one, for instance machine and human interface. By contrast, latent errors are accidents waiting to occur, and are failures of organizations or designs that allow the inevitable active errors to cause damage. All adverse events are involved in a mixture which has these two sets of factors.

This model can be applied to medication errors during prescribing, administration or dispensing. In each process, potential errors either happened or were prevented. Perneger (2005) explored the value of the SCM in a research study. Health professionals were asked about the significance of this model in health field. The professionals found the model to be inconsistent, a dominant theme being an overemphasis on potential mistakes or system factors compared to active failures. Another criticism was that the SCM was inadequate,

specifically concerning the kinds of cheese holes along with its inter-relationships. As an exploratory instrument it was not easily applicable (Luxhøj & Kauffeld, 2003).

One possible merit for the different views of the SCM is its ability to serve three different purposes as a means of communication, conceptual framework, and a basis for analysis.

- **Means of Communication:** the SCM also acts as a framework for accident investigation. Human Factors Analysis and Classification System (HFACS) (Shappell & Wiegmann, 2001) is the exploratory technique used widely. There are several other examples, like International Centre for Advanced Materials (ICAM), Broken Hill Proprietary Company Limited (BHP's), root cause analysis techniques, and Shell's Tripod Beta. Root cause technique is used when money or time is running out and this is regarded as major contributing factor of this technique. The important contribution of Shappell and Wiegmann, 2001 is the degree to which model applications are operationalized so that a wide range of investigators could use it. The original model, which failed to identify holes of SCM precisely was criticized. But such specificity was never their original intention. SCM was intended to be a generic instrument so that it can be utilized in a well-defined area. For supplying local details it is for local researchers.
- **Conceptual Framework:** The Swiss Cheese Model (SCM) is a guiding explanatory device for communicating the interactions and concatenations that happen when a difficult well-defended system suffers a catastrophic collapse. In particular, it carries the fact that no one failure, human or technical, is enough to cause an accident. In particular, an accident is not caused by any one failure, human or technical error, but rather unforeseeable conjunctions of several contributing factors arising from various systems levels. Organizational accidents are also identified, for instance several defenses or concurrent failures which are in some way prepared or facilitated by organizational design and unforeseen features.



- **Basis for Analysis:** The model has also been applied to proactive process measurement – the repeated assessment of a limited set of ‘vital signs’ that collectively give some indication of the current state of ‘safety health’ and the factors that are most in need of correction. Tripod-Delta was one of the first tools created by Shell by Groeneweg, Reason, Benson Wagenaar and Hudson in 1988-1990.

### **1.5.2.2. The Organizational Accident Model (Reason, 1997)**

The Organizational Accident Model (Reason, 1997) is regarded as the most frequently used and influential system framework, which is also the most cited where a range of failures are encountered in a system in modern fields of safety (Tolley, 2007). Within healthcare settings it is well recognized because it is crucial to understand the systematic organizational conditions, and human fallibility should be accepted as part of any causal analysis. As per the findings of Reason (1990), active and latent conditions are the reasons behind accidents. Active failures are close to events and can be caused by mistakes, violations, lapses, or slips which are committed by human operators. There are often consequences of conditions which trigger the incident event and are embedded deeply in the system. Moreover, latent conditions are referred as latent failures and result from the decisions of the developers of procedures, managerial control which is gained over time, and the designers of the system. Various contributing factors are linked in a coherent sequence by the Organizational Accident Model (OAM) and run in an upward direction in causation, and for investigation in a downward direction as depicted in Figure 3. Basically, unsafe human actions, error provoking conditions in the workplace, and certain organizational factors are the three levels. Organizational factors start with causative history where planning, budgeting, and strategic decisions are being made (Reason, 1997). The consequences of these activities are communicated to a particular work place throughout the organization such as shortage of staff, time pressure, equipment and insufficient tools. Unsafe acts are created by humans in any work place, which

are combined by local factors such as violations and errors that are committed by teams as well as individuals. Large numbers of these dangerous acts will be made, but only a few of them will create holes in the defences (Reason, 1997).

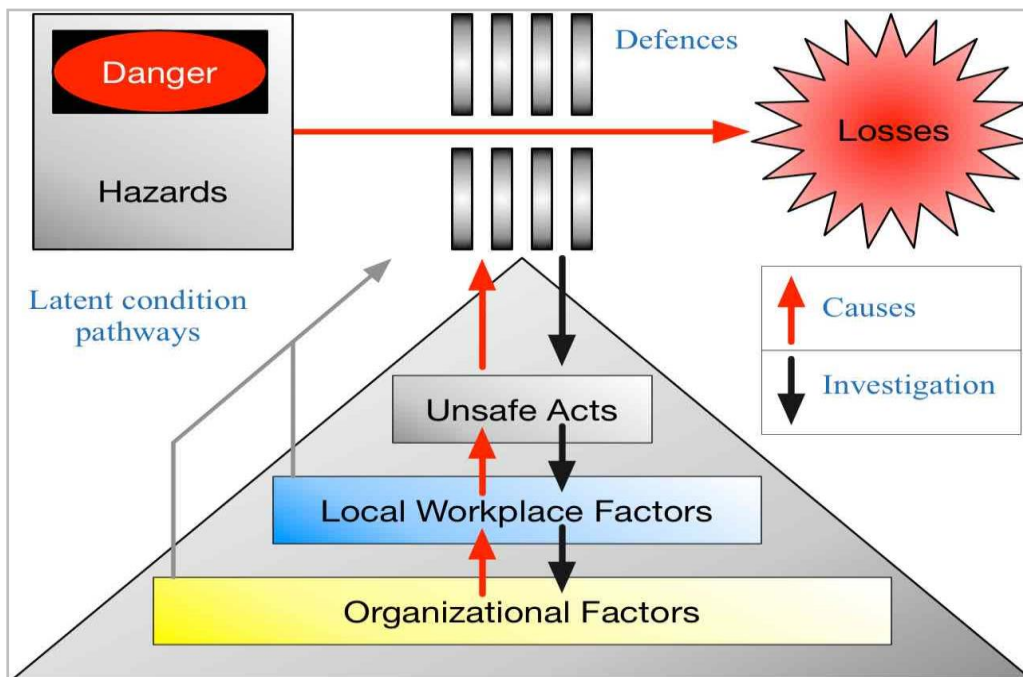


Figure 3. Depicts the investigation and development stages in organizational accident (Reason, 1997)

In this enhanced model, latent and active failures are distinguished by Reason. It is claimed by Reason that conditions which happen due to latent failures are inevitable conditions within the system, which are also known as resident pathogens and arose from decisions made by engineers, managers, designers etc. (Reason, 2000, p-769 ).

Furthermore it was also suggested by Reason that active failures resemble mosquitoes in swamps, and thus the most effective technique is to drain those swamp rather to kill them or drain active failures one by one. To create effective defenses would be the best remedy, for example the breeding of active failures and mosquitoes should be drained. In this case swamps are the latent conditions which are ever present. In order to build conditions like these is to move further in the development of tools where unsafe acts can be managed

properly, and for this purpose Reason (2009) proposed two elements for error management i.e. incidence of dangerous errors should be limited and in case of failure, certain systems should be created which have the ability to accept the occurrences of mistakes and also their damaging effects should be mitigated.

### **1.5.2.3. The Yorkshire Contributory Factors Framework**

Lawton et al (2012) developed the Yorkshire Contributory Factors Framework (YCFF) by using different data collection methods. The YCFF was developed from a wide range of other frameworks and is thus based on an empirical framework which is applied in settings of clinics across the world. From ninety five international studies this model includes 20 contributory factors of patient safety incidents (e.g. leadership and supervision). It is shown by the majority of studies that the factors contributing to patient safety incidents were active failures (errors and violations). The YCFF has the potential to be used across most health care settings to enable practitioners to identify and prevent factors that may influence their practice and forms a threat to patients' safety

The YCFF is a tool with an evidence base for optimizing learning and addressing problems of patient safety incidents by helping clinicians, risk managers, and quality and safety advisors to identify the contributory factors of patient safety incidents. This framework, illustrated below, describes the contributory factors as a series of concentric circles, with active failures (mistakes, slips/lapses and violations) at the center and the external policy context as the outer circle. This diagram helps to illustrate the domains and the extent to which a domain is proximal to the active failure. When reviewing incidents, the investigating teams often focus primarily on the proximal causes of the incident such as active failures and situational factors, and less on working conditions and latent factors that influence the occurrence of incidents. Adopting a limited focus on the proximal factors can lead to a failure to address the significant issues. It is often these, which if left unaddressed can result in the recurrence of

incidents. The highlighted goal of this tool is not to disregard individual responsibility for unsafe care, but to try to create more sophisticated knowledge of the factors that cause incidents. Changes in systems, structures and local working conditions address these factors. Finding the actual causes of patient safety incidents provides opportunities to manage systemic flaws effectively, for the benefit of all future service users (The Health Foundation, 2011).

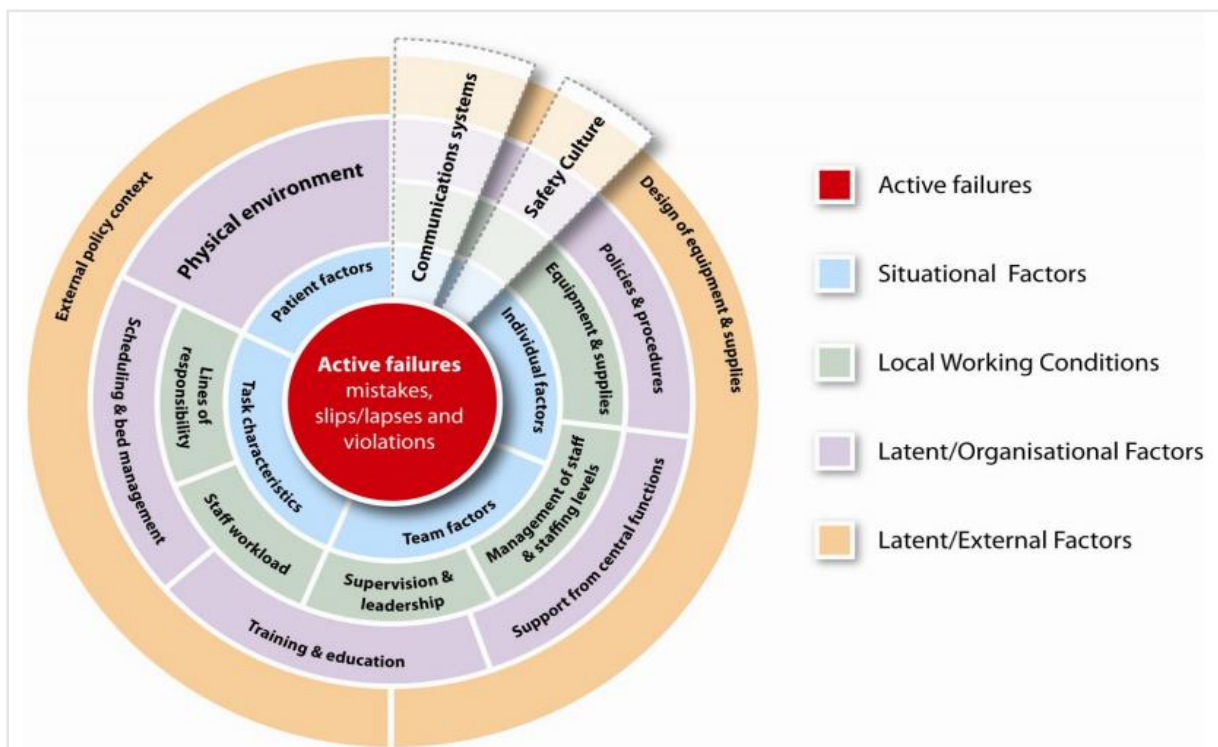


Figure 4. The Yorkshire Contributory Factors Framework

### 1.5.3. Medication Errors Theories and Models Summary

Understanding the scale of errors is not sufficient to fix the problem. One of the biggest steps forward in understanding patient safety has been through the development of theoretical models. These models allow the problem of why we make mistakes to be thought about in a structured way. As discussed in this section, James Reason has introduced Human Error Theory from two approaches that represent distinct philosophies of error causation: the person approach and the system approach. The person approach focuses on "Who did it?" instead of "Why did it happen?" (Kohn et al., 2000; Reason, 2000). Moreover, the person

approach is commonly preferred because "blaming individuals emotionally satisfies more than targeting institutions" (Reason, 2000). The system approach supported the idea that although individual practitioners "must be responsible for the quality of their work, more errors will be eliminated by focusing on systems than on individuals" (Leape et al., 1995). Therefore, this approach depends on investigative mechanisms and transdisciplinary analysis of both active and potential errors as threats to the system (Helmreich, 2000).

Several different models have been used to describe aspects of safety and risk. For example, the Swiss Cheese Model (1990) and Organizational Accident Model (1997). The SCM makes it easy to visualize how complex systems failures are, because of the compound and timing of multiple small failures. Reason confirms that any one failure or situation alone would be inadequate to cause an accident, but the compound and timing of small failures looks much more like the alignment of holes in a piece of Swiss cheese that has been sliced. The OAM looks to connect the different contributing issues into a coherent sequence that runs upward in causation and downward in investigation. Finally, the Yorkshire Contributory Factors Framework is the best framework because this model has the potential to be utilised through clinical settings to develop the prevention and identification of factors that cause harm to patients. Moreover, the YCFF model gives potential to optimise learning and take action to prevent further errors occurring.

These models and frameworks have increased awareness of the complexity of the systems in which providers work and in which patients receive care. As explained, the leaders in the organization must be system thinkers who need in-depth analyses of safety problems.

## **1.6. Safety Culture**

One of the most significant elements which rely on the system approach is the concept of safety culture (Waterson, 2014). The safety culture term can be traced back to the nuclear explosion in 1986 at Chernobyl (Wiegmann et al., 2001). The International Atomic Energy

Agency (IAEA) introduced this term in their first analysis because of the accident which happened in the nuclear reactor at Chernobyl (Dedobbeleer, 1998). Definitions of safety culture started to be developed by researchers since that term began to be utilized and the literature offers a number of definitions. The IAEA defines one of the two major terms of safety culture as “...an assembly of characteristics and attitudes in organizations and individuals which established as a priority, nuclear plant safety issues take the attention warranted by their significance” (IAEA, 1991). The second definition is taken from the UK Health and Safety Commission (HSC), where this position is being endorsed, and outlines positive safety cultures along with their characteristics by perpetuating the concept as “group values and individual outputs, their attitudes, perceptions, behavior patterns, competencies, that are determining the commitment, proficiency and style along with safety and health management of organization as well” (Health and Safety Commission (HSC), 1993). Organisations that have a good safety culture are characterised by communications founded on mutual trust by confidence in the efficacy of preventative measure, and shared perceptions of the importance of safety (HSC, 1993). There have been further definitions, and Table 1 summarizes a number of these (Guldenmund, 2000; Yule, 2003; Choudry, Fand & Mohamed, 2007).

Table 1. Definitions of Safety Culture in the Literature

References	Safety Culture Definitions
Cox & Cox (1991)	Attitudes, beliefs, perceptions, and values are reflected by safety culture which employees share for several safety measures.
<b>International Nuclear Safety Advisory Group (1991)</b>	“Safety culture is that assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, nuclear plant safety issues receive the attention warranted by their significance.”
<b>Pidgeon (1991)</b>	“The set of beliefs, norms, attitudes, roles, and social and technical practices that are concerned with minimizing the exposure of employees, managers, customers and members of the public to conditions considered dangerous or injurious”

<b>Ostrom et al. (1993)</b>	The concept that the organization's beliefs and attitudes, from which safety performance might be affected are manifested in procedures, actions and policies.
<b>Geller (1994)</b>	In a total safety culture (TSC), each member is feeling safe and responsible and pursuing it on daily basis
<b>Berends (1996)</b>	It is the collective mental programming which is leading towards organizational group safety
<b>Lee (1996)</b>	Organizational safety culture is group and individuals product values, perceptions, attitudes, behavior patterns, competencies, which are determining the style and commitment, proficiency, in terms of health and safety management of organization.
<b>Kennedy &amp; Kirwan (1998)</b>	It is underpinned concept of individual and groups' amalgamation perceptions, processes of feelings, behaviors, thoughts, which is giving rise to particular things on organizational basis however, and it is sub element of overall organizational culture.
<b>Hale (2000)</b>	Norms and values are defined by natural groups and thus referred to the attitudes, beliefs, and perceptions which are determining how they act and react in relation to risks and risk control systems.
<b>Glendon &amp; Stanton (2000)</b>	"Compromises attitudes, behaviors, norms and values, personal responsibilities as well as human resource features such as training and development."
<b>Guldenmund (2000)</b>	In terms of increasing and decreasing risk are related to the aspects of organizational attitudes and behaviors which might be impacted.
<b>Cooper (2002)</b>	In between people culture is the product of multiple goal-directed interactions in psychological manner, jobs in behavioral manner and organization in situational manner where safety culture is the degree of effort observance where all organizational members are directing their actions and attention and thus practicing to improve safety measures on daily basis.
<b>Mohamed (2003)</b>	It is organizational culture sub facet from which workers are being affected along with their attitude and behavior in on-going safety performance of organization.
<b>Richter &amp; Koch (2004)</b>	Experiences, and interpretations of work, shared and learned meanings, safety which are expressed symbolically and partially which are guiding people which is guiding people's actions toward risk, accidents and prevention.
<b>Fang et al. (2006)</b>	It is prevailing indicators, beliefs, and values set that the organization owns in safety.
<b>Nuclear Regulatory Commission (2011)</b>	Core values and behaviors is the nuclear culture safety which is resulted from collective commitment by individuals and leaders in order to emphasize safety over competing goals so that protection of people should be ensured and the environment.

It is depicted in the table that culture is a valuable safety construct and most of the researchers are agreed on it.

Moreover, much literature is devoted to safety culture (Guldenmund, 2000; Zohar, 2010). Reason (1997) safety is best managed by three models which include the human model, the engineering model, and the organization model.

Pidgeon and O'Leary (1994) argue that a "good" safety culture may reflect and be promoted by four factors: "senior management commitment to safety"; customs that are realistic and flexible, using practices for handling both well-defined and ill-defined hazards; continuous organizational learning by different means such as analyzing, monitoring, and through feedback systems, also a care concern shared across the workforce for risk management. Dedobbeleer (1998) proposed a basic element of safety culture, which is the workers' attitude towards safety. Any safety interventions may fail if the attitudes and perceptions of safety are not acknowledged and taken into consideration (Williamson et al., 1997).

Currently focus has been increased across the world and in the UK in order to improve safety measures, through which its cultural importance within organizations is also increased along with improvement processes (The Health Foundation, 2011). As per the findings of the Health Foundation, in all disciplines including health care, safety culture is a crucial fact of concern, and this is addressed in policies, with written guidelines and national priorities. By locating all important measures broadly, safety culture can be defined as "A global phenomenon that encompasses the norms, values, and basic assumptions of an entire organization" (The Health Foundation, 2011).

Attitudes, values and beliefs are encapsulated by most of the safety culture definitions that are shared by individuals as well as groups but the difference at an individual level is on the basis of behaviors, categorized into safe and unsafe measures, which is thus guided by



values, attitudes and personal beliefs (Fazio, 1986; Kleinke, 1984). In workplaces continued safety is important on an individual basis, which is constructed organizationally on shared beliefs. A related theme that is evident in the definitions of safety culture is that of individual norms. Moreover, it was argued by Ostrom, Wilhelmsen & Kaplan (1993) that social norms are consisted in cultures in terms which accept behavioral rules and sanctions can be faced if these are not followed properly. Reporting procedural irregularities is an example of positive safety standards that workers can report. Furthermore, Reason (1997) argued that such a standard can only be created under such conditions as a culture of reporting. Reporting culture can be further defined as a fair means for all to report all errors and issues without punishment. An example of a less positive safety standard could mean that work is conducted on live equipment when under time pressure, i.e. without isolating equipment. Understanding the safety culture of an organisation, work site or workgroup as a whole, may be difficult but identifying and understanding the dominant safety norms may be a more manageable method of isolating and working with specific issues.

It is believed by Leonard and Frankel (2012) that a robust safety culture is the combination of attitudes and behaviors through which inevitable dangers created when humans, who are inherently fallible, work in extraordinarily complex environments. According to the suggestion of Leonard and Frankel (2012), minimising risks and errors is associated with the extent to which leaders are aware of managing attitudinal and behavioural norms. Thus, knowing the values, beliefs, rituals, symbols, behaviours and perceptions that nurses hold about safety in their workplaces should help management evaluate their safety culture programs, and predict the extent to which staff will participate in improving patient safety and quality of care through communicating errors (Cooper, 2000; Kohn, 2000). Leonard and Frankel (2012) describe "norms" which need to be operational to ensure effective leadership, a fundamental strategy, regarding safety. These include psychological safety is also included

in which leaders create an environment to encourage speaking about and reporting medication errors, then ensuring that errors are dealt with positively and respectfully. Organisational fairness also plays a crucial part and this is applied in situations where workers know that they are not responsible for failures of the system, but instead they are conscientious, capable and not engaged in unsafe behavior. Lastly, learning systems are those systems where leaders are notified and leaders have a keen interest to hear nurses and patients and their related concerns about defects that intervened in providing safety and care. Continuous learning and improvement is needed for the provision of a reliable and safe culture. Leaders' roles are to define and support the goals and their related values within an organisation. Behaviors that are creating unacceptable risk should also be addressed by effective leaders, for example being disrespectful or disruptive behaviors, and perpetrations should also be informed that it is not to be tolerated. According to Leonard and Frankel (2012), real leadership can be seen when it is experienced in real life within any organization. Consistency and fairness are the two measures that leaders should have in order to hold people accountable for behaviors that are not acceptable and lead to risk, and in this way strong safety can be ensured. By taking into account both organizational and human factors, it was suggested by Leonard and Frankel (2012), that whenever an adverse event happens it is crucial to adopt simple procedures that allow organizations to determine key resources and unsafe individuals.

Flin et al. (2000) found themes relating to management and supervision in 17 studies. Thomson et al. (1998) similarly suggest that through indirect means procedures and safety policies are supported by senior managers in order to set production goals, whereas supervisors act as a link in between shop floor and management, where worker compliance can be monitored with proper feedback and safety concerning their behaviors. Marsh et al. (1998) found that the success of behavioral safety interventions implemented in building sites

across the UK was strongly influenced by the commitment of management. Thomson et al. (1998) also found that safe practice was influenced by managers through communication, i.e. what was brought to their attention, and by supervisors through how fairly they interacted with workers. Cheyne et al. (1999) in a study of the UK manufacturing industry found that the main influence on workers' safety commitment was how workers perceived management actions for safety. Cheyne et al. (1999) also found that management commitment played a key role in their predictive model of safety behaviors.

Management is considered as the key influence for the safety culture of an organization. According to Chib & Kanetkar (2014) organizational safety culture is thus influenced by two major components. First is the work type conducted and second is the system of management and leadership. Moreover, it was further concluded by Flin (2000) that the commitment of management is one of the crucial factors which involves management of organizational safety. On the other side Börjesson, Lajksjö & Enander (2007) stated that only a few studies have been conducted which focused on the direct influence of a safety culture leadership style. This promotes the need to explore what leadership is and how nursing leadership is defined, as explored in the following section.

### **1.7. Nursing Leadership**

Huber (2006) defined leadership as the influential process which involves people in order to accomplish goals, and its dominating factor was where leadership includes other factors such as communication, influence, motivation, goal achievement and group processes, irrespective of culture or country. Successful leaders are known to have a well-planned vision for satisfying and motivating employees. Additionally, successful leadership requires the ability to act on and articulate the values one believes in (Burns, 1978). It was observed by Cummings et al. (2010) that leadership is not only focused on completion of tasks in order to

have optimum results from certain workforces. The consensus of these authors' review is that at both the individual and organisational levels, the focus should be on developing transformational and relational leadership to enhance nurse satisfaction, retention and healthy work environments, particularly in situations of the continual worsening nursing shortage.

In comparing differences between management and leadership functions, Kozak (1998) notes that successful organizations need both management and leadership; although it is commonly accepted that managers deal with systems, processes, budgets, equipment, and "all things", leaders deal with visions and people. Another difference is that the effectiveness of leaders is typically measured by the accomplishment of one or more compound goals, whereas a manager's effectiveness is typically measured by profit margins. However, management and leadership are integral in order to provide effective healthcare. Healthcare quality improvement is concurrent with cost reduction and it can be observed by effective management and leadership skills (Stanley, 2008). It was contended by Shirey (2006) that authentic skills development application must have a positive impact on the workforce of nurses and that should be good for society and healthcare systems. Nursing is one of the stressful profession and though there is high ration of burnout, disability, and absenteeism incidences, these are the strong reasons that there should be a healthy working environment which enables the adequate maintenance of the nursing workforce, especially in a time where a shortage of nurses is encountered on a global level. In that regard, nurse leaders have a critical role to play in retaining competent nurses by ensuring the environment of the healthcare practice favours the desired outcome (Shirey, 2006).

### **1.8. The Kingdom of Saudi Arabia**

The Kingdom of Saudi Arabia (KSA) is a country with a unique culture as an Arabic and moderate Islamic state. The necessary price has been paid by KSA for its unique way of life, which continues to adhere to an inbuilt heritage of centuries past. KSA is regarded as Islam's

natural home, which defines the culture through teaching Islamic values in the country (Long, 2005). Saudi Arabia is distinct from the neighbouring countries because of its teachings which are from the 7th century. In order to become a multicultural state, in recent times the country has been developed and foreign workers constitute over 30% of the total population according to the results of central department of statistics and indicators (CDSI, 2013).

### 1.8.1. Population and economic overview

In the Arabian political world, KSA has become the dynamic state because it is the largest nation in the region; its area comprises 850,000 sq. miles, and it is four-fifths of the peninsula of Arabia, which is aligned ultimately with its wealth of oil (Walston, Al-Harbi & Al-Omar, 2008). The economy of the nation has become raised due to the Saudi Arabian population and commercial exploration of oil which has remained the reason behind its rapid development (WHO, 2006a). To the east KSA is aligned with UAE, Qatar, and Kuwait, and from the north, Iraq, Jordan and Bahrain. From the north side it is aligned with the southern borders with Yemen and Oman. From the west it is aligned to the Red Sea and from the northeast to the Gulf (Mufti, 2000). See Figure 5 for details.



Figure 5. The Kingdom of Saudi Arabia

In 2016, the recorded population of KSA was more than thirty three million (Central Department of Statistics, 2016). As the population is increasing rapidly, it is important for the government of Saudi to enhance and make better health care systems in order to cope with the population. This has remained the main reason for improving the health care systems

between 2005 and 2008, where billions in local currency (Rriyal) were spent on the improvement of hospitals and healthcare so that the inhabitants live a good life (MOH, 2008).

### **1.8.2. Economic overview**

There is an isolated and traditionally poor society in Saudi Arabia where a health care system was lacking because it was not organised well internally due to its focus on a traditional eastern medicinal persuasion, and this continued until the expansion of oil exploration. In between the period 1880-1953, during the reign of King Abdul-Aziz Al-Saud, and under his authorisation legislation was passed in 1926 for the establishment of the department which is related to health for the country (Mufti, 2000), but instead the country remained poor and underdeveloped.

The hospitals and clinics that were built in major urban areas were overseen by the health department along with its supervising responsibilities, and their services were monitored. For creating efficient, effective and fully functional health care systems, a government should have its own determination, which was initiated by the health department with the collaboration of the bureau's Attorney General, which is also known as GDHA (General Directorate for Health and Aid). The Health Council was initiated with the Attorney General's guidance in order to improve standards. Their other goal was to prevent diseases which were encountered in the country (Mufti, 2000). However the funds available were not sufficient for the modernisation the health care system that was been attempted by the government and it was a huge challenge to standardise the health care system. Indeed, it was not until 1954 that the standardised adaptation of health care began to take real effect through the MOH being established (Al- Mazrou, Khoja and Rao, 1995). Within the health care sector, supervision of facilities in public and private sectors was carried out by MOH.

In 1970, the government commenced its original five years National Development Plan, which was a culmination of crude oil revenues over the previous decades. Throughout the previous decades, transformation had been encountered by the health care system along with enhanced development plans that were similar to the original. As time passed, the government made it possible to create the systems for healthcare which will be modernised as per today's conditions. New facilities were also introduced for Research and Development (R&D). One issue that has remained prevalent throughout the course of this internal redesign is that these new facilities have required expatriate medical staff. In fact, the majority of health care professionals are expatriates, and there is a noted shortage of Saudi medical professionals (Safi 2016). This potentially brings with it a range of challenges that influence the quality of care provision. Hence, there has been an increased requirement to begin understanding the need for investment in human resources for health care, which in turn has created the overseas scholarship programme for nationals who wish to pursue careers in this field (Jannadi et al, 2008: 48). At this current time, there is a huge need to raise the numbers of hospitals and clinics rapidly in Saudi Arabia due to demand (Safi 2016).

### **1.8.3. Religion, culture and language**

Islam has a relationship with the actions, food, social customs and spirits in Saudi Arabia. It is a firm belief of Muslims that Allah is the only one that gives sickness, health or death (Rassool, 2000) and hence sickness is not a punishment; however, it's a compensation of one's immoralities (Al-Shahri, 2002). This has made it complicated for health providers to take care of the patients because they do not take care of themselves. Nevertheless, Muslims are recommended to take care of people while they are sick. Islam has given many suggestions for health maintenance, like eat reasonably, exercise regularly, alcohol is prohibited, and tobacco is harmful for health, cleanliness and breastfeeding (Rassool, 2000).

Debated by a western writer, socio-cultural variation in the country is dominated by the nomadic and city-dwellers, literate or illiterate people, and conservative and non-conservative ones (Parssinen, 1980). The people of Saudi Arabia have made Islam their cornerstone and they do not only practice the ideology but embrace it through their activities in their daily lives, even though the intricate functions of the religion may vary in interpretation between each individual in adapting to their own form of worship. Moreover, there is a variation that has been noticed in gender compliance in the different groups of the society.

Furthermore, the participation of females in the market for employment is a controversial topic in the society, when the rhetoric of gender was gaining momentum, giving the economy of the country an upturn in the 20th century (Al-Bar, 1984). The nation has benefited hugely by receiving revenues from the crude oil that has influenced the wealth of the country positively. The social sphere has also been affected by this influence. For instance with respect to healthcare provision, it has been observed (AlYami and Watson 2014) that the nursing profession is not well received in the wider Saudi community and culture, which exacerbates the manpower challenges faced by the industry – and possibly the overall quality of care provision. The segregation between the genders in the sector of healthcare is necessary in the context of Saudi Arabia and this raises a number of issues (Parveen et al., 2016).

#### **1.8.4. Social and literacy rates**

The social and economic change was marked in Saudi Arabia after the emergence of the oil in 1930s along with the growth of the political system. This led authorities to encourage the population of the country to change these in villages and towns. Basically the strategies for the industries were built that gave rise to the employment status of the country for rural and urban workers, not only for Saudi Arabia but all the Arab Countries. The emergence of oil made the country more visible in the world and ready to grow economically, socially and



politically. This transformation in the urban environment made the country able to develop from a rural nation to a developed one that was already seen in the 1950s, with increasing urbanisation through 1990 (Frisbie, 1995). Geographically, around 10 different areas that were urban were situated in the country by 1940s. Though the majority of them were in the west, they were in the region of Hijaz, the home to the grandest city, Makkah. It was filled with about 80,000 people (Al-Khalifah, 1995). In addition, 85% of the industry of the nation and about 75% of the complete employment was situated in the four major cities of the country (Al-Khalifah, 1995; Long, 2005).

The social functions and culture of Saudi Arabia are traditionally extensive with family networks, where genders have different roles. Men being the protectors as who provides the family with the necessities, and women being housewives (Long, 2005). A lot of discrimination has been seen between the genders in education specially. These differences begin from the age of seven, even the public education was established in 1952 for men and later on in 1959 for women. Nevertheless, it can be noticed that education is an integral part of the country's policies by the government. Multiple initiatives have been taken, from the first in the 1970s, to make education free for all the citizens for all levels of education.

#### **1.8.5. Nursing and Health Providers in Saudi Arabia**

An overview of nursing and health care services in Saudi Arabia is presented in this part of the chapter. An overview of healthcare services is outlined; the history of health services, hospitals and nursing in Saudi Arabia as well as education, and medication error policies in Saudi Arabia are presented.

Nowadays, in Saudi Arabia there are a limited number of guidelines, which promote the process of creating and maintaining a healthy practice environment for nurses. Gallagher and Searle (1985) previously mentioned healthcare in Saudi Arabia as shaped by cultural and social factors. The local traditions and culture of the people of Saudi Arabia have been

formed and created from traditions and attitudes inherited from the ancient civilisation of the Arabian tribes, and are mainly based on Islamic teachings (Gallagher & Searle, 1985). Many factors have affected and shaped the lifestyle of Saudi people including those of politics and geography. Restrictions on foreigners entering the country, strong tribal and family bonds, and the strict adherence to religion have made Saudi Arabia a closed nation regarding cross-cultural interaction (Long, 2005). Environmental factors and economic status also play a role in forming the culture of the Saudis (Al-Shahri, 2002; Aldossary et al., 2008; Long, 2005; Searle & Gallagher, 1985). Saudi society has struggled to accept working women, although this has started to change more recently (Aldossary et al., 2008).

In Saudi Arabia the health care system is managed and operated by physician-oriented staff from whom an authoritative impression is given rather than a cooperative one (Brown & Busman, 2003). Tumulty (2001) observed that in most healthcare facilities in Saudi Arabia, the director of nursing reports to the hospital directors, who are physicians known for their bureaucratic and hierarchical style of management. Since the nursing departments depend on the hospital director for budgetary allocations, autonomy and creativity among nurses are limited. Tumulty's (2001) study was conducted in both Saudi Ministry of Health (MOH) hospitals, which are similar in certain situations to private hospitals, and government hospitals. However, in most of the public and private sector, hospitals are now receiving their budgets from the government and managing on their own, but this has not yet been applied in hospitals of the MOH.

Saudi Arabia is divided into 13 regions ("Saudi Arabia: Administrative divisions". arab.net). This number includes the 13 regional capitals. The regions are divided into 118 governorates. In addition, the governorates are further subdivided into sub-governorates.

### **1.8.6. Health Care in Saudi Arabia**

In the last twenty years, the health services in Saudi Arabia have developed quickly, which led to increases in health facilities in all areas of Saudi Arabia. 60% of services are provided by MOH in Saudi Arabia and the rest is shared among the private sector and other government agencies. Rapid improvement in the training and education of the upcoming Saudi health workforce has also taken place. The recent health development plan sets out the future challenges facing the health system in Saudi Arabia. Ideal use of current health resources is included in it with qualified health administrative skills, the maintenance of a balance between therapeutic and protection services, the search for alternative means of funding these services, the expansion of training for the Saudi health workforce in order to meet the demand which is increasing, and comprehensive primary health care program implementation.

### **1.8.7. Health Care Services History in Saudi Arabia**

In Saudi Arabia healthcare services history can be traced to 1949 when a tiny number of medical staff - around 111 doctors and fewer than 100 hospital beds - were documented (Sebai et al., 2001). Since then, Saudi Arabia has made considerable improvements in the healthcare system. Important developments have brought health services to each region of Saudi Arabia. In 1998, the number of doctors and nurses had increased by over 20 times, to approximately 30281 doctors and 64790 nurses, in more than three hundred hospitals and 1700 primary health care centres. Government spending on health has risen sharply as the budget of the MOH increased to 3.2 billion US\$ in 1998; about 6.2% of the national budget (Saudi Ministry of Planning, 1970-1985; Saudi Ministry of Health, 1998).

Especially in therapeutic medicine the quality of health services has improved, accompanied by an improvement in the healthcare system. Hospitals have become fully equipped and can

perform a range of advanced procedures in cancer surgery and cardiovascular treatment, as well as all types of transplant operations (Sebai et al., 2001).

By 1998, health education had also improved significantly, with more than 300 doctors and 80 dentists graduating from seven medical and dental colleges (MOH, 1998). Following this, four government colleges were opened in Madinah, Qassim, Gizan and Hassa. There were also developments in the local literature on health care in Saudi Arabia. In various fields of medicine and allied sciences over the last 50 years, the amount of health research has increased, and more than 10 Saudi medical journals have been established.

The Saudi Ministry of Health was established in 1951 (Saudi Ministry of Health, 2015) and is accountable for providing healthcare through primary health care centers and hospitals. At a national level, the MOH is the responsible authority that can solve any conflicts related to health (Saudi Ministry of Health, 2015). It is also responsible for improving policies and strategic plans, supervising and monitoring (Aldossary & Barriball, 2008).

3.2% of the total domestic product was spent by Saudi government on health in 2012 (World Health Organization (WHO), 2013). There are a range of types of health care providers in Saudi Arabia: hospitals of MOH, Military hospitals, Educational hospitals, private hospitals (Al-Yousuf et al., 2002, Arabian American Oil Company (ARAMCO) hospital, and; Saudi Ministry of Health, 2012), (Table 2). In the future, the MOH plans to provide free health insurance to all citizens (Al-Yousuf et al., 2002).

Table 2. Number of Hospitals and beds in Saudi Arabia (MOH, 2012)

	<b>Hospital Number</b>	<b>Beds number</b>
MOH Hospital	259	35,828
Educational and Military hospitals	40	11,043
Private hospitals	137	14,165

Arabian American Oil Company	1	400
<b>Total</b>	<b>437</b>	<b>61,436</b>

According to MOH (2012), the number of hospitals was 437 with approximate 61436 bed. The number of doctors working in Saudi Arabia was around 81,182, with only 21% Saudi doctors, the majority drawn from other nationalities (Alriyadh, 2011). The majority of nurses are from India and the Philippines. In addition, a few nurses are from the United Kingdom, North America, Australia, South Africa, Malaysia and Middle East countries (Aboul-Enein, 2002; Luna, 1998; Tumulty, 2001). The number of Saudi nurses was very low because in the Saudi culture there was a negative view of the nursing profession. In addition, it is not felt to be appropriate for women (Al Yami & Watson, 2014). It is planned by government to fill the gap in nursing through the introduction of different nursing programs in Saudi Universities. In 2014, the numbers of private and public institutions awarding nursing bachelor degrees to Saudi nurses have been increased to more than 34 colleges for males and females (Saudi Ministry of Higher Education, 2014). There are in total 3 universities which are awarding master's degrees to nurses (Saudi Ministry of Higher Education, 2014). MOH offers nurses the chance to complete a postgraduate degree in a developed country through the scholarship programs.

### **1.8.8. Nursing in Saudi Arabia**

There has been an improvement in nursing education, the workforce and nursing practice in Saudi Arabia. However, the shortage of Saudi nurses is still the main problem; this is connected with high staff turnover. Most of the nurses working in government and private hospitals in Saudi Arabia come from other countries, while Saudis were only 29.1% of the total nursing workforce. The number of Saudi nurses in government hospitals is very low, but this rate is even lower in the private hospitals, where Saudi nurses form about only 4.1% of the total nurse workforce (Almalki M., Fitzgerald G. & Clark M., 2011).

### **1.8.9. Nursing Education in Saudi Arabia**

In 1958, health education started in Riyadh in Saudi Arabia, when the MOH initiated the first health institute for boys. In Riyadh and Jeddah in 1961, two-year nursing schools for women were opened, and from that first batch 13 graduated (Al Thagafi 2006; Alhusaini 2006). The MOH established the Department of Health Education and Training in 1967. In 1992, health institutes along with its branches were providing education in the health and nursing sectors (Alhusaini, 2006). Currently, according to Alhusaini (2006), there are more than 46 health colleges; 21 health colleges which include 4 for males and 17 for females, and 25 junior colleges where 15 were for males and 10 for females. The Saudi Ministry of Higher Education (MOHE) became responsible for all of these educational organizations in 2008 in order to develop the quality of nursing education.

King Saud University in Riyadh was the first college of nursing established by MOHE in 1976 to awarded bachelor of nursing degrees (Tumulty, 2001). Two nursing colleges were initiated, in Jeddah in 1977, and in Dammam in 1987 (Tumulty, 2001). A master's degree in nursing started in 1987; the first master's programme in the Gulf Countries (Alamri et al., 2006). King Abdulaziz University in 1994 started PhD program collaboration with British universities in order to facilitate career advancement for female nurses who are unable to travel overseas (Abu-Zinadah, 2004).

The latest statistics for the numbers of Saudi nurses show 67% have a diploma; 30% assistant degree holders, and 3% have a bachelor's degree. Additionally, 28 graduates have a master's degree, but so far there are just 7 graduates with a PhD (Abu-Zinadah, as cited in Aldossary et al., 2008). Scholarship programs are being offered to meet the rising needs of nurses and this is offered by various organizations including MOH, MOHE, larger Saudi hospitals and universities as well. Nowadays, there are many sponsored students who are studying nursing in various countries around the world (Alhusaini, 2006).

### **1.8.10. Medication Errors Policies and Procedures in Saudi Arabia**

In Saudi Arabia in 2008, the Committee of Nursing Standard Policy and Procedures (CNSPP) was established (Al-Osimy, 2008). Occurrence Variance Reports (OVR) (Incident Report) was one of the crucial aspects of the policies. The OVR is a form with guidelines for reporting occurrences that affect the quality of care within the hospital. It helps to identify an unsafe act in the early stage and prevent a recurrence of errors.

The policy states that the information contained in the OVR is not meant to be utilised for individual disciplinary action. It is stated that all OVRs shall be handled and maintained confidentially with access to documentation restricted to authorised individuals. Further, to maintain privacy, the content of the report should not be discussed with colleagues or other staff, patients, or visitors. Within 48 hours, the completed OVR must be sent to the Quality Department.

The 'Sentinel Event' which is part of policy of nursing is stated as, "an event that is undesirable and usually unanticipated death or serious physical injury or psychological injury is encountered and any event that might cause risk to the hospital with potential legal consequences and/or media inquiries or coverage" (WHO, 1997). Immediate response is needed along with its investigation after an error. For example, mortality related to medication errors, delays in treatment, and unexpected causes lead to death. The Quality Department is the authorised department to investigate, and recommendations should be provided to the hospital manager and finally the legal department of the health authority. The decisions that may be taken against nurses depend on the severity of the error and include warning letters, fines, or cancelling of licenses.

Nurses in Saudi Arabia are not insured against any errors, while doctors have insurance. It is stated by policy that if the patient is harmed, compensation will be given to them, depending on the degree and type of harm; for instance, death, body part damage, or any kind of

disability. For nurses this compensation must be paid personally by the nurse, and fear of having to pay large sums of money may prevent them from reporting errors. In addition, this compares poorly with other developed countries such as the UK, where the NHS in most cases will provide indemnity for nurses if there is a claim against them.

### **1.9. Implications for Medication Errors**

The Agency for Healthcare Research and Quality (AHRQ) describes patient safety as "freedom from accidental or preventable injuries produced by medical care" (AHRQ, 2004). Regarding patient safety, errors in medication administration is regarded as the problem within a healthcare environment. However, safety is not only the issue in healthcare systems and globally interest has been shown in healthcare systems in terms of safety culture in order to minimize associated routine risks which are directly concerned with tasks. Aviation and other safety relevant industries have frequently been held as examples for healthcare to emulate because of their ability to achieve safety despite the high risk and potentially catastrophic loss of life (Vincent, 2013). The parallels between healthcare and other industries can be overstated. However, the monitoring and measurement of safety in both high risk (oil, nuclear, construction and aviation) and industrial (food, manufacturing) settings is potentially extremely informative for healthcare, both regarding the measures used and the regulatory context in which they operate (Vincent, 2013).

Patient safety can be defined as 'the avoidance, prevention and amelioration of adverse outcomes or injuries stemming from the process of health care" (Vincent, 2010). The main concern of today's health care system in many countries is to ensure a patient's safety and this is the priority of health policy (WHO, 2002); thus it is clear that the safety of the patient is regarded as a corner stone of high quality care. Moreover, it is one of the ethical responsibilities of providers of health care to maintain the safety of patients. Within a healthcare delivery system, safety promotion and error promotion are also the responsibility



of the health care delivery system (WHO, 2002). Technological advancements have made improvements in order to maintain safety of patients although more complicated systems of health care exist today. As with any system, the complexity of healthcare carries its risks and things to go wrong, no matter how devoted and professional the healthcare staff. These incidents, particularly medication errors are widespread and can reappear with physical and emotional consequences not only for patients and their families but also for staff. Notably, there are also certain events that can cause more complicated consequences and even possible fatalities. More widely, these incidents and events can also increase the cost of treatment through litigation and additional treatment (National Patient Safety Agency, 2006).

The findings of the Harvard Medical Practice Study (HMPS), which was conducted by Brennan et. al., (2004) and published in two consecutive papers, show that's several countries reported shocking numbers of patients harmed or even killed by medical errors through reporting the frequency and magnitude of avoidable adverse patient events. This was the impetus for the publication of a report, ten years later by the Institute of Medicine (IOM). To error is Human: Building a Safer Health System (Kohn et al., 2000) also brought health professionals' attention to the problem. The report showed that health care errors affect almost 1 in every ten patients around the world and the World Health Organisation in 2002 called patient safety an endemic concern (World Health Organisation (WHO), 2002)..

The report focused on the external environment, policy and market strategy that should be employed to encourage safer actions by health professionals and healthcare organisations. However, this report neglected to acknowledge the values and beliefs of health professionals that were described as the major forces for improving patients' safety. As different organisations have different cultural values and beliefs, the figures in the report may not be applicable across all institutions. This is a particular issue for Saudi Arabian healthcare organisations, which are highly multicultural with a wide range of different values and beliefs.

Figures from the Institute of Medicine (IOM) show that medication errors impact at least 1.5 million people annually. The therapeutic costs of treating medication errors related injuries occurring in hospitals are roughly 3.5 billion dollars per year in the USA of America (IOM, 2006). The variation of the rate of medication errors ranges between 2 to 14% of hospitalised patients. Medication errors are estimated to kill 7000 patients annually and account for nearly one in 20 hospital admissions in the USA and the UK (Keers & Williams, 2013). Medication integration process is solely responsible for the failure of patients' safety and thus integrity is compromised in the process of administration which is a prime concern for healthcare professionals. Patient safety issues include prevention of suicide or fall, transfusion errors etc. Moreover, the quality of healthcare can be indicated by medication safety for patients (Benjamin, 2003; Joint Commission on Accreditation of Healthcare Organizations, 2006). It has been depicted that most common errors were administration errors, followed by prescribing errors, judged amongst all medication errors in chemotherapy and pediatric inpatient settings (Ghaleb et al., 2010). As Mentioned before, ADE is more clinically significant than ADR, for instance, aspiration pneumonia and over-sedation resulting from a 10-fold overdose of a drug would be considered an ADE but not an ADR, according to the WHO definition (Bates, 1995).

The most frequent reasons behind malpractice were injuries related to drugs, and ADE was considered by reviewers as preventable if it was to happen due to errors (Bates, 1995). All medication errors are not prone to cause injuries; errors include missing of dosage etc. and it should be under proper consideration though it is not injury but medication error. There should be considerable efforts to reduce medication errors which can be encountered in any form (Leape et al., 1995). A variety of errors can be caused by a single proximal cause, for instance wrong techniques of administration in medication, and also a lack of knowledge in physicians which lead to improper dosages, or rules might not be followed (Leape et al.,

1995). The National Coordinating Council for Medication Errors Reporting and Prevention (NCC MERP) took a stance on the medication error incidence rate and stated that there is not any acceptance of medication errors and the healthcare system must be improved continuously in order to cut down the number of medication errors in USA and UK (NCCMERP, 2002). So for decreasing medication errors, interventions are needed for improving the safety of patients through all stages in the overall management of medication, which includes safer administration in medication.

Medication errors are the most frequent cause of ADEs and most commonly occur in the prescribing stage (Aljadhey et al., 2013; Bates et al., 1995). In Saudi Arabia, the majority of the studies conducted to investigate prescribing errors came from primary care settings, and not many studies featured hospitalized patients. Therefore, the focus of this study is to investigate in depth the key barriers to medication error reporting and their relationships with nurses' perceptions of nursing leadership and patient safety in Saudi hospitals.

#### **1.10. Significance of the study**

Medication errors are a major worldwide issue and can cause serious medical consequences for patients, particularly those with acute complex medical conditions (Kozler, 2006). In general, medication errors (MEs) are under-reported in all countries (Osborne, Blais & Hayes, 1999), especially in developing countries. In Middle Eastern countries, and especially in Saudi Arabia, little is known about medication errors because of a lack of information (Alsulami, Conroy & Choonara, 2013). In addition, studies related to reporting of medication errors in these countries are relatively few. Medication errors are common in hospital settings, but very little is known about these errors in Saudi Arabia because of the absence of research (Alshaikh et al., 2013). Research and education programmes on medication error reporting for nurses and other staff are urgently needed.

Determination of barriers to medication errors reporting is a significant aspect of the current study because preventing medication errors from affecting the patient depends on knowledge of the barriers. Identifying the reasons for underreporting is crucial in preventing and reducing the incidence of MEs.

Recently, there has been a rise in the rate of medical error claims in Saudi Arabia (Shaheen, 2011). Approximately 40,000 medical error complaints are filed annually, a third of medical practitioners are banned from travel due to those complaints, and 80% of those complaints end without a conviction (Al-Harby, 2007; Samarkandi, 2006). A study by Alsafi et al. (2011) which investigated physicians' knowledge as practiced towards medical error reporting in Saudi hospitals, mentioned the underreporting of medical errors has been common in this hospital. In addition, physicians do not appreciate attempts to develop the system of error reporting, and a culture of blame still prevails. No study of nurses' practices related to medication error reporting was found in Saudi Arabia. A need for more transparency in discovering these errors is evident. Understanding the reasons behind this increase are not well studied and tend to emphasise the frequency of occurrence of errors without getting healthcare workers' perspectives (Alamry et al., 2012; Aljarallah et al., 2012; Tobaiqy, 2013).

There is no previous literature in Saudi Arabia that examines the barriers of medication errors reporting by nurses related to safety culture and nursing leadership. This may not facilitate accurate error reporting and may eventually compromise patient safety within the Saudi health care system.

This study outlines in depth an exploration and examination of nurses' and nurse managers' perceptions of the relationship between perceived safety culture and leadership styles and medication errors reporting by nurses in Saudi Arabia. It will add to the limited existing evidence base to inform the improvement of concentrated nursing education, and cultures

based on nurses' perceptions, which subsequently may encourage them to manage and report errors within a safe environment. It is crucial to develop strategies to identify the barriers to error reporting and reduce or prevent medication errors that suit the opinions of both the participants and the cultural context of this country.

### **1.11. Summary**

An overview of the thesis is presented in this chapter, presenting the research aim and objectives, the context of the study and an introduction of medication errors concepts, and the culture of safety and nursing leadership. In addition, an overview of the healthcare system in Saudi Arabia has been presented to orientate the significance and its potential importance. The purpose of the following review of the literature is to uncover knowledge regarding medication errors reporting, safety culture and nursing leadership, and identify the absence of this information to demonstrate the evidence gap in knowledge, as outlined in the next chapter.

## **Chapter II: Literature Review**

### **2.1. Introduction**

The literature review chapter provides a review of the articles on safety culture, nursing leadership and medication errors reporting in adult general nursing settings. The aim of this review is to identify the extent of work already done and any gaps related to the research question (Hart, 1998). This will then guide the focus of the study. It can also help to find methodologies which may be suitable to the research objectives. The chapter starts with the search strategy, and then the results of the search are detailed. There follows an appraisal of the literature, and then data extraction is presented. In the chapter summary the gaps in current study was discussed depend on the reviewed studies.

### **2.2. Searching the Evidence**

A systematic and comprehensive search strategy was used to research a wide range of databases and search engines using targeted selection criteria. The initial literature search was used to identify relevant key words and refine the inclusion and exclusion criteria. Using the search terms 'Safet\*', 'cultur\*', 'nurs\*', 'leadership\*', 'medication\*' and 'error\*' with the Boolean Operator (AND and OR), a comprehensive search was undertaken using the following databases: MEDLINE, CINAHL, and Cochrane database.

#### **2.2.1. Criteria for Selecting Studies**

The inclusion and exclusion criteria were identified and studies were searched and analysed according to the type of studies in terms of the quality of papers, outcome measures and type of participants.

##### **2.2.1.1. Inclusion Criteria**

The inclusion criteria were used to structure the research strategy:

- Primary research papers, which had a robust research design.
- Papers published in English or Arabic.
- Those published between 1993 to the modern day in order to include all the relevant information from the beginning of the exploration of safety culture (Health & Safety Commission, 1993).

#### **2.2.1.2. Exclusion Criteria**

The following aspects were excluded from the search:

- Papers published in languages other than English or Arabic.
- Research conducted in institutions other than hospitals
- Published before 1993

#### **2.2.2. Results of the search**

Following an initial broad search that yielded 1340 papers, the inclusion criteria and exclusion criteria were applied, and 1109 of the papers were excluded. A further, 221 papers were excluded following detailed screening according to specific criteria, including the removal of duplications. Consequently, 10 papers were reviewed in total (See Figure 6).

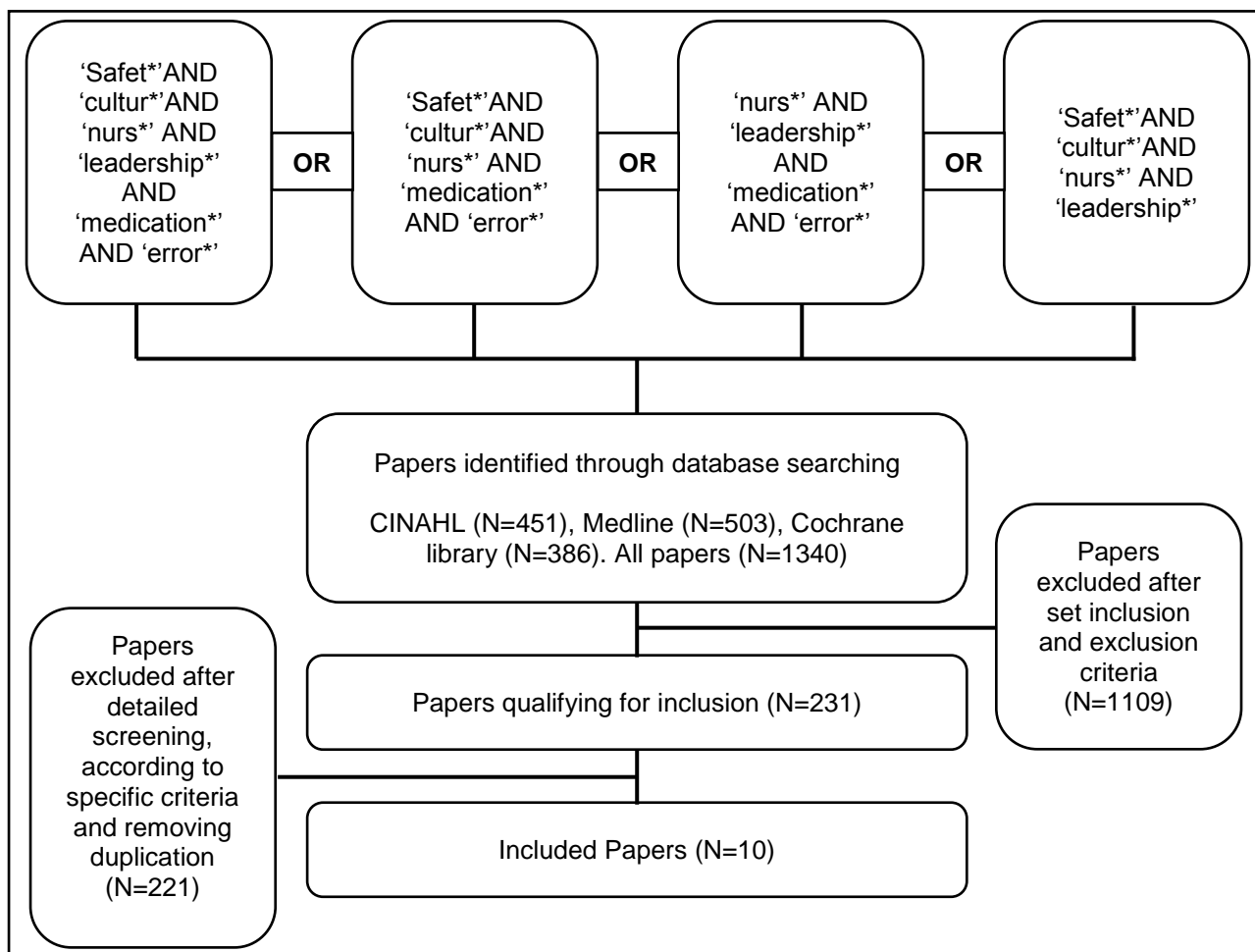


Figure 6. The results of the literature search

## 2.3. Evaluating the Evidence

### 2.3.1. Studies Selection

Initially the studies were chosen dependent on the title of the article and abstract meeting the determined criteria. Then, the full article text was read for clarification, if that were not clear.

### 2.3.2. Article Appraisal and Assessment of Studies Quality

The critical appraisal of papers is a process of assessing their quality against set criteria in order to determine whether they are a good fit to the research and of high-quality standard. Hawker et al. (2002) stated that appraising tools are specifically valuable for this purpose. Plenty of tools are available to assess research quality (Creswell, 2013, Brink & Louw, 2012, Hawker et al., 2002; Higgins & Green, 2008). Out of these, the Hawker Assessment Tool was selected for this study as it allows the researcher to score and measure



the quality of the reviewed papers. Moreover, when compared with other tools of appraisal such as the Critical Appraisal Skills Programme (CASP) which is mainly concerned with individual research designs (CASP UK, 2013), the Hawker Assessment Tool has a single form that can be applied to all of the studies regardless of design, which affords consistency in appraisal. Overall, when appraising a paper using this tool there are numerous factors to be assessed, which include the abstract and whether it provides a clear description of the study under consideration, the introduction and aims, as well as the background to the study and findings. The implications of the study in terms of putting the findings into policies and practice also need to be discussed, as well as the contribution of the study, and its recommendations. When all these factors are evaluated, a total score is provided (with the maximum of 36) reflecting the quality of the papers against set criteria (Hawker, 2002) (See Appendix 1).

### **2.3.3. Data Extraction**

Using the Hawker Assessment score Tool the data extraction template was completed by the researcher to gather pertinent data about the properties of the included studies (University of York & Centre for Reviews Dissemination [CRD], 2009). The template for data extraction enables the researcher to review the literature and minimise bias (Elamin et al., 2009; University of York & CRD, 2009). The study data extraction template is outlined in Table 3.

Table 3. Articles included in the Literature Review

No	Author/year	Abstract and title	Introduction and aims	Method and data	Sampling	Data analysis	Ethics and bias	Results	Transferability or generalizability	Implications and usefulness: How important are these findings to policy and practice	Quality Score=36
1	Aljadhrey et al. (2012) (Saudi Arabia)	Medication safety practices in hospitals: A national survey in Saudi Arabia.	Assessed the presence of core medication safety practices in Saudi Arabian hospitals.	Cross-sectional Survey design. A survey to assess medication safety practices in hospitals.	78 Saudi government hospitals.	Descriptive analysis (SPSS) and chi-square test.	Not mentioned	30 % of the hospitals have a safety committee and 9 % have a safety officer, which indicates that there are poor safety practices in these hospitals that should be addressed in order to maintain patient safety.	Yes	The results of this study have important implications on practice in other developing countries similar to Saudi Arabia. Action should be taken by the healthcare professionals and hospital administrators to implement low cost practices. These practices include lists of LASA medications, lists of discharge medications and lists of prohibited abbreviations.	
	HAT*	3	4	4	3	4	1	3	4	3	29
2	Aljadhrey et al. (2013) (Saudi Arabia)	Challenges to and the future of medication safety in Saudi Arabia: A qualitative study.	Explored the perspectives of healthcare practitioners on current issues about medication safety in hospitals and community settings in Saudi Arabia.	Exploratory qualitative enquiry. Focus group discussion.	65 medication safety experts. Including physicians, nurses, pharmacists and academics.	Thematic content analysis.	Not mentioned	There has been identification of the major challenges and opportunities for medication safety in Saudi Arabia, the policy makers and practitioners need to consider these factors and challenges.	No	Future initiatives should consider the issues raised in this study in designing programs aimed at improving the safe use of medication. The study findings also highlighted the need for the implementation of interventional, research and educational services to ensure the safe use of medications.	

	HAT*	4	4	4	4	3	1	3	2	3	28
3	Drach-Zahavy et. al (2014) (Israel)	(How) do we learn from errors? A prospective study of the link between the ward's learning practices and medication administration errors.	To test the effectiveness of four types of learning practices, namely, non-integrated, integrated, supervisory and patchy learning practices in limiting medication administration errors.	Observations, self-report questionnaires and administrative archive data. Structured observation sheet, Learning Practices Questionnaire.	360 nurses in 76 wards (medical & surgical).	Mixed linear model.	Ethical Approval presented	The use of technology and quiet location of the medication cabinet were significantly associated with reduced medication administration errors.	Yes	First, nurses must be educated in the potential costs of their "cutting corners" in the course of medication administration. Secondly, local leaders can facilitate learning from errors by monitoring nurses' medication administration behaviours. Thirdly, risk management units should aim to devolve learning to the unit level, error prevention is required as a first line of defence.	
	HAT*	4	3	4	3	4	3	4	2	4	31
4	Hofmann & Mark (2006) (USA)	An investigation of relationship between safety climate and medication errors as well as other nurse and patient outcomes.	To investigate the relationship between safety climate and medication errors as well as other nurse and patient outcomes.	Mixed Method predictive observational study with surveys to correlate key factors cross sectional survey. Dillman's Total Design Method.	1127 nurses in 81 medical and surgical units in 42 non-federal, non-psychiatric accredited acute care hospitals in USA.	Exploratory factor analysis.	Not mentioned	Taking a broad view of safety climate one that includes not only the development and adherence to safety protocols, but also open and constructive responses to errors is an important move forward a more comprehensive view of safety with organisations.	Yes	The policies and procedures would in turn be reinforced by a positive social context. we believe that future research should consider whether an even more comprehensive view might come closer to achieving .The results clearly document the importance of the overall safety climate of the unit on key health care outcomes.	

	HAT*	2	3	4	3	3	3	4	2	3	27
5	Kagan & Barnoy (2013) (Israel)	Organizational Safety Culture and Medical Error Reporting by Israeli Nurses.	Investigate the association between patient safety culture (PSC) and the incidence report rate of medical errors.	Cross-sectional Survey design. Questionnaire survey, HSOPSC.	247 nurses in one University.	Pearson correlation coefficient, t tests, and multiple regression analysis.	Ethical Approval presented	The level of the patient safety culture was positively and in significant correlation with the reported errors.	No	A positive, carefully designed organizational safety culture can encourage error reporting by staff and so improve patient safety.	
	HAT*	4	3	4	3	3	3	4	2	3	29
6	Lawton et. al (2012) (UK)	Identifying the Latent Failures Underpinning Medication Administration Errors: An Exploratory Study.	To identify the latent failures that are perceived to underpin medication errors.	Cross-sectional qualitative design. Semi-structured interviews.	12 nurses and 8 nurse-managers in three medical wards in a hospital in the United Kingdom.	Thematic content analysis.	Ethical Approval presented	The interview outcomes have predicted ten latent failures including ward climate, working environment, workload, human resources, procedures and policies, and communication.	No	Knowledge of the study results could be used to inform measurement for patient safety at the organizational level. Could also be used as the basis for the improvement and design of incident reporting systems.	26
	HAT*	3	4	3	4	3	4	3	1	3	28
7	Pazokian et. al (2014) (Iran)	Iranian nurses' perspectives on factors influencing medication	To explore nurses' perspectives of factors influencing medication errors.	Qualitative. Semi-structured interviews.	20 nurses in a teaching hospital.	Content analysis.	Ethical Approval presented	Planning of comprehensive educational programs and the provision of constructive feedback are	No	Findings of this study can be beneficial to managers for nurturing a transparent organisational culture, whereby staff members freely discuss their errors in patient care and seek advice for problem solving.	28

		errors.						important factor in favours of learning climate.			
	HAT*	4	4	4	3	3	3	4	1	2	28
8	Vogus & Sutcliffe (2007a) (USA)	The safety organizing scale Development and Validation of a Behavioural Measure of Safety Culture in Hospital Nursing Units	To develop and test a self-report measure of safety organising that capture the behaviours theorised to underlie a safety culture and demonstrate use for potentially improving patient safety as evidenced by fewer reported medication errors and patients falls.	Cross-sectional analysis and survey. Analysis of medication errors incident and the safety Organizing Scale (SOS).	1685 registered nurses from 125 nursing units in 13 hospitals.	One way (ANOVA) and Multi Regression .	Not mentioned	There is a variation between the organisational commitment and trust that has been associated with negative reporting of the medication errors.	Yes	It provides a self-report measure of the behaviours that lead to the emergence of a safety culture.	28
	HAT*	4	3	3	3	4	2	4	3	1	27

9	Vogus & Sutcliffe (2007b) (USA)	The Impact of Organizing, Trusted Leadership, and care Pathways on Reported Medication Errors in Hospital Nursing Units.	Explore the Impact of Organizing, Trusted Leadership, and care Pathways on Reported Medication Errors.	Cross-sectional survey design correlated with prospective observational study. Analysis of reported medication errors on hospital incident reporting system in relation to safety perceptions.	1033 nurses and 78 nurse-managers in USA.	Multilevel Poisson Regression.	Not mentioned	The benefits of safety organising on reported medications errors were amplified when paired with high levels of trusted management or the use of care pathways.	Yes	Safety organising plays a key role in improving patient safety on hospital nursing units especially when bundled with other organisational components of a safety supportive system.	27
	HAT*	4	3	3	3	4	3	4	3	1	28
10	Wong (2015) (Canada)	Connecting nursing leadership and patient outcomes: State of the science.	Describing the evidence linking leadership with patient outcomes.	Systematic review.	20 included articles.	Systematic review.	Not applicable	Supportive leadership approach is connected with positive patient safety outcomes resulting in a lower rate of medication errors and also high degree of patient satisfaction.	Not applicable	Research findings suggest that leaders' value for and knowledge of patient care requirements, the quality of their interpersonal skills and their facilitation of healthy working conditions and engagement in leadership behaviours that inspire nursing teams to higher levels of performance are important predictors of improved patient outcomes.	27
	HAT*	4	4	3	4	3	1	4	1	4	28

\* HawkerAssessment Tool

## **2.4. Individual Studies Overview**

Ten studies were included. These addressed different issues and aspects of medication errors reporting in relation to safety culture and nursing leadership. Details of the studies are shown in Table 3.

### **2.4.1. Study Designs**

The ten studies selected related to safety culture, nursing leadership and medication errors reporting by nurses in health care settings. 4 studies used mixed methods (Drach- Zahavy et. Al., 2014; Hofmann & Mark, 2006; Vogus & Sutcliffe, 2007a; Vogus & Sutcliffe, 2007b). In mixed methods research the investigator combines quantitative and qualitative methods, gaining two varieties of data. This mixed method design allows the researcher to gain data by two ways, utilise one to interpret the other and giving a more detailed clarification of the results (Creswell, 2007). This kind of design approach to collection of data can provide explanation and context which a single method might not provide.

2 descriptive survey studies were identified (Aljadhey et al., 2012; Kagan & Barnoy, 2013). The method for the used design is straight forward so that information can be obtained from samples along with that this method is also regarded as appropriate because about perceptions and views information can be obtained. Samples like large number of nurses can be approached by this method because it is providing wider view regarding issue in least time span (Lobiondo-Wood and Haber, 2006). Additionally, the studies which have been done had used variety of surveys; they are provided short descriptions without detailed explanation. 3 studies used qualitative designs to conduct in-depth interviews with their participants (Aljadhey et. al., 2013; Lawton et. al., 2012; Pazokian et. al., 2014). 1 was a systematic review (Wong, 2015).

### **2.4.2. Sampling and Participant Recruitment**

4635 nurses participated in the ten included studies; the convenience basis was selected by five studies (Aljadhey et al., 2012; Drach- Zahavy et. al., 2014; Kagan & Barnoy, 2013; Vogus & Sutcliffe, 2007a; Vogus & Sutcliffe, 2007b). The response rate was very high in two studies at more than 90% (Drach- Zahavy et. al., 2014; Kagan & Barnoy, 2013) and around 50% in two other studies (Vogus & Sutcliffe, 2007a; Vogus & Sutcliffe, 2007b). The sample in Aljadhey et al.'s 2012 study was drawn from 78 Saudi government hospitals. In only one study was the sample selected on a random basis (Hofmann & Mark, 2006). The sample in Aljadhey et al., (2013), was 65 medication safety experts including physicians, nurses, pharmacists and academics.

The qualitative study of Lawton et. al. (2012) included 12 senior managers and 8 managers. In the second qualitative study (Pazokian et, al, 2014), 20 nursing staff with at least 2 years of work experience were selected using purposeful sampling. The sample was very small which impacted the generalisability of their results and makes it hard to have trust in the findings given. In the third qualitative study (Aljadhey et. al., 2013), 65 health professionals from a team including nurses were divided into 9 round-table discussion sessions.

### **2.4.3. Country of Origin**

The studies were located in different countries. The international studies should give a valuable comparison to the differences in culture in the hospitals of Saudi Arabia. Two of the included studies were located in Saudi Arabia (Aljadhey et. al 2012; Aljadhey et al., 2013). Three took place in the United States (Vogus & Sutcliffe, 2007a; Vogus & Sutcliffe, 2007b; Hofmann & Mark, 2006), two in Israel (Drach- Zahavy et. al 2014; Kagan & Barnoy, 2013), one in the United Kingdom (Lawton et. Al., 2012), one in Canada (Wong, 2015), and one in Iran (Pazokian et. Al., 2014).



#### **2.4.4. Study settings**

Seven studies were carried out in general or unspecified or private hospitals (Aljadhey et al., 2012; Aljadhey et al., 2013; Drach- Zahavy et. Al., 2014; Hofmann & Mark, 2006; Lawton et. Al., 2012; Vogus & Sutcliffe, 2007a; Vogus & Sutcliffe, 2007b), and two in teaching hospitals (Kagan & Barnoy, 2013; Pazokian et. al., 2014). The final study was a systematic review (Wong 2015).

Five studies were carried out in more than one clinical setting (Aljadhey et al., 2012; Kagan & Barnoy, 2013; Pazokian et. al., 2014; Vogus & Sutcliffe, 2007a; Vogus & Sutcliffe, 2007b). Three studies were conducted solely on adult and surgical units (Drach- Zahavy et. al., 2014; Hofmann & Mark, 2006; Lawton et. al., 2012). Aljadhey et. al., (2013) study used a multidisciplinary health professional team which included nurses.

### **2.5. Aim of Review**

The aim of this study was to investigate the medication error reporting in relation to perceived safety culture and nursing leadership as well as trying to establish a link between these three factors. Several studies have outlined safety culture, nursing leadership and medication errors within their research. Having reviewed the final ten papers a number of themes emerged within this area. They included defining and measuring medication errors, perceived contributing factors to medication errors, preventing and managing medication errors, medication safety practices and safety culture, and finally, leadership in healthcare.

#### **2.5.1. Defining and Measuring Medication Errors**

Regarding medication administration errors, three studies detailed medication errors can happen at any part of the medication process (Drach- Zahavy et. al., 2014; Hofmann & Mark, 2006; Vogus & Sutcliffe, 2007a)

Medication errors can happen at any step of the medication process, starting with drug prescription by a doctor, up to drug administration by nurses or patients. There are some specific reasons for medication errors which include false diagnosis, prescription errors, dose miscalculations, poor practices of drug distribution, imprecise drug administration, poor communication and absence of the patient (Academy of Managed Care Pharmacies (AMCP) 2010). Some studies defined the key and hidden factors influencing medication errors.

Drach- Zahavy et. al. (2014) focused on the complex and demanding medication administration stage. They suggest that medication administration errors are defined differently across the literature. They define them like any variation from policies, procedures, and/or best practices for medication administration. This definition points out that although these variations do not significantly lead to adverse consequences (i.e. patient harm), they initiate conditions which can underpin more frequent consequences. Adverse consequences for patients were reported to be the result of alterations to typical procedures of medication administration. Drach- Zahavy et. al. (2014) utilised various methods including survey, administrative archive data and observations. Data collection dealt with the collection of baseline measures of medication administration errors and the control of variables. Medication administration errors were tested by a structured observation sheet proposed in previous research on nurses giving medications (Drach-Zahavy et. al., 2014). This has been identified as one of the best methods to measure safety compliance, as recent studies suggest an underestimation bias when nurses use only self-reports (Armitage & Knapman, 2003). The structured nine-column observation sheet outlined nine different phases in the medication administration process, using best practice and Saudi Ministry of Health guideline. The doctor's medication prescription, prescription documentation in the nurses' reporting sheet, medication preparation for a particular patient, identification of the patient before administration of the drug, taking applicable health measures (e.g. blood pressure), providing

information about the medicine, providing the medicine and making sure that it has been completely taken, confirming administration of the medication by signing the Kardex, and checking for symptoms and side effects. Observers reported if these factors were executed effectively, and determined if deviation occurred. In both of the two phases of data collection, all nurses were observed administering medications to patients on three different occasions. Medication errors were then calculated as a proportion of deviations from the prescribed procedure for each patient across the three observations.

Medication errors were defined as the incorrect patient, incorrect dose, incorrect drug, incorrect time, incorrect route, or omission (Hofmann & Mark, 2006). To avoid a potential reporting bias, Hofmann & Mark utilised a measure of medication errors which resulted in harm. Harm turned out to be a medication error that needed to be raised during medication intervention or treatment, observation, laboratory and/or radiographic testing, technical monitoring, or transfer of the patient to another unit as a result of the error. The study coordinators also recorded the frequency of medication errors reported in archived records.

Medication errors were characterized as happening whenever medication was given to the wrong patient, at the opportune time, in the correct dose, or by means of the correct course (e.g. intravenous), and were measured using the quantity of errors that were reported to the incident reporting unit for half a year after the collection of the data (Vogus & Sutcliffe, 2007a).

About the utilisation of medicines, nurses are giving instructions to the patients along with its proper prescription which is proper procedure being advised by registered authorities of professionals like doctors and nurses and proper plan has been prepared (Haas et al., 2012). Common errors are encountered in medication that can be produced by nurses and doctors. There are various forms of errors related to prescription and the most common are the illegal

detailing, incorrect amount of dosage and ordering drugs or medication in inappropriate manner and it can react as well when taken with other medications (Haas et al., 2012). For prescribing medicines in Saudi Arabia, nurses have not any authorisation and definition which is includes inappropriateness would not be prescribed.

### **2.5.2. Perceived Contributing Factors to Medication Errors**

Out of ten studies, there were three which investigated perceived contributing factors that affect medication errors (Lawton et. al., 2012; Pazokian et. al., 2014; Vogus and Sutcliffe, 2007b). Lawton et, al., (2012) conducted an exploratory study that dealt with the factors that lead to medication errors. Medication errors stand out amongst the most well-known sorts of patient safety incident and may cause serious adverse effects. Lawton's study utilised semi-structured interviews with nurses working on medical wards, and their managers, to identify the latent failures perceived to be associated with medication errors. Eight supervisors were interviewed (including a nursing executive, a clinical director, and a risk manager). Questions were aimed to bring out the perspectives of the participants on the causes of medication errors. The interview questions were based on Reason's organisational model of human error (Reason, 1990). These included dynamic failures, local conditions, and organisational perspectives. Responses were analysed using Content Analysis. Based on this analysis, ten latent failures were found: ward climate, working environment, amount of work, fixed procedures, communication of the team, human resources, supervision and leadership, written policies and processes, bed management, and training.

Pazokian et, al., (2014) from Iran also performed a qualitative study to examine nurses' opinions about components that affect medication errors. This study utilised semi-structured interviews using a deductive approach according to Reason's human error model. The study included 20 nurses with no less than two years' experience working in one teaching hospital. Two themes were distinguished by the participants: (1) the individual approach including the

mental processes of nurses, the medical history of patients and doctors' order errors; and (2) the social and hierarchical approach including learning process, working environment conditions, hazard administration procedures, attendants' pharmacological information, unavoidable nursing errors and medication error difficulties.

Vogus and Sutcliffe (2007b) in contrast explored the effect of safety procedures, authority and trust in managers, and configuration (utilisation of care pathways) on reported medication errors in hospital nursing units. A sum of 1033 registered nurses and 78 nurse managers in 78 intensive care, emergency department and surgical-nursing units in 10 acute care hospitals in Indiana, Iowa, Maryland, Michigan, and Ohio were surveyed from December 2003 to June 2004. A cross-sectional investigation of medication errors found that the hospital errors reporting system six months after the administration of the questionnaire highlighted safety organising, confidence in administrators, utilisation of care pathways, registered nurses' qualities and staffing to be influential

### **2.5.3. Preventing and Managing Medication Error**

Seven studies investigated how to reduce and prevent medication errors (Aljadehy, 2012; Aljadehy, 2013; Drach–Zahavy et al., 2014; Pazokian et. al., 2014; Vogus & Sutcliffe, 2007a; Vogus & Sutcliffe, 2007b; Wong et al., 2013). These studies provide important thoughts on patient safety and medication errors, although they adopted different methodologies and approaches. Studies such as that of Vogus and Sutcliffe (2007b) and Wong et al. (2013) for example, have delved beyond a sole focus on medication errors, highlighting a connection between supportive leadership and positive patient safety results, together with a reduction in medication errors. Vogus& Sutcliffe (2007a) argue that the benefits of focusing on and reporting medication errors improves when there is buy-in from senior management.

In contrast, practices to develop medication safety have not been applied in many hospitals in Saudi Arabia. Greater effort should be made at national level to improve the adoption of such practices (Aljadhey, 2012). Healthcare professionals face both extensive opportunities and challenges for medication safety in Saudi Arabia. Policy makers and practitioners must take responsibility for considering these factors in improving medication safety (Aljadhey, 2013).

The results of the Pazokian et al. (2014) study can help head nurses and chiefs to manage organisational cultures whereby staff can have open debate about their errors and discuss different approaches to take care of the issues. In addition, the outcomes of the study demonstrate the significance of planning educational programmes for those engaged in patient care and allowing a critique of incidents in a positive learning atmosphere. They argue that emphasis ought to be on approaches that guarantee choice in light of legitimacy, satisfactory preparation, insightful supervision, tutoring to lessen mistakes by untrained staff individuals, and legitimate assessment. All members of the work force must be able to attend. It is suggested that utilising quality change programs in all facilities can be used to highlight arrangements, teaching, and innovations to decrease medication errors.

Drach–Zahavy et al., (2014) found that ward-based learning plays a vital part in minimising medication errors. The most influential factor associated with decreased medication errors was supervision. This approach facilitates learning in the unit, allowing organisations to examine mistakes by observing, giving criticism and rectifying staff attendants' medication administration errors, by identifying the ward's needs and promoting standards (Leroy et al., 2012). This demonstrates that standard inspections, supervision and close observation are the best methodology to enhance adherence to guidelines and strategies (Brady et al., 2009). Additionally, by checking attendants' adherence to rules, nurse managers' support equally shows practices that promote error free medication administration processes. Safety environment analysts see the line manager's role as key to facilitating an environment of

health in the working environment (Zohar & Tenne-Gazit, 2008), and in restricting medicine organisation errors. No connection was found between non-integrative learning practices and medication errors. Using risk-management initiatives to prevent medication errors has several benefits, including the appointment of experts to deal only with safety issues, which enables them to see the big picture at the organisational level and to give solutions for issues based on their cumulative experience (Drach–Zahavy et al., 2014).

Wards should move from avoiding medication errors to overseeing them. However, little is known about how wards apply methods to minimise errors. Drach-Zahavy et al. (2014) led an investigation to check the viability of four different types of learning, in particular, non-coordinated, incorporated, supervisory and patchy learning in restricting medication errors. Information was gathered from four doctor's facilities in Israel using different techniques (perceptions and self-report surveys). The participant included 76 units (360 attendants). Medication errors were characterized as any deviation from endorsed drug forms and measured by an approved medication sheet in the wards' medication administration; a solution situation and workload were recorded and learning practices and socioeconomics were measured using approved surveys. Consequences of the blended approach model examination showed that the utilisation of innovation and a calm area for prescribing were connected with diminished medication errors (gauge = .03,  $p < .05$  and evaluate = - .17,  $p < .01$  correspondently), while workload was connected to increased medicine organisation mistakes (assess = .04,  $p < .05$ ). Of the learning practice, supervisory learning was the main practice connected to reduced medicine organisation mistakes (evaluate = - .04,  $p < .05$ ). Coordinated and sketchy learning were together connected to more elevated numbers of medication administration errors (evaluate = - .03,  $p < .05$  and appraise = - .04,  $p < .01$  correspondently). Non-incorporated learning was not related ( $p > .05$ ). The ways in which wards oversee errors may suggest solutions for organisational mistakes, the impact on the

normal individual and hierarchical components. It is argued that managers can encourage learning from errors by monitoring and checking medical care takers.

How units manage errors might have implications for medication errors beyond the effects of typical individual, technology and organisational risk factors. Head nurses can learn from errors by monitoring nurses' medication administration behaviours in a non-blaming way (Drach- Zahavy et. al., 2014).

#### **2.5.4. Medication Safety Practices and Safety Culture**

To build an effective medication error reporting system it is important to understand the views and beliefs of nurses toward safety culture. Four studies evaluated medication safety practices and safety culture (Aljadhey et al., 2012; Aljadhey et al., 2013; Hofmann & Mark, 2006; Kagan & Barnoy 2013). Aljadhey et al. (2012) conducted a study in Saudi Arabia hospital to evaluate core medication safety practices and the finding of this study showed there was a significant development opportunity. Issues included transitions in care, Look-Alike Sound-Alike (LASA) medications, drug information, control of concentrated electrolyte arrangements, information technology, and other medication safety practices. Seventy-eight hospital were studied and the result illustrated just 30 % of the hospitals have a safety committee and 9 % have a safety officer, which indicates that there are poor safety practices in these hospitals that should be addressed in order to maintain patient safety. The vast majority of these hospitals had a limit of 100– 299 beds that implies it is a large hospitals. Moreover, just 33% of the hospitals had a list of LASA medication and half had a list of error prone abbreviations. Concentrated electrolytes were accessible in floor stock in 60% of the participant hospitals. None of these hospitals have pharmacist to discover history of medication and just 37% of hospitals provide the list medication to the patients at discharge. This study showed the essential practices of safe use of medication were not applied in several Saudi Arabian hospitals. To improve the safety of medication use in these



hospitals, the decision and policy makers need to offer education programmes, regulation and support research.

Aljadhey et al. (2013) investigated the perspectives of healthcare workers about medication safety in hospitals and community settings in Saudi Arabia, keeping in mind the end goal to reduce difficulties in enhancing and investigating prescription practices. An aggregate of 65 doctors, pharmacist, academics, nurses and medical attendants went to a one-day meeting in March 2010. The members were separated into nine round-table information exchange sessions. Three major issues were investigated in these sessions, including: the main considerations of prescribing, difficulties in enhancing pharmaceutical safety practice, and recommendations for enhancing medication safety. The sessions were recorded and interpreted verbatim and investigated by two researchers. The main considerations identified access to medicines from different clinics and group drug stores, correspondence gaps between human services foundations, which were constrained innovations, by supplier arrangements, and the absence of solution programs in health centres. Difficulties in prescription safety recognised by members included underreporting of errors and different medication responses, multilingualism and contrasting foundations of medicinal services experts, absence of communication between healthcare suppliers and patients, and high workloads. Recommendations for enhancing medication safety practices in Saudi Arabia included competency assessment focusing on medication safety and continuous education for healthcare professionals, improvement of a culture that empowers solutions to mistakes and negative medication responses. In Saudi Arabia healthcare provider experts have recognised real difficulties and have opened doors for drug management. Policy makers and professionals must to consider these elements when planning future projects for enhancing the utilisation of medicines (Aljadhey, 2013).

In the other study, Hofmann & Mark (2006) explored the medication errors in relation with outcomes of patients and nurses along with the safety of climate. Empirical support has been shown by findings as well in order to treat various sub-dimensions which are traditional in manner in terms of safety-climate. There are several other sub-dimensions as well which are treating as an indicator assessment as single and broad for climatic safety. Additionally, errors in medication relate the safety of climate significantly and several other vulnerabilities are also being caused for management such as back injuries of nurses, infections in urinary tract, satisfaction of patients, and perceptions of patients regarding response of nurses. Patient's conditions on the unit and its associated complexity measured the relationship of safety climate to medication errors and back injuries of nurses as well. Moreover it can be said that interaction form decided the outcomes of healthcare which are related to the safety of climate when more complex patients are being dealt. However, it is believed that results depict the theoretical as well as extensive practical implications.

Kagan and Barnoy (2013) examined the relationship between patient safety cultures (PSC) and the occurrence and reporting of medication errors by nurses. Self-administered surveys were used to test 247 nurses selected at University (response rate = 91%). The survey had three sections to examine medication errors reporting, the type and rate of reporting in the clinical practice and the nurse's perception about safety culture. The finding from this study illustrated the lack of reported errors in the participant hospital with only 1.6% of nurses reported errors in the last year. In addition, just 44.1% of nurses claimed that they reported their own errors "often or always," while 6% of the sample never reported their own errors. The finding of this study illustrated the importance of education for nurses in organisational safety culture and how this might improve error reporting. In addition, Kagan and Barnoy divided the implications for nursing practice in many levels. Firstly, the clinical level, these results could help to both promote error self-reporting and reduce error making.

These results showed a relationship between a higher PSC and higher levels of error reporting and lower levels of error making. Furthermore, creating positive patient safety culture could promote reporting the errors and lead to reduce making errors. Secondly, the management level, this study has highlighted the influence of administrative leadership to the promotion of patient safety: management must institute a strong safety culture and make it prominently visible to all nurses and other staff members. Thirdly, the national level, these topics need to be at the centre of political and public discussion and among the first concerns of the healthcare system's senior managers. In the final analysis it is they who must provide the resources needed to achieve quality and safety.

#### **2.5.5. Nursing Leadership and medication errors reporting**

In variety fields the leadership has been studied from education, military, psychology, health, and more recently in nursing (Cummings et al., 2010). There are various crucial measures as well which are dealing with the increasing demand in order to anticipate the change, improvement of performance, leadership performance which is effective so that essentiality should be insured which is leading the company towards more efficiency and effectiveness for developing new structures (Erkutlu, 2008). It has been noted by Al-Hosis (2009) that profession of nursing has been thought with great vision by leaders who have worked continuously in order to achieve the professional vision. Leaders were skilful and extracted the best performance leaders which were done by their followers and it was also dared by them to challenge the resistance which was coming on their paths which were leading to the success. Leadership in effective nursing has remained very crucial for future because this profession has faced challenges which are mounting.

In this study two studies explored the connection between nursing leadership and reported medication errors by nurses (Vogus & Sutcliffe, 2007b; Wong, 2015). Vogus and Sutcliffe (2007b) found the fact that higher levels of trust are directly associated with higher levels of

organising the safety or it can also be said that pathways which are related to extensive use has reported fewer errors in medication. High functional unit is associated with the reporting of errors and reported errors in medication are associated positively with various safety performance indicators. Moreover, it has been shown in the previous research about patient's falls and RN back injuries are affected negatively by safety organising and safety climate respectively. Regarding performance of safety another indicator has also been found where medication errors are negatively associated with unit assessment of nurse managers. Therefore, low rating of nurse managers regarding their quality care resulted medication errors high in number. Interestingly, a systematic review conducted by Wong (2015) attempted to examine the link between nursing leadership and patient outcomes based on evidence. Instead of considering the assessment of the nurses' outcomes the reviews are got from the databases from administration prospectively. It was clear that the relation between safety outcomes of the patient and effective leadership and satisfaction from the patients is higher. The research also suggests that the value of leaders and the required knowledge to take care of patients, their facilitation of healthy working conditions, the quality of their interpersonal skills and the engagement of leadership behaviors that encourage the teams of nurses to perform at higher levels. These are the factors that help in predicting the outcomes of patients to get improved. At the end, a reporting systems and safety cultures need to improved, sending a powerful message by leadership within organisations about how errors should be managed within a patient safety culture.

## **2.6. Limitations of the review**

Quantitative surveys have been depicted by two studies which have used numerous measuring tools from which self-reporting bias might be created. Different concepts were used by surveys, which depicted different concepts and also made crucial comparisons in various studies like Aljadhey et al. (2012) and Kagan & Barnoy (2013). Only three studies

have done a qualitative analysis and provided in depth information, but the major concern was that these were not generalisable because the sample was very small and so the generalisability of the findings was affected; and it was difficult to have confidence in these evidence.

The majority of included studies were mixed method where the investigator might be interested to combine the two methods, for instance qualitative and quantitative, and it was difficult for researchers to carry it all alone. Moreover, using both methods extensively is expensive and more time taking (Creswell, 2007). In this literature review only Arabic and English publications are included, from which bias can be created because errors reporting does not include the cultural perspective in detail. In spite of this, different studies were compared which were taking from various methodologies in order to identify the crucial areas for future research perspectives, to minimise medication errors by potential intervention and improve medication errors reporting systems in present health care settings.

## **2.7. Summary**

This current review has examined the relationship between perceived safety culture, nursing leadership and medication error reporting by nurses. It is apparent that there is no previous research that specifically links these three concepts together in a Saudi Arabian context or worldwide. Related to the lack of evidence in Saudi Arabia context and the resulting that there is a differences of beliefs between cultures confirms a need to searching an in-depth study of nurses' views of reporting medication errors in Saudi Arabia.

From the review, it can be concluded that there is a need for further studies in Saudi Arabia in terms of medication errors reporting, and the relationship with safety culture and nursing leadership, which will be addressed by the current study.

A variety of data obtained from this literature review was supportive for the chosen of surveys and interview questions in this study. From different methodologies the studied have

promote a concentrate on the quality, issues and components of medication errors reporting in relation to perceived safety culture and nursing leadership. The following chapter outlines the philosophical paradigms and methods used to explore the relationship between safety culture, nursing leadership and medication error reporting by nurses in a Saudi Arabian context.

## **Chapter III: Methodology**

### **3.1. Introduction**

Methodology involves a description of the research design, including justification of why it was the most appropriate approach for the study. This chapter provides a comprehensive presentation of the methodological problems and methods which were used in this study, as well as the justification for their use. The aim of any study should guide the methodology used, as the method chosen should be one that will produce data most appropriate to answer the research questions. In this chapter, the aims and objectives, the philosophical paradigm, the research design, the study setting, samples and instrumentation, procedure, and data analysis techniques are presented in detail.

### **3.2. Research Aim**

The aim of the study was to explore the relationship between perceived safety culture, perceived nursing leadership, and medication errors reporting by nurses in adult medical-surgical wards in the Qassim region of Saudi Arabia.

### **3.3. Specific Research Objectives**

1. To compare reported medication error rates and types of errors between hospitals in the Qassim region of Saudi Arabia
2. To investigate the perceptions of nurses and nurse managers about the safety culture in adult medical-surgical wards in Qassim hospitals.
3. To investigate the perceptions of nurses and nurse-managers about nursing leadership styles in adult medical-surgical wards in four hospitals across this region.
4. To investigate whether there were any associations between perceptions of safety culture, nursing leadership styles and reported medication errors.

### **3.4. Philosophical Paradigm**

The philosophical paradigm used in this study was adapted from critical realism. Critical realism was developed by the British philosopher Ray Bhaskar; it deals with both ontology and epistemology (McEvoy & Richards, 2006). Ontological study of the nature of social reality (Dillon & Wals, 2006; Ramey & Grubb, 2009) – the type of things that exist, the conditions of their existence and the relation between these things (Blaikie, 2003). Drawing on the work of Schwandt, Carter & Little (2007), epistemology is the study, theory and justification of knowledge; to sum up it is an analysis of ‘how we make knowledge’ (Dillon & Wals, 2006).

The epistemological stance used in this study was constructivism. Constructivism has become a strong model for explaining how knowledge is produced (Gordon, 2009). Constructivists obtain explanatory power through the dynamics of social relations between individuals (Burr, 2003), and methodology is all about “interpretation, multiplicity, context, depth, and local knowledge” (Ramey & Grubb, 2009).

It is important to utilise both ontological and epistemological theories to justify the research design and methods to find out about nurses’ practices and experiences of non-reporting medication errors and nursing leadership. Dynamic relationships between nurses and nursing leaders may explain issues of medication error reporting.

Critical realism assumes reality to have multiple layers containing structures and mechanisms that influence and lie behind the observable (events) and what can be experienced. It is the exploration of these structures and mechanisms that provide the basis for exploration of reality and what we can know about it using critical realism. For example, in this study the structures and mechanisms could be the causes or what influences nurses not to report medication errors. What is observed and experienced is the non-reporting of medication error.



Structures and mechanisms here could be nurses' fear of reporting, nurses' needs for more training and knowledge, or nurse or organisational leadership styles.

These structures and mechanisms are beyond the realm of simple observation of events; they often may not be immediately detected, known, or perceived, but can be, as defined by McVoy & Richards (2006), inferred through a research design consisting of both deductive (empirical investigation) and inductive (theory construction) processes; i.e. adopting a mixed methods research design. Where critical realism differs from other middle ground philosophies, and what acts as the central reasoning for its adoption in mixed methods research, is that it places a focus on further understanding and explanations of events through these structures and mechanisms.

Critical realists contend that the selection of techniques ought to be directed by the idea of the examination issue. As a rule it is recommended that the best approach is to utilise a blend of quantitative and subjective strategies or systems (Olsen, 2004). The quality of quantitative strategies is that they might be utilised to create dependable depictions and measures of events that can be quantified for and compared. In the exploratory period of an examination, quantitative techniques can recognize examples of and relationships between phenomena that may some way or another be concealed, and which could coax out new and startling causal components. Qualitative strategies can likewise be utilised to try out speculations about how causal instruments work under specific arrangements of conditions (Mingers, 2004). The key quality of subjective techniques, from a basic pragmatist point of view, is that they are open-ended. This may enable subjects to arise during the span of a study that couldn't have been expected ahead of time. Qualitative methods can help to illuminate complex concepts and relationships between structures, mechanisms and occurrence of observed events that may not be captured by predetermined response categories or standardised quantitative measures.

This study employed an Explanatory Sequential Mixed Methods design to explore the relationship between perceived safety culture, perceived nursing leadership, and medication errors (involving nurses) in adult medical-surgical wards in the Qassim region of Saudi Arabia.

For this study, mixed methods were employed to find out about Saudi nurses' points of view about their roles and their responsibility to know and deal with medication error reporting in their hospitals. At the beginning of this study, a non-experimental descriptive cross-sectional quantitative survey design was used. That is, two main variables were measured: Safety culture and perceived nursing leadership styles, by conducting two questionnaires: the Hospital Survey on Patient Safety Culture (HSOPSC) and the Multifactor Leadership Questionnaire (MLQ 5X). Then, analysis of audit data of type and rates of reported medication errors were utilised. In the next phase of the study, qualitative methods were applied to collect data through conducting semi-structured face-to-face interviews that were audio recorded. The qualitative data produced built on the quantitative research findings to offer explanatory accounts of them.

A critical realist framework informed the use of mixed methods to explore the relationship between safety culture, nursing leadership and reported medication errors by nurses. The quantitative surveys and audit data helped to identify patterns of practice, which were confirmed and elaborated on by the findings from qualitative semi-structured interviews. The research design was explanatory because the qualitative findings were used to explain the quantitative data results. The research design was sequential because the first quantitative stage is followed by the qualitative stage. Mixed method research integrates and inter-relates quantitative and qualitative methods in a single study. The potential benefits of combining methods for the sake of creating greater understanding of events was outlined by Rogers & Nicolaas (1998), who inferred that utilising a mixed methods approach empowered them to

build up a more complete picture of the examples and procedures than had been produced in past investigations utilising quantitative or subjective strategies alone. The goals of mixed methods design are to expand and strengthen a study's conclusions, which is philosophically compatible with a critical realist perspective. Critical Realism provides a philosophical stance that is compatible with the philosophical assumptions of both quantitative and qualitative research, and can facilitate communication and cooperation between these two approaches (Mark, Henry, and Julnes, 2000; Greene, 2002). This communication and cooperation is illustrated in this study through the integrated analysis of the relationships between safety culture and nursing leadership and how they affect nurses' medication errors reporting. However, critical realism not only helps to integrate the two approaches into a more coherent combination, but can serve to increase the usefulness of both approaches as it produced greater depth to the information about nurses' medication errors reporting. Additionally, mixed methods techniques can be utilised to uncover distinctive aspects of a seemingly similar reality and produce accounts of reality from alternate points of view. This study aimed to explore the hidden issues in the combination of medication error reporting patterns and the perceptions of nurses about safety culture and nursing leadership. The quantitative methods provided reliable detail and enabled precise comparisons about safety culture and nursing leadership, and the qualitative method helped reveal new, otherwise hidden, causal mechanisms. Also, the qualitative method, from a critical realist point of view, unfolded themes that could not have been foreseen before through the quantitative methods alone.

### **3.5. Research Design**

This study employs an Explanatory Sequential Mixed Methods design, in which the scientist initially directs quantitative research, investigates the outcomes and after that expands on the outcomes to clarify them in more detail with subjective research. It is viewed as informative on the grounds that the underlying quantitative information are clarified and facilitated with

the subjective information. It is viewed as successive on the grounds that the underlying quantitative stage is followed by the subjective stage. Both quantitative and qualitative research approaches have their strengths and weaknesses, but sometimes the research questions require the use of the two ways in one study.

Figure 7 shows the procedures of the explanatory design. This design began with the collection and examination of quantitative data from four hospitals in the Qassim region using the HSOPSC, and the MLQ 5X questionnaires, and a prospective audit of type and rates of reported medication errors in these wards. This first stage was followed by the subsequent collection and examination of qualitative data, gathered by face-to-face semi-structured interviews with nurses and nurse managers. The qualitative stage of the study was outlined so that it corresponds to (or relates to) the results of the first quantitative stage.

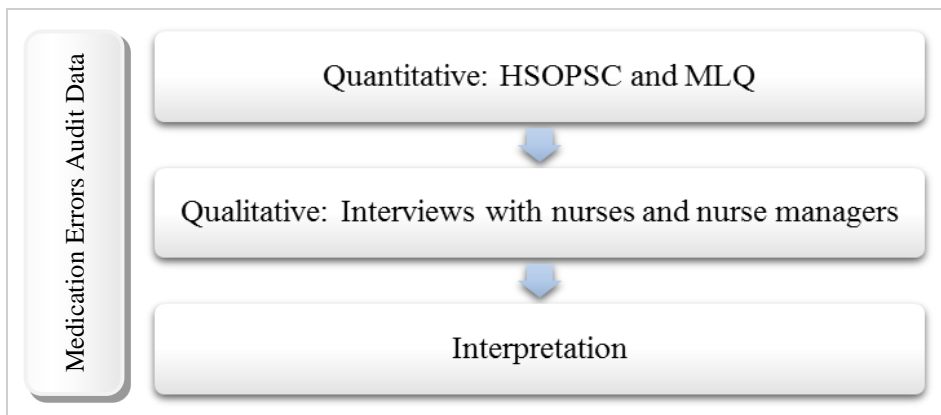


Figure 7. Sequential Explanatory Design Flowchart (HSOPSC - Hospital Survey on Patient Safety Culture. MLQ - Multifactor Leadership Questionnaire)

### 3.6.1. Quantitative Method

Quantitative research is depicted by positivism and deductive (Duffy, 1985). It has been utilised as a part of physical sciences and based on the logical procedure. This approach is a formal, deliberate, targeted process in which phenomena are measured utilising figures and numerical information to deliver discoveries. It utilises the deductive procedure of gathering

information (Duffy, 1985) to depict, test, and inspect circumstances and form connections with the end results (Burns & Grove, 1987).

Quantitative research includes two major approaches; experimental and non-experimental. The experimental approach includes control of study variables and randomisation of the investigation population. This approach expects to establish causal associations between the different factors under examination (Cormack, 2000). The principal highlight of experimental designs is to give objective and quantifiable proof of connections between the variables through recognised statistical methods. Through manipulation, the effect of the independent factor on the dependent factor can be measured (Carr, 1994). Non-experimental quantitative research is ordinarily intended to develop a picture of a recognizable phenomenon or to investigate occasions, people, and circumstances that regularly exist (Lobiondo-Wood & Haber, 2006). In this study, audit data of type and rates of reported medication errors in participant hospitals were collected and validated questionnaires were used to measure nurses' perceptions about nursing leadership and safety culture, and therefore a non-experimental approach was used to examine the perceptions of nurses. The current study has one dependent variable, the medication error, and two independent variables, the nurses' perceptions about nursing leadership and safety culture.

Utilising some strategies may require no immediate contact with participants, as in self-managed or postal poll studies. Minimising direct specialist inclusion in gathering information is believed to decrease the possibility of predisposition that guarantees objectivity (Carr, 1994). This originates from the capacity of quantitative philosophy to control or dispense with inessential factors, while the information produced by this approach can be evaluated utilising parametric and standard tests (Duffy, 1985).

### **3.6.1.1. Quantitative Methods in this Study**

This study is investigating the perceptions of nurses and their managers about their roles and responsibility so that medication errors can be reported professionally in their hospital. In the first part of this study, a non-experimental descriptive cross-sectional quantitative method was utilised. Two validated surveys were used to collect nurses' responses about their perceptions of nursing leadership and safety culture: the multifactor leadership questionnaire (MLQ 5X) and the hospital survey on patient safety culture (HSOPSC) and audit data about types and rates of errors in the participant hospitals. There is strength in the quantitative approach because of control over variables by having a strict structure but there is one drawback as well; it does not have the ability to consider real research situations (Carr, 1994). The limitations of methods, for instance surveys, are the thinking of the participant, and misunderstandings can lead to difficult situations in completion of survey (Parahoo, 1997). Self-completion surveys bias has the possibility of difficulty in understanding, or even completion of the survey by someone other than the intended participant (Bergman et al., 2004). Moreover, collection of data by surveys sometimes can be disputed on the basis of rates of low response and superficial data (Parahoo, 1997). However, the advantage of a quantitative method is that it can be administered and analysed quickly. Secondly, in data gained by a quantitative approach, comparisons are facilitated between organizations or groups (Creswell, 2003).

However, Parahoo (1997) states that issues which are related to values, beliefs and meanings are considered difficult to capture by using a quantitative approach, requiring qualitative approach utilization in order to provide more evidence in parallel.

### **3.6.2. Qualitative Method**

Qualitative research is considered as the philosophical approach from which adaptable science is being created when compared to quantitative approaches (Burns & Grove, 1987).

This method has come from two ontological ideas - constructivism and interpretivism (Guba & Lincoln, 1994). At the level of ontology, it has been believed that truth or reality are built by people socially from which it has been made ceaselessly changing (Guba & Lincoln, 2005). Epistemologically the brain is endeavouring to find and approach what is reality, how it can measure and whether the specialist would be a piece of the truth (Guba & Lincoln, 2005). Qualitative approaches are inductive in nature, including a more inside and out investigation of participants' perspectives on medication errors reporting than the quantitative part of the study.

Mays & Pope (1995) mention that this research approach has been utilised in many studies in the social sciences over a long period of time, including in health research. Moreover, this method is valuable for research about perceptions, experiences, attitudes, and thoughts. It can also be helpful in investigating social or other phenomena in natural settings (Avis, 2003; Mays & Pope, 1996). In the field of health practice qualitative studies are a common method, through which contributions are being provided for outcomes in research (Curry et al., 2014; Shortell, 1999). Some exploratory questions are unpredictable, individual and potentially undermining, for example here, inquiries concerning pharmaceutical mistakes and blame. Subjective research may manage inquiries, for example, 'What is x?', and 'How does x occur in what conditions?', as questions which can be asked in a direct communication, where the question could be adapted and the responses can be either positive or negative. Hence, the strategy used to collect the qualitative data is key to providing relevant data to translate the significance of the participants' experiences (Avis, 2003).

It is difficult to generalise the results of qualitative approaches such as interviews; for ideas of researchers' analysis of qualitative data lead to the bias perspective. Furthermore, it is difficult to compare the results due to differences in individual studies, along with time requirements for collection of data, its interpretation and analysis.

### **3.6.2.1. Qualitative Methods in this Study**

Subjective research is concerned with comprehension and deciphering people's perspectives and recognitions regarding the phenomena under scrutiny inside their social world (Avis, 2003). This can be valuable in a human services setting as it empowers an investigation of the social procedures of wellbeing and medicinal services, instead of concentrating exclusively on quantitative wellbeing results (Avis, 2003). Subjective research in this study includes gathering attendants' perspectives about reporting medication mistakes, safety culture, and nursing leadership in their own words and investigating these perspectives as literary information as opposed to numbers. Textual information (nurses' words, texts, and possibly field notes) are seen as the genuine dialect through which people can express their convictions and contemplations, and furthermore encourages comprehension of their significance (Avis, 2003). This can be accomplished by special techniques such as in-depth interviews and participant observation (Cormack, 2000), which more often than not begins with the expansive research question and provides an open door for medical attendants to talk and express their emotions (Avis, 2003). Top to bottom meetings in the present investigation were chosen to give nurses a chance to give their perspectives about their involvement in overseeing and announcing prescription mistakes. This was relied upon to give a total picture with the goal that the information from these meetings could clarify and supplement the information from the quantitative parts of the investigation.

### **3.6.3. The Value of Combining Methods**

In the fields of health and social research the use of mixed methods approaches is strongly advocated (Pawson & Tilley, 2001; Creswell, 2003; Johnstone, 2004). As mentioned earlier in this chapter, in the philosophical paradigm section, Olsen (2004) said that the most effective approach in research design is to utilise a blend of quantitative and subjective strategies or methods. What is most vital from a basic pragmatist point of view is the means



by which quantitative and subjective strategies are utilised (Pratschke, 2003). Combining the two methods gives strength to this design; in this study the quantitative stage was followed by the qualitative stage. This allowed the researcher to present data from different sources, using one to explain the other (Creswell, 2007). The benefit of incorporating such strategies lies in utilising clear and more engaged research plans to satisfactorily clarify how the blend may strengthen the research and decrease its limitations (Duffy, 1985; Robson, 2009; Murphy & Dingwall, 2003). Blended research strategies in this study are utilised for correlative purposes, clarifying contrasts and likenesses, affirming and triangulating the information towards creating hypotheses to comprehend and accomplish the investigative points (Sandelowski, 2000; Creswell et al., 2003).

Triangulation alludes to the utilisation of more than one way to deal with the examination of an exploratory question, keeping in mind the end goal to maintain trust in the outcomes. Much social research is established on the utilisation of a single research technique and may experience the ill effects of limitations related to that strategy. Triangulating information from subjective and quantitative sources resists bias, increases understanding and improves confidence in the results. (Murphy & Dingwall, 2003; Kinn & Curzio, 2005). Denzin (1989b) expanded the possibility of triangulation. For instance, utilising numerous scientists in an examination (examiner triangulation) and utilising more than one hypothetical plan (hypothetical triangulation), and methodological triangulation (Denzin & Lincoln, 1994).

It is critical to justify and disclose every technique (Morse, 1991; Miles & Huberman, 1994; Morse & Chung, 2003). A far-reaching research methodology is vital to oversee gathered information and encourage reflection on the process of examination. For instance, it might be troublesome for the specialist to choose to enrol members from a similar population for the two phases of the study, or to utilise people from a similar population for the two investigations. As per the findings of Creswell (2007), time order is considered for the

research designs of mixed methods i.e. in concurrent or sequential, and paradigm emphasis was encountered as well in the same extent, which includes dominant status or equal status (Creswell, 2007; Sandelowski, 2000).

Having outlined the advantages, one must also recognize the limitations and shortcomings when taking a blended strategy approach. For instance, it can be troublesome for a solitary analyst to complete both subjective and quantitative research, particularly if at least two methodologies are relied upon simultaneously (i.e. it may require an exploration group). Additionally, the scientist needs to find out about different techniques and approaches and see how to blend them properly. However, this takes more time and is expensive in order to carry out the intended tasks.

#### **3.6.3.1. Application of Mixed Methods in This Study**

Information triangulation will be utilised, as part of which information assembled through the quantitative surveys will be clarified by information accumulated through the qualitative interviews. This will expand the legitimacy and consistent quality of the information (Robson, 2009; Miles & Huberman, 1994). Along these lines, a blended strategy to deal with information gathering will provide setting and clarification which a solitary report would not give. For instance, a survey can give unverified data that is descriptive in nature where some correlations might be allowed for variables in order to carry out the tasks. By adding more sources of data for instance participant's interviews which can further generate the correlation for more explanation. A mixed method enables the researcher to identify the best potential data sources available without being constrained by one single method (Giddings, 2006).

		Time Order Decision	
		Concurrent	Sequential
Paradigm Emphasis Decision	Equal Status	QUAL + QUAN	QUAL → QUAN QUAN → QUAL
	Dominant Status	QUAL + quan QUAN + qual	QUAL → quan qual → QUAN QUAN → qual quan → QUAL

Figure 8. Mixed Methods Design Matrix (*QUAN- Quantitative. QUAL- Qualitative*)

Figure 8 demonstrates the nine unique choices for blended strategies, which may fluctuate as per which technique comes first and the aspect in which the examinations are directed. So as to see such a plan, the scientist needs to first comprehend the reason for the examination and the documentation that is utilised (Sandelowski, 2000; Morgan 1998; Creswell, 2003). The capital letters mean a need for expanded weighting, and lowercase letters indicate a reduced need or weighting. The plus sign (+) indicates the concurrent collection of data, and the arrow sign (→) represents a sequential collection of data. For instance: “QUAN → QUAL” shows that the quantitative and qualitative paradigm is the equal status, sequential design where the overall study is initially quantitative but this is followed by a qualitative stage. This particular design was selected for this study, as the researcher believed that it would be better to collect quantitative data first then explore and explain this data secondly. In the exploratory phase of the current study, the quantitative method provides reliable detailing and precise comparisons. It identifies patterns and associations that may be hidden otherwise. This study aims at exploring the hidden associations in the combination of medication error reporting patterns and the perceptions of nurses about safety culture and nursing leadership aspects. This qualitative process will help reveal new or unexpected causal mechanisms. The

strongest point of qualitative methods, from a critical realist point of view, is that they are open ended. This can assist in unfolding themes that could not have been foreseen before.

There are many aspects of mixed methods research for which realism provides a valuable perspective (Maxwell, 2011). A blended techniques approach can be connected with the search for basic authenticity. Cohen, Manion & Morrison (2011) distinguish that 'blended strategies' can mean numerous things; it can allude to the utilisation of different sorts of information gathering that are lined up with both subjective and quantitative methodologies (Venkatesh, Brown & Bala, 2013). In the current study, survey data (perceived safety culture and nursing leadership) is best collected by utilising a quantitative design, however, issues related to in-depth meanings, values and beliefs cannot be collected through these methods; thus combining the two methods makes methodological sense (Parahoo, 1997). One disadvantage of this design is that it might be hard for the researcher to recruit participants of the same sample for both phases, or to use persons of the same sample for both studies (Creswell, 2007).

### **3.7. Research Setting**

The study was undertaken in adult medical and surgical wards in four hospitals in the Qassim region in the middle of Saudi Arabian. From seven major hospitals giving health care to about 1,370,727 people in the Qassim region 4 hospitals are chosen:

1. **King Fahad Specialist Hospital (Hospital F)** is a specialist governmental hospital containing 400 beds with 83 nurses and nurse managers participating in the adult medical and surgical wards.
2. **Burydah Central Hospital (Hospital B)** is a general governmental hospital administered by the Saudi Ministry of Health. Having 300 beds, it also offers specialised and

general health care. There are 77 nurses and nurse managers working in the adult medical and surgical wards.

3. **King Saud Hospital (Hospital S)** provides care for patients with both general and specialised health care needs, with 300 beds and 82 nurses and nurse managers working in the adult medical and surgical wards.

4. **Al-Bukiriah hospital (Hospital A)** is a public government hospital with 200 beds and 58 nurses and nurse managers working in the adult medical and surgical wards.

These four hospitals were the target pool for the population as they are the largest hospitals among the seven hospitals in the Qassim region. Whilst the study was limited to the Qassim region in Saudi Arabia, the findings of this study may be generalizable and/or transferable to other regions, as all policy and guidelines in the MOH are the same. Adult medical and surgical wards of these four hospitals were chosen over other wards because all reported medication errors could be obtained from these wards.

### **3.8. Data Collection Methods**

In order to meet the main objectives of this study, the multi-method design involved two stages: (1) a quantitative phase: the administration of validated surveys to measure Safety Culture and Nursing Leadership Styles, and a prospective audit of anonymised reported medication error rates and types, and (2) a qualitative phase: face-to-face semi-structured interviews.

#### **3.8.1. Phase I: Quantitative Data Collection - Survey Administration**

In this phase, two main variables were measured: Safety culture and perceived nursing leadership styles. Two instruments were used; The HSOPSC and the MLQ 5X.

### **3.8.1.1. Measuring Safety Culture: The Hospital Survey on Patient Safety Culture (HSOPSC)**

There are some tools available to measure the safety culture among health care professionals. Most of these measurement tools are based on research and supported by information regarding the reliability and validity of their use. Early instruments were taken from questionnaires introduced in other industries (e.g., Thomas et al. 2004). The latest instruments have been developed specially for healthcare (e.g., Sorra & Nieva, 2004). Nowadays, a wide range of safety culture instruments are available to healthcare organisations. The Australian Commission on Safety and Quality in Health care, (2006) lists three potential questionnaires in their Measurement for Improvement Toolkit:

- **Hospital Survey on Patient Safety Culture**, Sorra, JS and Nieva, VF, US Department of Health and Human Services, Agency for Healthcare Research Quality (USA)
- **Safety Attitudes Questionnaire**, Sexton, Thomas, Helmreich, Neilands, Rowan, Vella, Boyden, Roberts & University of Texas (USA), 2007.
- **Safety Climate Survey**, Sexton & Thomas (2006), Institute for Healthcare Improvement (USA)

Among the variety of instruments, they all have strengths and weaknesses. Appendix 2 gives a general view of the instruments, considering the elements of safety culture that they intend to measure, along with their strengths and weaknesses.

The HSOPSC was selected for this study as it is relatively easy to complete and it has been used widely and extensively in a variety of settings (The Health Foundation, 2011). Moreover, it was free to use. The HSOPSC was expanded to cover zones of safety management and accidents; the organisational culture and safety climate; also reporting of errors – medical and nursing and patient safety.

The HSOPSC is a questionnaire commonly used in the USA with strong psychometric properties (Agency for Health Care Research and Quality, 2004). It has expanded in usage internationally. For instance, this tool has been used in the USA, UK, Belgium, China, Netherland, Turkey, Saudi Arabia, Spain and Lebanon (The Health Foundation, 2011). This tool has also been used with other tools in large scale studies, and it was used to compare between hospitals and countries (The Health Foundation, 2011). The HSOPSC includes 42 elements divided into 12 sub-dimensions that measure perception of patient safety culture in a healthcare organisation and in all the departments of the hospital. (Appendix 3)

Key dimensions of patient safety culture which were already in place were originally identified by the Agency for Healthcare Research and Quality (AHRQ). The HSOPSC survey was reviewed and tested for cognitive values by other researchers and hospital administrators. The survey was piloted in 2003 in 21 hospitals in the United States. There were 1,437 respondents and their data was examined, testing item response variability, reliability, and individual response to the dimensions of safety culture (Sorra & Nieva, 2004). Psychometric tests were performed and as a result sets of items were formed which contained independent and reliable safety culture dimensions (reliabilities ranged from .63 to .84).

### **3.8.1.2. Measuring Nursing Leadership Style: Multifactor Leadership Questionnaire**

#### **(MLQ 5X)**

To measure perceived nursing leadership styles and leadership outcomes, the validated Multifactor Leadership Questionnaire (MLQ) (Appendix 4) developed by Bass & Avolio (1989), was utilised and permission for using the MLQ was obtained from Mind Garden (see Appendix 5). Other validated questionnaires used to measure leadership styles are listed in Appendix 6. However, the MLQ 5X) is the basic instrument for showing transformational

and transactional leadership behaviour (Bass & Avolio, 2000; Avolio & Bass, 2004). It has been translated into many languages and utilised by both researchers and practitioners around the world. The MLQ was created and approved by Bass & Avolio (1995). The analyst obtained consent to utilise the instrument from the original creators. In its revised shape (MLQ 5X-short) the MLQ measures the full scope of administration styles gathered into three general classes: transformational leadership, transactional leadership and non-transactional leadership style, or passive avoidant behaviour. It additionally measures the results of leadership. The MLQ is viewed as the chief instrument for research related to transformational leadership and has been accounted as “a standout amongst the most generally used instruments to gauge transformational and transactional leadership practices in the authoritative sciences” (Tejeda, Scanura & Pillal, 2001).

For alternative instruments: The Leader Attributes Inventory (LAI) instrument was developed to study the leadership attributes of people within vocational education, not within the healthcare field. In spite of the fact that the Leader Competency Inventory (LCI) may be of use with a wide range of organisation techniques, there is still a need for ongoing research into the LCI, including further validation and updating. The Leadership Practices Inventory (LPI) is best used for training and development purposes; in a study by Zagorsek, Stough & Jaklič, (2006) the outcomes proved that some items were redundant as they added little to the overall precision of the instrument. In addition, the LPI was thought to be most accurate and reliable for respondents with low to medium leadership competence and became highly unreliable for high-quality leaders. Validity and reliability measures for the Leadership Skills Inventory (LSI) were not available. Also, for the Leadership Skills Inventory – Karnes (LSI – Karnes), construct and concurrent validity was absent. There is no reliability or validity for the 360-degree feedback instrument provided in the Leadership Skills Profile (LSP).



### **3.8.2. Reliability and Validity of the HSOPSC**

The reliability and validity of the HSOPSC have been checked and validated in many previous studies. The reliability in terms of Cronbach's  $\alpha$  for the AHRQ data ranged from .63 to .84 (Fleming 2010).

In a study by Sorra & Dyer (2010), survey data was collected from 331 US hospitals, with 2,267 hospital units and 50,513 respondents, and examined to test the psychometric characteristics of the survey's items and composites. The reliability of the composites is shown in Table 6. Cronbach's  $\alpha$  for the composites ranged from .62 to .85, with an average of .77. All composites had a good reliability (.70 or greater) except the Staffing composite ( $\alpha = .62$ ), Appendix 7. The authors observed that, in general, the survey's items and dimensions are psychometrically sound at the individual, unit, and hospital levels of analysis, and can be used by researchers and hospitals interested in serving patient safety culture (Sorra & Dyer, 2010).

A study conducted by Nie et al, (2013), used the updated HSOPSC poll to measure 10 dimensions of patient safety culture from 32 hospitals in 15 cities across China. The poll had 1160 Chinese health-care workers who were divided into predominantly internal physicians and nurses. 1500 polls were given out of with 1160 responses, as required (response rate 77%). The internal consistency of the total survey was comparatively satisfying (Cronbach's  $\alpha = 0.84$ ). For the 10 dimensions, the internal consistency (Cronbach's  $\alpha$ ) ranged from 0.40 to 0.64, shown in Appendix 8.

Another study aiming to indicate the legitimacy and consistent quality of the Portuguese form of the HSOPSC found that using Cronbach's alpha ( $\alpha$ ), the poll has acceptable dependability, as 7 of 12 measurements had  $\alpha > 0.7$  and a high worldwide Cronbach's  $\alpha$  (0.9) (Appendix 9). Expelling an item from the staffing measurement expanded internal consistency. The develop

legitimacy was satisfactory for all composites. The composite direct relationships demonstrate that there are no two measurements measuring a similar construct. The strongest connection was between the composites criticism and correspondence regarding mistake and correspondence transparency.

### **3.8.3. Reliability and Validity of the MLQ 5X**

The MLQ has undergone several modifications since it was originally proposed (Bass, 1985) in an attempt to better determine the component factors while at the same time addressing concerns regarding its psychometric properties (Antonakis et al., 2003). Confirmatory Factor Analysis (CFA) was the way utilised to specify the psychometric properties of the MLQ. A set of 14 samples (N=3,786) were used in which respondents evaluated the target leader. The reliabilities of the six authority scales varied from .63 to .92 in the first sample set and .64 to .92 in the replication set. The approximates for internal consistency were higher than 70 for all scales except for management by exception – active (Avolio & Bass, 2004; Bass, Avolio, 1999). The organisational performance scale had a Cronbach's  $\alpha$  of .95 (Allen & Helms, 2002). Permission to utilise the instrument was obtained. Appendix 10 presents the descriptive statistics and reliability estimates for the MLQ short version 5X by Avolio & Bass (2004).

## **3.9. Sampling method and sample selection**

### **3.9.1. Inclusion/Exclusion Criteria**

The target population for the surveys were the 300 registered nurses and nurse managers working in the adult medical and surgical wards on of the four hospitals. There were no limitations regarding the demographic factors of nurses such as gender, religion, age, or the nursing school attended. The major condition for participating in the study was that the

nurses should be available at the time of the study, qualified and working at the time on any medical or surgical wards of the four hospitals.

### **Inclusion Criteria**

- Nurses staff
- Nurse managers
- Working in medical and surgical wards.
- Qualified as nurses and practicing nursing
- Available during distribution the surveys

### **Exclusion Criteria**

- Unauthorised nurses, nursing assistants and students
- Unavailable nurses in the time of study
- Nurses working in other wards (e.g. paediatric, psychology, ICU)

### **3.9.2. Sample Size and sample selection**

The sample were selected depend on the convenience sampling who are available and suitable in the time of study. The advantage of convenience sample that it is very easy to apply, relative to other methods. Convenience samples are subjects who are convenient to the researcher, for one reason or another (Panacek, 2007). The sample in this study were staff nurses and nursing managers who agreed to participate.

Many studies have said that in the majority of cases, a sample size of 150 observations is considered sufficient to obtain a precise solution in exploratory factor analysis, as long as item intercorrelations are reasonable and strong (Guadagnoli & Velicer, 1988). Item intercorrelations in both questionnaires, HSOPSC and MLQ, were reasonably strong based on previous validity and reliability studies. Therefore, a minimum of 150 observations would

be sufficient for the current study. Moreover, from another perspective, a sample must have not less than 30 subjects for every study variable measured. Statisticians count 30 subjects as the least number of data on one variable to reach a normal distribution. Therefore, if a study has four variables, researchers need at least 120 subjects in their final sample (Gray, Grove & Burns, 2013). The current study has three main variables, which are medication error, safety culture, and nursing leadership, indicating that a minimum of 90 subjects is sufficient to get reliable results. However, three hundred was considered a reasonable potential sample and with a target response rate of 70% for the surveys would produce a participant sample of 210 nurses; enough to make sense of the survey data and generalise across the medical-surgical ward context.

Convenience sampling as a non-probability sampling technique means that it may not be representative, for all potential participants in the population do not have the same opportunity of being chosen. That is why a small sample might not stand for the target, and all statements that generalise the outcomes beyond the real sample should be assured qualifications. To overcome this problem for this study, it was crucial to approach all nurses and nurse managers in the medical and surgical wards in the four hospitals, as all of them were appropriate and complied with the inclusion and exclusion criteria.

### **3.9.3. Participant Recruitment**

The first phase of data collection (quantitative method) was conducted between May and July 2015 for the administration of HSOPSC, and between March and May 2016 for the administration of the MLQ. The nursing sections at the participating hospitals were included in the handing out of the HSOPSC and MLQ surveys. The participants returned the survey through a locked return box placed in every ward. The researcher was the only person allowed access to the return box.

### **3.9.4. Phase II: Qualitative Data Collection (Face-to-face Semi-Structured Interviews)**

Different topics are addressed by semi structured interviews which can be further addressed by characterising same phenomenon with different topics by having different types of questions that are being created so that study objectives can be reached. Moreover, they enable the researcher to find the corresponding and correct meanings instead of only answers to questions (Denzin, 1989), and provide a more flexible reach in collection of data (Fitzpatrick & Boulton, 1994). Interviews that are semi structured counted as a useful technique to explore nurses' views because they allow the researcher to gather in-depth responses. Semi-structured interviews let the interviewee talk about a story, or develop a narrative corresponding to some or all parts of their own life-experience (Wengraf, 2001).

#### **3.9.4.1. Qualitative Interview Participant Recruitment**

The second phase of data collection (Qualitative method) carried out between June and July 2016. In phase two, eight nurses and eight nurse managers across the mixture of wards and hospitals were recruited, to explore in more depth the nurses' and nurse managers' perceptions about safety culture, nursing leadership style and medication errors reporting.

There is no agreement among researchers as to the adequate number of participants to fully explore a topic (Sandelowski, 1995). In general, the researcher ought to fix the participant number according to the bases of reaching informational redundancy or theoretical saturation, balanced against the quantity of information and the analytic task it poses. In a study in which in-depth semi-structured interviews are used to examine experiences and perspectives within a defined group, a sample of 6-10 may be adequate (Bourgeault, Dingwall & de Vries, 2010). The majority of studies having sets of semi-structured interviews use a purposeful sample ranging between 10 and 50 interviews, depending upon the aims of the research (Newing, 2010). A total recruitment figure of 16 nurses and nurse managers across the four hospitals was considered sufficient for this part of the study. Flyers in the staff rooms giving

information promoted the study and asked for nurses in the wards to participate. For the interviews, nurses and nurse managers were selected using a purposive stratified random sampling approach, considering study site, gender and number of years qualified to ensure a variety of perspectives.

#### **3.9.4.2. Qualitative Interview Protocol**

At the start of each interview, the nurses were asked if they were happy to give written consent (Appendix 11) for the interview to be audio recorded. They were told that once the interview was finished it would be transcribed and the tape would be deleted. This phase recruited nurses and nursing managers from different wards. The interviews took on average about 45 minutes.

#### **3.9.4.3. Interview Guide**

The interview questions were extracted from the available information generated from the survey findings (Appendix 12); nurses' and nurse managers' perceptions of safety culture, nursing leadership and medication errors reporting, nurses' reactions and role in addressing and administering an actual medication error occasion and from literature as well.

English language was used by nurses to administrate the questionnaires; the original language in which the questionnaires were validated. English was used for the following reasons. Health care workers are commonly expatriates from different countries (Aboul-Enein, 2002; Tumulty, 2001) where English is used for the formal way for team members of the health in hospitals of the Saudi Arabia. Moreover, direction in medicine follows the English language, nursing and health sciences faculties in Saudi Arabia (Suliman & Tadros, 2011). Moreover, Saudi Arabia is wishing to enlist the working nurses with Saudi Commission for Health Specialties (SCHS). The Saudi Commission for Health Specialties arranges exams in English language to new candidates to guarantee their level of capability, and their abilities to give

safe and state of the art nursing services (Abu-Zinadah, 2004). Ultimately, hospitals in Saudi Arabia are authoritatively following either the British or American framework. Thus, in Saudi Arabia nurses have ability to comprehend and speak the English language.

### **3.10. Data analysis**

#### **3.10.1. Quantitative Data**

Quantitative data obtained from the surveys HSOPSC and MLQ were put into the Statistical Package of Social Science (SPSS 22) program for analysis. Data from the surveys was at first checked, cleaned and separated for any exception or any missing information before examination. Descriptive statistics including frequencies, means and standard deviations were figured to analyse the demographic data, self-reported leadership styles, nurses' perception of leadership style and organisational performance. The .05 level of statistical significance was used to test the hypotheses in this study. The demographic variables were analysed using two-independent samples t-test (for dichotomous variables) and one-way ANOVA (for variables with more than two categories).

#### **3.10.2. Qualitative Data**

Qualitative data was obtained from the semi-structured face-to-face interviews that were audio recorded. Qualitative data was then entered, coded and examined following a highly organised thematic framework (Miles & Huberman, 1994). Data analysis was performed by applying thematic analysis (TA) techniques. TA is an important method for distinguishing and analysing patterns in qualitative data (Merton, 1975).

#### ***Six phases of thematic analysis (Braun & Clarke, 2006)***

Thematic analysis ought not to be seen as a linear model, where one cannot continue to the following stage without finishing the earlier stage (effectively); rather analysis is a recursive procedure.

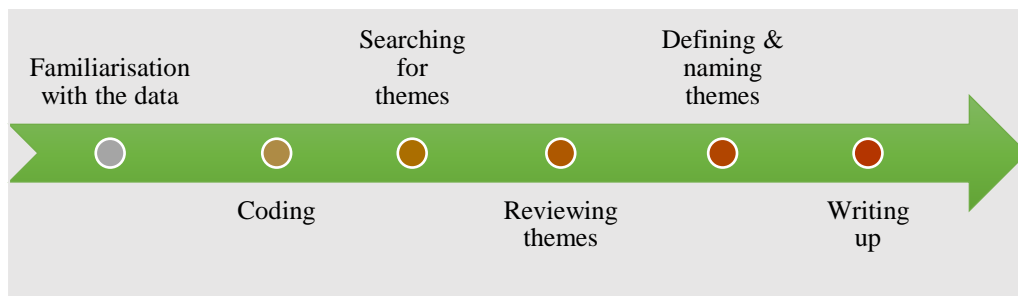


Figure 9. Six phases of thematic analysis by Braun and Clarke (2006)

**1) Familiarisation with the data:** as is typical to all types of qualitative analysis, the researcher listened to the audio-recorded data a few times to get familiar with the data, wrote a script for it, and read the data scripts several times to note any initial analytic observations.

**2) Coding:** a typical component of many ways to deal with qualitative analysis (Braun & Clarke, 2012a, for thorough comparison). After getting familiar with the data, the researcher generated sharp marks for essential highlights of the data which were of significance to the (wide) research question directing the analysis. The researcher composed codes that caught both a semantic and theoretical perusing of the data, by coding each datum, and closes this stage by gathering all their codes and significant information extracts. For instance, interviewees provided information about the reasons for not reporting medication errors, which might be related to their fear of being punished or losing their jobs, so the researcher could extract the code “Fear of Punishment”.

**3) Searching for themes:** the researcher, built topics by coding the created codes to distinguish comparability in the data, and at that point examined all the coded data which was important to each subject.

**4) Reviewing themes:** themes generated were checked in correspondence to the full data-set and the coded extracts. Some themes were collapsed together, while others were discarded while searching for new themes.



**5) Defining and naming themes:** after reaching convincing themes, the researcher conducted and wrote a definite analysis of each topic; the researcher exhibited what story each topic told and how a topic fitted into the general tale about the data, distinguishing the 'essence' of each topic and developing a compact and enlightening name for each topic.

**6) Writing up:** contextualizing it in correspondence to existing writing, the scientist composed the analytic process in TA, involving the narrative and data extracts to display intelligible anecdotes about the data.

### **3.10.3. Data Integration (Triangulation)**

Denzin defines triangulation as the use of “many spectators, techniques, interpretive perspectives, and levels and types of empirical materials in the development of translations” (Denzin, 1989b, p.270). In the current study, the researcher used a mixed model research design of qualitative with quantitative designs. The data from qualitative and quantitative sources were joined and put together for triangulation and complementary purposes. Triangulation using validated data from more than two other sources adds extra verifiable data to the study (Creswell, 2003). The researcher has excellent quantitative data on the perceptions of nurses about safety culture and nursing leadership, in addition to quantitative data of medication error incidence in the four hospitals under study. The researcher also has separate qualitative data collected through conducting the semi-structured interviews. Triangulation of the findings from the different data collection methods highlights the strengths and weaknesses of the different methods and give more insights than any one method is likely to provide. The triangulation of methods decreases the deficiencies or biases coming from a single method. That is, the strengths of one method may compensate for the weaknesses of another. In this study, the researcher used the results of the quantitative analysis process to build and proceed to the qualitative study. So, the unclear limited

responses coming from the quantitative analysis would be explained by the qualitative study as respondents would give narrations of stories about the collected quantitative data.

### **3.11. Ethical Approval and Considerations**

Cooper and Schindler (2008: 113) define ethics as the “norms or standards of behaviour that guide moral choices about our behaviour and our relationship with others”. This section discusses the ethical and moral considerations of the study and the measures taken to guarantee the rights and wellbeing of the participants and in respect of ethical research practice. It additionally covers data management and storage techniques.

The four principles of Beauchamp and Childress (2008) – autonomy, non-maleficence, beneficence, and justice – have been extremely influential in the field of medical ethics, and are fundamental for understanding the ethical issues in health care. For health practitioners, respect for autonomy means acting intentionally after being given sufficient information and time to understand the information. Beneficence means the researchers should have the benefit and wellbeing of the research participants as a guiding goal of research study. On the other hand, non-maleficence implies first do no harm, which can be achieved by careful decision-making and having adequate training. Justice in health care is usually defined as a form of fairness; this meant all participants in this study were equally treated.

In the first phase of data collection, questionnaires were used to collect quantitative data. The questionnaire was distributed in an envelope that the participating nurse could use to drop the completed questionnaire in a locked box in each ward. Respondents were informed (see information sheet, Appendix 15), in accordance with non-maleficence ethical principles, that their information would be confidential and that their responses would be anonymous. The participant information sheet laid out that participation in the research was voluntary and did not include any monetary reward (autonomy) or physical risks (non-maleficence). Related to

the ethical principle of autonomy, the participants were also informed that they could withdraw from the study as needed without giving a reason.

During the second phase of data collection, where qualitative data (interview) was being collected, a signed consent form and information sheet was required for interview participation. According to the ethical principles of autonomy and beneficence, the information sheet stated that the participant could ask questions and withdraw from the research process at any time without providing a reason. The researcher retained the original documents, and each respondent was provided with a copy of both the informed consent form and the information sheet. Furthermore, each respondent was asked before the interview whether they would agree to audio recording of the interview and they all responded positively. Non-maleficence and beneficence ethical principles were evident through assurances that their audio recorded interviews would be anonymised, and deleted as soon as they were transcribed. Additionally, the researcher kept the data safe on a password-protected hard drive at the University of Central Lancashire.

Non-maleficence ethical principles regarding the possibility of risk and harm occurring from the research were also considered, for example, if the participant became distressed or did not want to answer particular questions during an interview, the interview would have been paused or stopped. Thus, the researcher detailed fully the nature of the research as well as confidentiality. What is more, in Saudi Arabia, a woman is prevented from remaining alone with unfamiliar males, due to religious and cultural tradition, which means that any female should feel totally comfortable to participate in the interviews (World Health Organization, 2005). In this study there was a need to undertake the interviews in an 'open' space so that females were not alone with the male researcher. This action would seem to connect with respecting women's cultural ability (autonomy) and capacity to participate (justice and

fairness) as well as promoting their wellbeing (beneficence) and not causing harm (non-maleficence).

Favourable ethical opinion was granted by the STEMH Ethics Committee at University of Central Lancashire (UCLan) on 1st May 2015 (ref number (STEMH333) see Appendix 13) and from the Qassim Regional ethics committee on 6th April 2015 (see Appendix 14).

### **3.12. Data storage**

Based on UCLan regulations data from questionnaires and interviews were kept in a locked filing cabinet and a password secured electronic folder accessible only by the analyst on site at UCLan. The data will be kept for up to 5 years after publishing and all reports will then be destroyed or erased as appropriate.

### **3.13. Summary**

The aim of this study was to explore the relationship between safety culture, nursing leadership and medication errors (involving nurses). The study adopted a mixed methodology with the participation of nurses and nurse managers (n=300 nurses and nurse managers) working in adult medical and surgical wards in four hospitals in the Qassim region of Saudi Arabia. Data was obtained using validated questionnaires (HSOPSC and MLQ) and face-to-face semi-structured interviews to achieve the study aim. The next chapter will outline the results.

## **Chapter IV: Findings**

### **4.1. Introduction**

This chapter presents the findings of the quantitative and qualitative phases of the research. It includes two main sections: (1) Mixed method combining quantitative and qualitative data. (2) Data from surveys administered to staff. Audit incident reporting data are derived from hospital quality departments and are presented as the first component of the quantitative data sources; followed by the surveys data analysis section includes two sub-sections: (1) Descriptive data analysis, and (2) Inferential data analysis. The descriptive data analysis sub-section includes descriptive statistics of survey response rates, a breakdown of participant demographic characteristics, and scores for survey items: The Hospital Survey on Patient Safety Culture (HSOPSC) and Multifactor Leadership Questionnaire (MLQ 5X). The inferential analysis section presents the findings of two-independent samples t tests, ANOVA, Post Hoc and Pearson's r correlation coefficients performed using survey measurement scales to examine any potential significant differences between groups of respondents. Both types of data analysis; descriptive and inferential, were performed using the statistical package for social sciences (SPSS version 22.0) and all original output tables/graphs are presented. Then, the qualitative data section, this includes semi-structured interview analysis with 16 nurses, both staff and managers.

### **4.2. Audit Incident Reporting Data**

One of the objectives of the research was to collect reported medication error rates and types from participating hospitals. Two of the four participating hospitals provided information on reported medication errors, but the other two hospitals did not collect this data (see Appendix 16). This section provides a detailed summary and analysis of the anonymised reported medication errors during the period this study was conducted. Five types of data are reported

(1) source of medication error (i.e., professional group), (2) which professional group reported it, (3) type of error, (4) outcome of the error, and (5) stage involved. The medication errors are reported during the two Hijri (Arabic Calendar) years 1436 and 1437 (2014-2016). The total number of medication errors reported by Hospital F was 1844 incidents, where 59% of these errors were reported in 1436 and 41% in 1437. Hospital S reported 2,588 incidents in total, where 56% of them were reported in 1436 and 44% were reported in 1437.

#### 4.2.1. Source of Medication Error

Only Hospital F reported the source of medication errors. Figure 10 shows that the majority of errors (> 90%) in both years were attributed to physicians. Less than 10% of errors were pharmacist attributed and less than 1% of errors related to nurses.

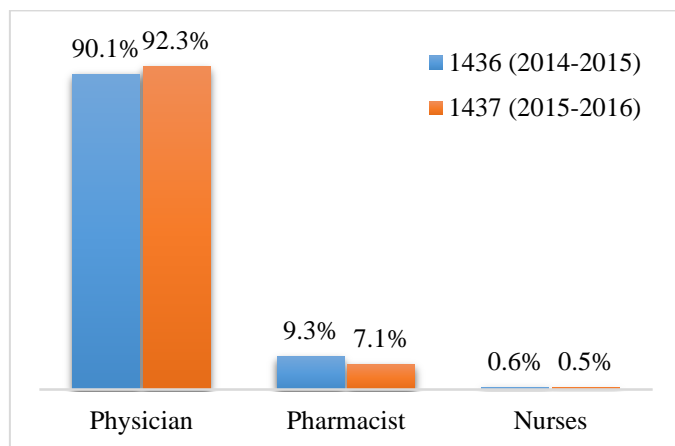


Figure 10. Source of Medication Error - Hospital F

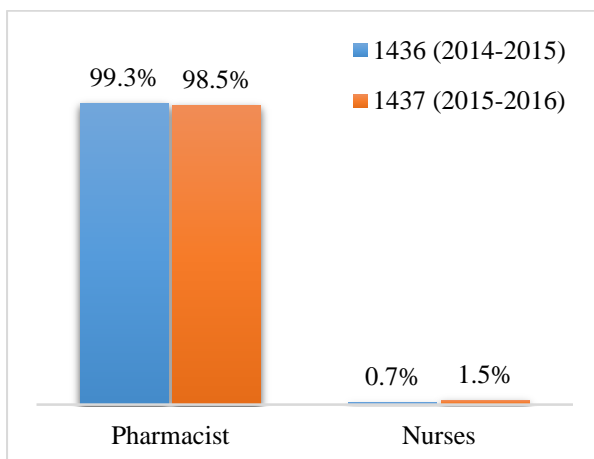


Figure 11. Who Report the Error - Hospital F

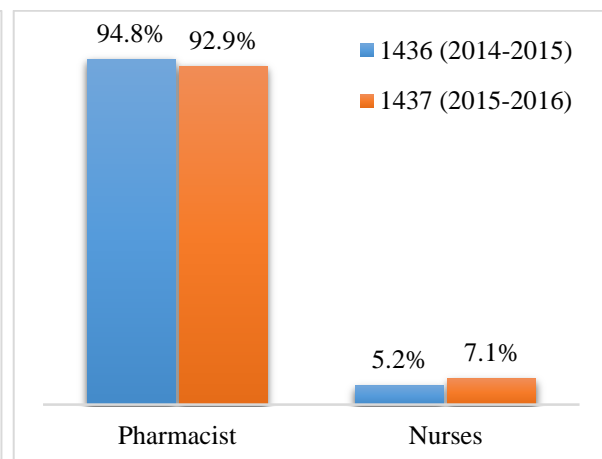


Figure 12. Who Report the Error - Hospital S

#### 4.2.2. Who Reported the Error

Hospitals F and S both provided information of who reported the error. In both hospitals and in both years, the majority of medication errors (> 92%) were reported by a pharmacist. Fewer than 2% of errors were reported by nurses in Hospital F, and less than 8% of errors were reported by nurses in Hospital S.

#### 4.2.3. Type of Error

Only Hospital F reported upon the type of errors. The most common errors were ‘wrong frequency’ (35%-37%) and ‘incorrect dose’ (20%-19%). The range of error types reported included wrong route of administration, improper dose, wrong drug preparation, wrong dosage form, wrong frequency, wrong medication ordered, wrong duration, therapeutic duplication and others (Figure 13).

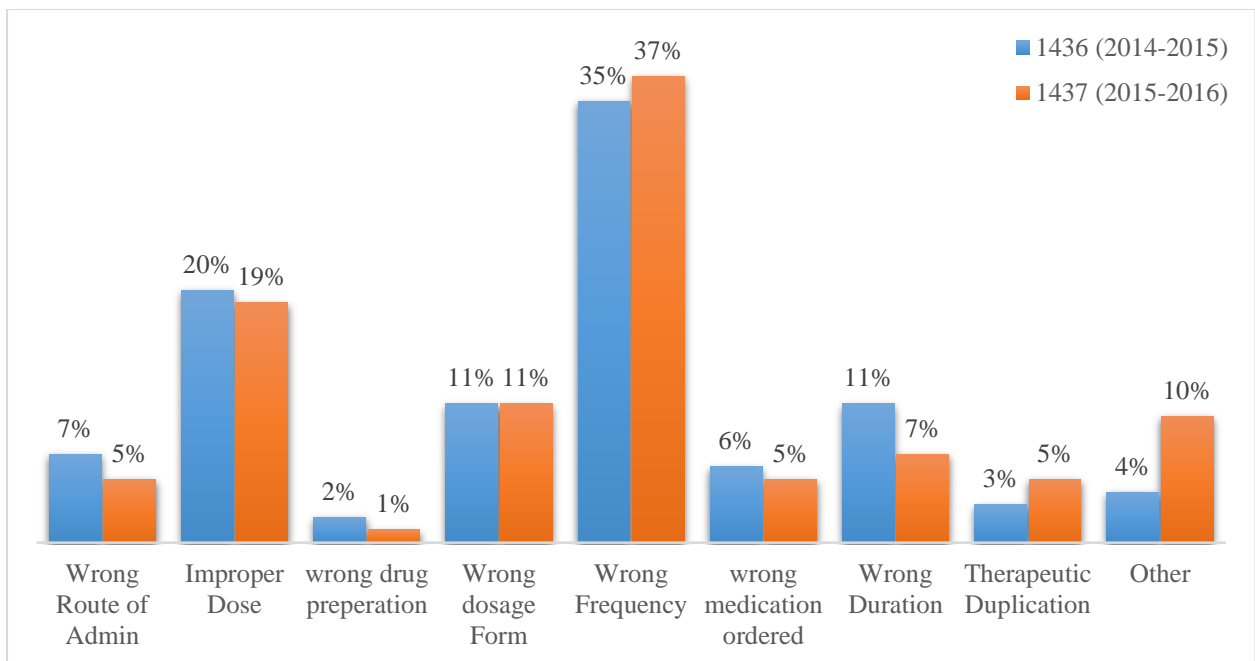


Figure 13. Medication Error Type - Hospital F

#### 4.2.4. Outcome of Error

Hospital F reported outcomes of medication errors. Figure 14 shows that the majority of errors (> 90%) in both years resulted in a near miss – an error that was identified before administration and therefore did not reach the patient. Less than 10% of errors resulted in errors that reached patients but were unlikely to cause harm.

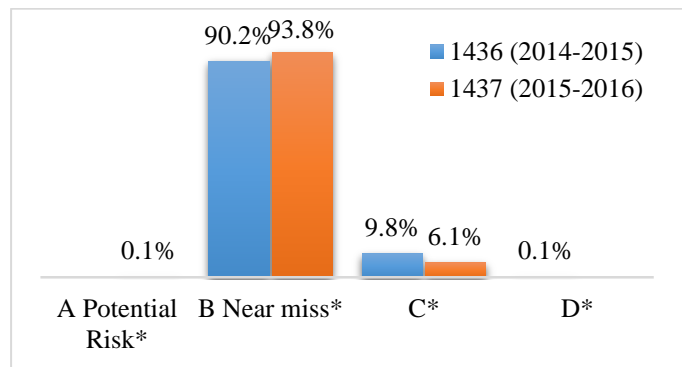


Figure 14. Outcome of Error - Hospital F

A\* No error, capacity to cause error

B\* Error that did not reach the patient

C\* Error that reached patient but unlikely to cause harm

D\* Error that reached the patient and could have necessitated monitoring and/or intervention to preclude harm.

#### 4.2.5. Stage Involved

Data reported by both Hospitals F and S showed that the majority of errors were reported during the prescribing stage; more than 89% in Hospital F and more than 66% in Hospital S.

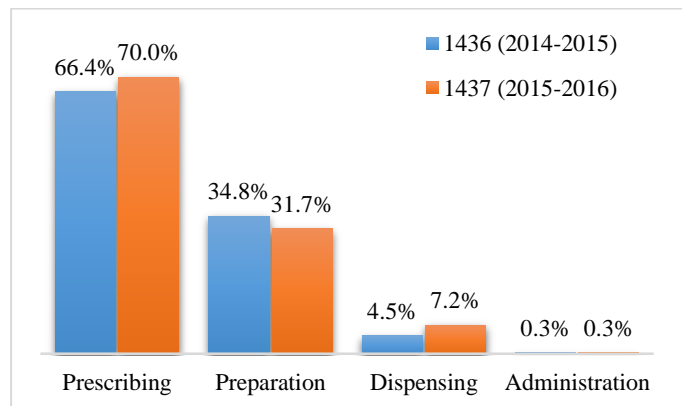


Figure 15. Stage Involved - Hospital S

Moreover, Hospital S reported a considerable amount of errors in the preparation stage, which was greater than 31% (Figure 15). In Hospital F, less than 10% of errors were reported in the Preparation stage (Figure 16) and less than 10% were reported in the Dispensing stage. Errors were rarely reported in the Administration stage in either hospital.



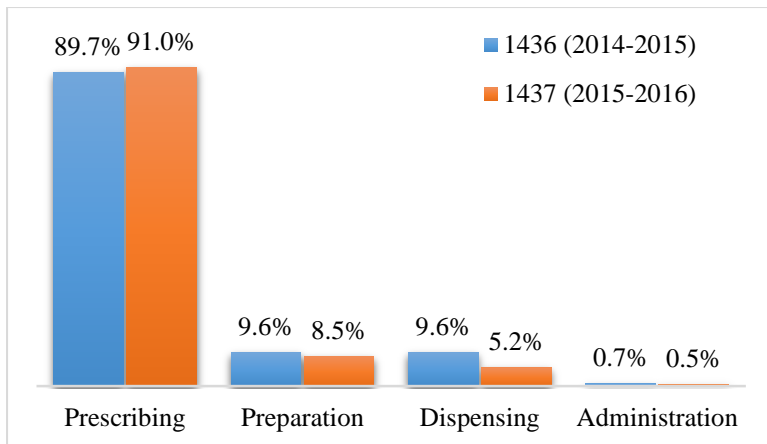


Figure 16. Stage Involved - Hospital F

### 4.3. Quantitative Data Analysis

This section includes presentation of findings of the data analysis performed on the survey data sources used in this study, which were: (1) HSOPSC, and (2) MLQ 5X. The following subsections include the descriptive and inferential analysis results and findings. Descriptive analysis statistics are presented for HSOPSC, MLQ 5X and questionnaire responses. Inferential analysis statistics are presented for questionnaire responses to find significant differences between groups of respondents. The significance level is determined at  $\alpha = 0.05$ .

#### 4.3.1. Descriptive Analysis

Before any statistical analyses are conducted, descriptive analysis is essential. Descriptive analysis is the basic statistical analysis as it is the elementary transformation of data in a way that describes characteristics such as central tendency, distribution, and variability (Babin & Zikmund, 2012). In this section, frequencies and percentages are used to summarise the distribution of data; means and standard deviations are used to refer to central tendency and spread of data; and bar charts are used to illustrate percentages graphically. This sub-section presents the findings of a descriptive analysis of the survey data collected from the distribution of the two questionnaires. First, response rate is presented with hospital breakdown, then respondent profile is tabulated using the demographic data obtained from each questionnaire.

#### 4.3.1.1. Hospital Response Rates

As outlined in previous chapters, 4 sites were involved in the study. The King Fahad Specialist Hospital (F) is a large urban 500 bed hospital. It has 4 adult medical and surgical wards with 100 beds, while Buraidah central hospital (B) has 400 beds, The King Saud Hospital (S) has 300 beds, and Al Bukayriyah hospital (A) is a small hospital with a capacity of 100 beds. All of these hospitals are government hospitals and have two medical and two surgical wards. The distribution of the participating nurses in the four hospitals' medical and surgical wards was as follows:

Table 4. Nurse participants per hospital and unit

Work Hospital	Primary Work Area / Unit		Total
	Medical Unit	Surgical Unit	
King Fahad Specialist Hospital (F)	31 (50.8)	30 (49.2)	<b>61 (28.0)</b>
Buraidah central hospital (B)	24 (46.2)	28 (53.8)	<b>52 (23.9)</b>
King Saud Hospital (S)	34 (45.9)	40 (54.1)	<b>74 (33.9)</b>
Al Bukayriyah Hospital (A)	14 (45.2)	17 (54.8)	<b>31 (14.2)</b>
<b>Total</b>	<b>103 (47.2)</b>	<b>115 (52.8)</b>	<b>218</b>

The proportion of respondents from the four hospitals were relatively equally distributed. This can also be seen in the distribution of nurses between the medical and surgical wards. Almost half of leaders worked in the medical unit and half in the surgical unit, similarly near to half of nurses worked in the medical and surgical units.

Questionnaires were distributed to all 300 nurses currently employed in the medical and surgical wards in the four participating hospitals. Out of the 300 HSOPSC questionnaires sent out, 218 were completed giving a response rate of 73%. Out of 300 MLQ questionnaires 186 were completed, out of 50 nurse managers 32 returned the MLQ 5X Leader questionnaire giving a response rate of 64%. Out of 250 nursing staff, 154 returned MLQ 5X Staff questionnaires giving a response rate of 62%. This was viewed to be good response rate.

Bertot, McClure and Ryan (2001) suggest a good response rate is 50 to 70%. Babbie (1973) says, “I feel that a response rate of at least 50 percent is adequate for analysis and reporting. A response rate of at least 60 percent is good. A response rate of 70 percent or more is very good. The reader should bear in mind, however, that these are only rough guides, they have no statistical basis, and a demonstrated lack of response bias is far more important than a high response rate” (Babbie, 1973).

#### **4.3.1.2. Respondent Profile**

Each questionnaire provided some information about respondents including their position in the hospital, their work experience, qualifications, age, gender, and nationality; (See Tables 13 and 14). Table 13 shows the profile information of participants who completed the HSOPSC questionnaire. The frequency distribution shows that the majority of respondents had less than 5 years of work experience in hospitals, representing 69%, while a quarter of the nurses (24%) have been working for 6-10 years. Most respondents have worked for less than 5 years in their hospital representing 80%. The vast majority of nurses work full time and 83% of respondents are registered nurses; with 17% either charge nurses or nurse managers. Finally, the majority of respondents (81%) have been working within the current specialty or profession for 1-10 years, and 17% have been working with the current specialty or profession for less than a year.

Table 5. Respondent Frequency Distribution (N = 218) – HSOPSC

<b>Background Information</b>	<b>Frequency</b>	<b>Percent</b>
<b>Hospital Working Experience</b>		
Less than one year	45	20.64
1-5 years	106	48.62
6-10 years	52	23.85
11-15 years	11	5.05
16-20 years	4	1.83
<b>Current Hospital Work Area / Unit Experience</b>		
Less than one year	51	23.39
1-5 years	124	56.88
6-10 years	38	17.43
11-15 years	5	2.29
<b>Number of hours working per week</b>		
Less than 20 hours per week	2	.92
20-39 hours per week	41	18.81
40-59 hours per week	167	76.61
60-79 hours per week	8	3.67
<b>Staff Position in Hospital</b>		
Registered Nurse	180	82.57
Nurse Manager / Charge Nurse	38	17.43
<b>Direct Interaction or Contact with Patients</b>		
YES, I typically have direct interaction or contact with patients.	202	92.66
NO, I typically do NOT have direct interaction or contact with patients	16	7.34
<b>Current Working Specialty or Profession Experience</b>		
Less than one year	38	17.43
1-5 years	122	55.96
6-10 years	54	24.77
11-15 years	4	1.83

The two sets of respondents (nurses and leaders) who answered the MLQ questionnaire were relatively diverse in terms of their nationality composition. The majority of respondents

(69%) in the leaders group were Saudi nationals, whilst in the nurses group the majority (64%) were non-Saudi nationals. With respect to participants' gender, women represented the majority in both groups; 69% in leaders and 81% in nurses. Younger respondents were found in the nurses group, which makes sense, as leaders are frequently older. In the nurses group, 63% of respondents were 20 to 30 years old; while in the leaders group the majority of respondents (72%) were 31 to 40 years old. A higher proportion of respondents who were 41 to 50 years old was found in the leaders group (19%), while in the nurses group they represented only 4% of the sample.

In terms of nursing qualifications, the majority of respondents from both groups had a bachelor's degree; 60% of leaders and 82% of nurses. The distribution of respondents amongst the three levels of nursing qualifications suggests that the participants were well educated. With respect to the number of years of work experience, leaders had the most. Leaders with 6 to 10 years of experience represented 34% and those with 11 to 15 years represented 56%, comprising 90% of total leaders. The majority of nurses (80%) had at most 5 years of experience. Some nurses had 6 to 10 years of experience but this represented only 17% of total nurses.

Table 14. Respondent Profile (N = 154) – Collected by the MLQ 5X

<i>Demographic Variables</i>	<i>Groups</i>	<b>Leader n (%)</b>	<b>Nursse n (%)</b>
<i>Nationality</i>	Saudi	22 (68.75)	55 (35.71)
	Non-Saudi	10 (31.25)	99 (64.29)
<i>Gender</i>	Male	10 (31.25)	29 (18.83)
	Female	22 (68.75)	125 (81.17)
<i>Age</i>	20-30	1 (3.13)	97 (62.99)
	31-40	23 (71.88)	51 (33.12)
	41-50	6 (18.75)	6 (3.90)
	51-64	2 (6.25)	0 (.00)
<i>Nursing Qualifications</i>	Diploma	10 (31.25)	25 (16.23)
	Bachelor	19 (59.38)	126 (81.82)
	Master	3 (9.38)	3 (1.95)
<i>Years of Work Experience</i>	Less than one year	0 (.00)	16 (10.39)
	1-5 years	0 (.00)	108 (70.13)
	6-10 years	11 (34.38)	26 (16.88)
	11-15 years	18 (56.25)	4 (2.60)
	16-20 years	2 (6.25)	0 (0.00)
	21 years or more	1 (3.13)	0 (0.00)
<i>Work Hospital</i>	King Fahad Specialist Hospital	9 (28.13)	39 (25.32)
	Buraidah central hospital	8 (25.00)	41 (26.62)
	King Saud Hospital	9 (28.13)	41 (26.62)
	Al Bukayriyah Hospital	6 (18.75)	33 (21.43)
<i>Work Unit in Hospital</i>	Medical Unit	16 (50.00)	79 (51.30)
	Surgical Unit	16 (50.00)	75 (48.70)
<b>Total Respondents</b>		<b>32</b>	<b>154</b>

The following sections provide an overview of the survey responses to the HSOPSC and the MLQ 5X questionnaires. This first phase of the study aimed to investigate the safety culture and nursing leadership in adult medical and surgical wards in four hospitals in the Qassim

region of Saudi Arabia, as perceived by the nursing staff. Subsequent sections give a more detailed analysis of the questionnaire items and dimensions.

#### **4.4. Results of HSOPSC Survey Data Analysis**

The overall survey results from the HSOPSC are presented in the first instance showing the average percentage of positive responses across the hospitals on each of the survey's items and dimensions. The results indicated an overall positive perception of patient safety among the nursing population; the average patient safety positive response score was 66% giving excellent and very good for their hospitals. The number of positive responses and percentages were calculated for items and dimensions as per the AHRQ survey analysis recommendations (AHRQ, 2004). Items were scored on a 5-point Likert response scale of agreement (strongly disagree, disagree, neither, agree, or strongly agree) and frequency (never, rarely, sometimes, most of the time, or always). Dimension scores were expressed as an average percentage of the positive responses towards patient safety. These were calculated by summing the positive score for each item and dividing them by the number of items of the same dimension. The positive response is defined by the percentage of respondents answering the questions by checking (strongly agree, agree; or always, most of the time) to a positively worded item, or by checking (strongly disagree, disagree; or rarely, never) to a negatively worded item. The scores of negatively worded items were reversed when computing positive percentages.

##### **4.4.1. Safety Culture Dimension-Level HSOPSC Survey Analysis Results**

This section provides results from analysis of twelve patient safety culture dimensions; seven unit-level aspects of patient safety culture, representing the perception of respondents towards their department or unit, three hospital-level aspects representing perceptions hospital wide, and two outcome variables measuring the overall perception of safety with the frequency of

event reporting. In addition, the survey measures two single item outcome questions on patient safety grade and the number of events reported.

### **I. Unit-Level Aspects:**

1. Teamwork within Units (4 questions: A1, A3, A4, A11)
2. Supervisor/manager Expectations & Actions Promoting Patient Safety (4 questions: B1, B2, B3, B4)
3. Organisational Learning – Continuous Improvement (3 questions: A6, A9, A13)
4. Feedback and Communications about Error (3 questions: C1, C3, C5)
5. Communication Openness (3 questions: C2, C4, C6)
6. Staffing (4 questions: A2, A5, A7, A14)
7. Non-punitive Response to Error (3 questions: A8, A12, A16)

### **II. Hospital-Level Aspects:**

8. Management Support for Patient Safety (3 questions: F1, F8, F9)
9. Teamwork across Units (4 questions: F4, F10, F2, F6)
10. Handoffs and Transitions (4 questions: F3, F5, F7, F11)

### **III. Outcome-Level Aspects:**

11. Overall Perceptions of Patient Safety (4 questions: A15, A18, A10, A17)
12. Frequency of Events Reported (3 questions: D1, D2, D3)

### **IV. Single-Item Outcome Questions**

13. Overall Grade for Patient Safety (1 question: E)
14. Number of Events Reported (1 question: G).

The dimension scores were calculated by dividing the total number of positive responses to the items in the dimension by the total number of items in each dimension. Those dimensions with the highest positive response rates were identified as areas of strength and dimensions with the lowest positive response rates were identified as potential areas for improvement.



Figure 17 lists the average positive response rates for the first twelve multi-question dimensions and is followed by the percentage of positive responses to the other two single-question dimensions. It shows that the positive response rate for the 12 patient safety culture dimensions ranged from 24% to 92%, and the mean positive response rate was 66%. The lowest positive dimension response rate was Staffing (24%), while the highest positive response rate of was for the Teamwork dimension within Units (92%).

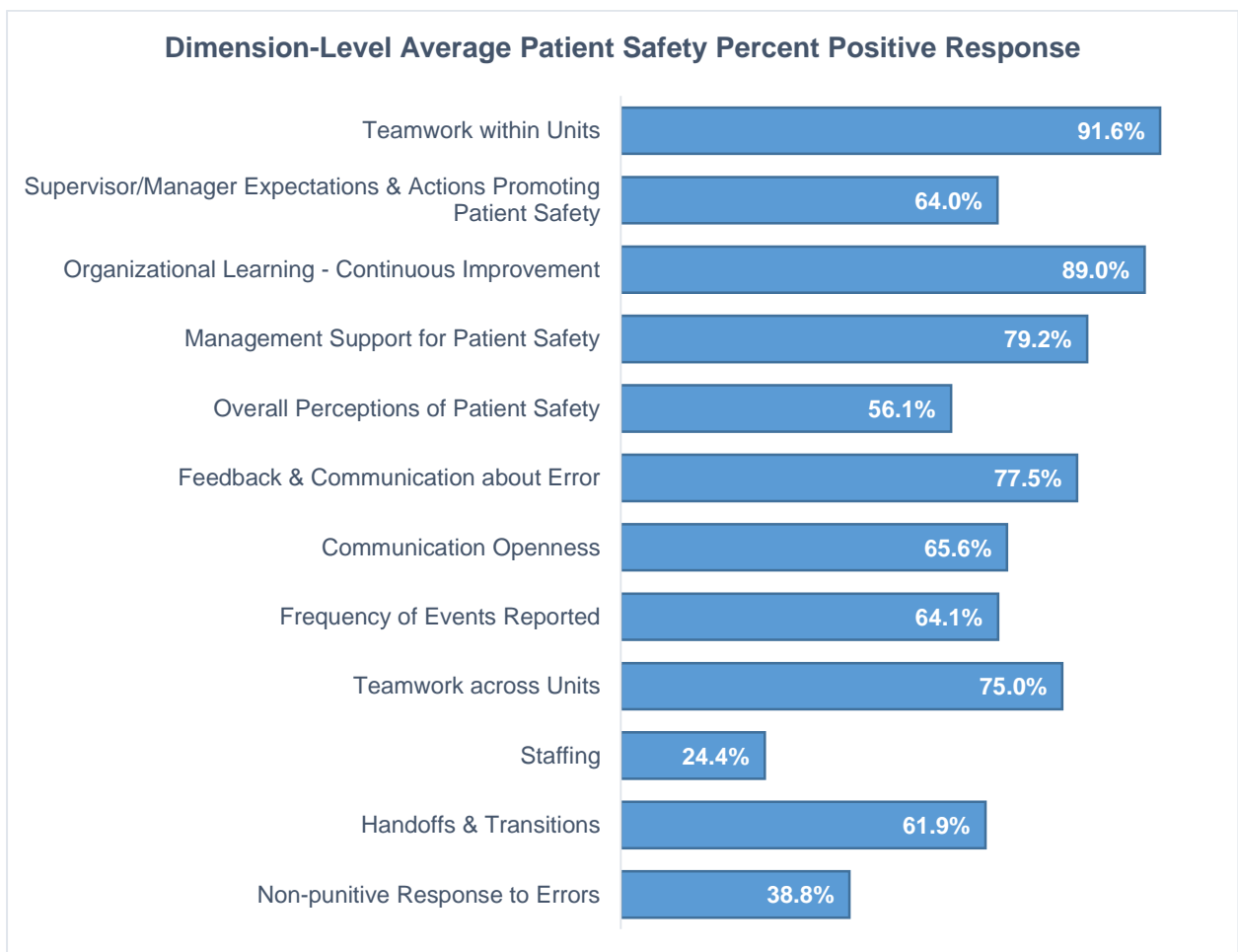


Figure 17. Dimension-Level Average Patient Safety Percent Positive Response

### Overall Grade on Patient Safety

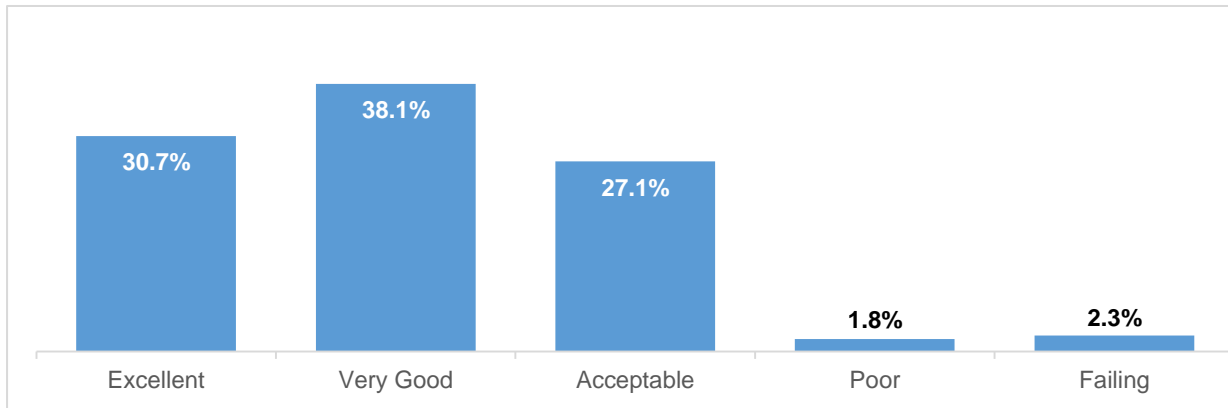


Figure 18. Overall Grade on Patient Safety

On average, most respondents were positive, with 69 % giving their work area or unit a patient safety grade of “Excellent” (31 %) or “Very Good” (38 %). 96% of respondents provided that patient safety in their work area/unit was at least

### Number of Events Reported

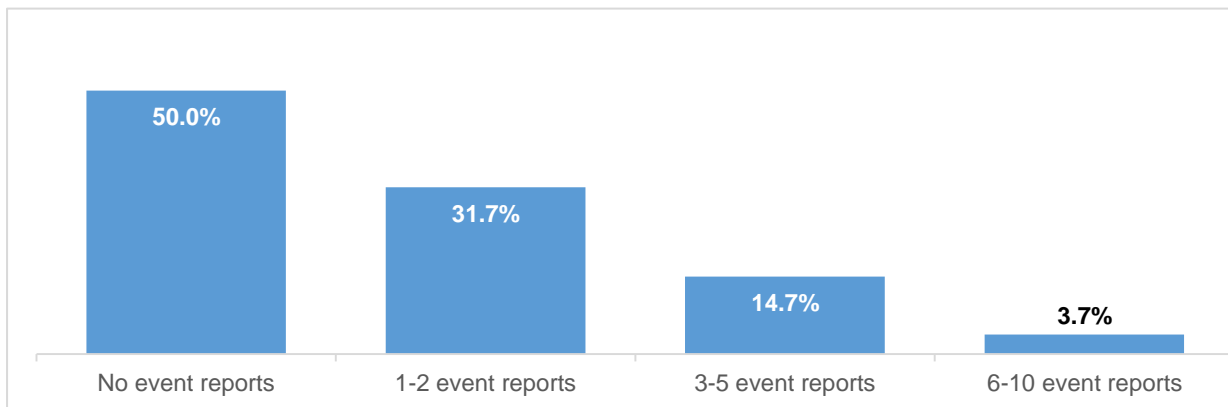


Figure 19. Number of Events Reported

On average, 50% of respondents had not completed and submitted an event report within the past year, whilst 32% only submitted 1-2 event reports and 15% submitted 3-5 event reports.

The twelve dimensions were examined to determine areas of strength (those with the highest percentage positive rating) and those requiring improvement (scoring the lowest). The dimensions with the highest positive score and thus considered areas of strength were Teamwork within Units (92%), Organizational Learning - Continuous Improvement (89%), Management Support for Patient Safety (79%), and Feedback & Communication about Error

(78%). The dimensions with the lowest positive scores and thus considered as potential for improvement were Non-punitive Response to Error (39%) and Staffing (24%).

#### 4.4.2. Perceptions about survey items

##### 4.4.2.1. Teamwork within Units

The Unit Level dimension “Teamwork within Units” received the highest positive response (92%), with response rates ranging between 83% and 96%, indicating that the nursing staff generally support each other, work together as a team, and treat each other with respect. This implies that there is a spirit of cooperation and solidarity among the staff, suggesting team work is positive in the maintenance of patient safety. Figure 20 shows the breakdown of agreement/disagreement for the dimension items.

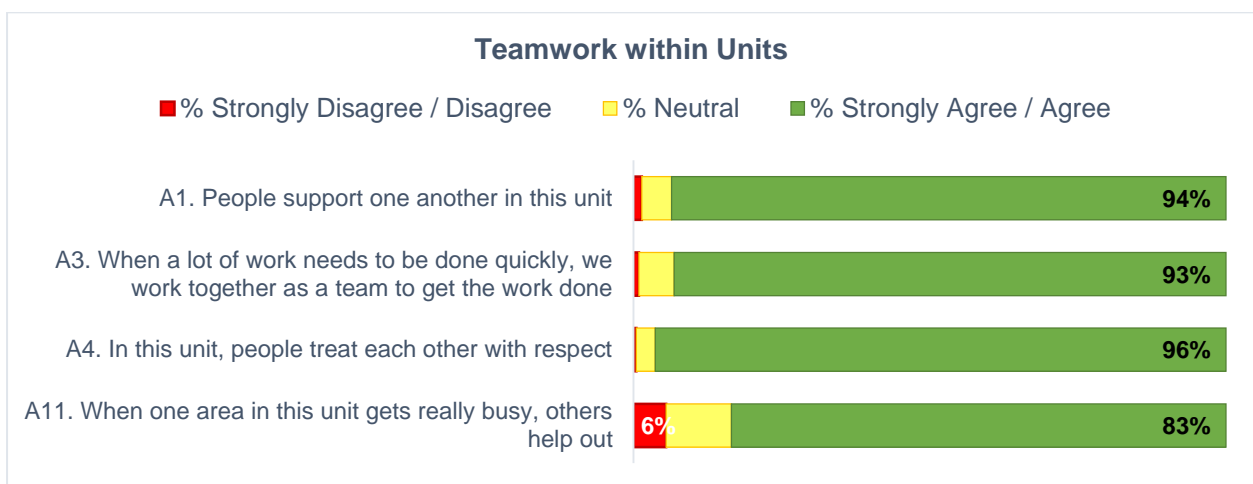


Figure 20. Response Rates for “Teamwork within Units” Dimension Items

##### 4.4.2.2. Supervisor/Manager Expectations & Actions Promoting Patient Safety

This dimension had an average positive response rate of 64%. It deals with the perceived relationship between the nurses and their supervisors/managers during the daily routine on the wards. It has shown that the nurses are sometimes subjected to pressure from their manager in order to work faster, which might compromise patient safety.

Shown in Figure 21, the majority of nurses (90%) agree that supervisors and managers give positive feedback when nurses do the job according to the established procedure of patient

safety. This is positive and an important incentive for nurses to provide better care. The majority of nurses (88%) indicated that their supervisor and managers seriously considered their safety suggestions. In contrast almost half of nurses (48%) perceived that their supervisors and managers put pressure on them sometimes and asked them to complete their work faster, and that this might compromise the quality of the job being done. 52% of nurses reported that their managers/supervisors are overlooking patient safety problems.

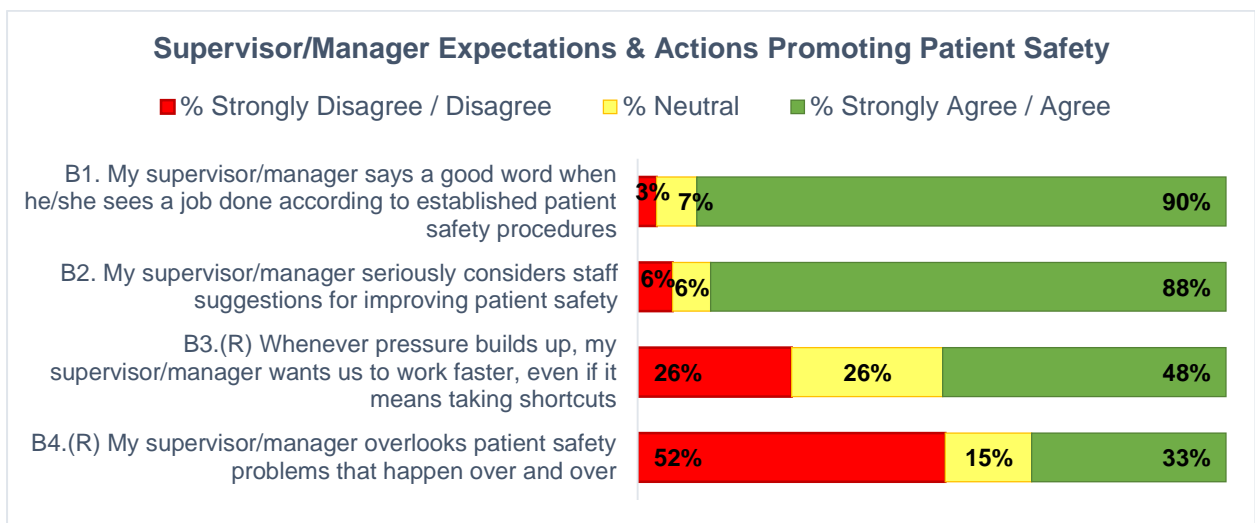


Figure 21. Response Rates for “Supervisor/Manager Expectations & Actions Promoting Patient Safety” Dimension Items

#### 4.4.2.3. Organizational Learning – Continuous Improvement

This is the second dimension that was identified as an area of strength; the average percentage of positive response was 89%. Almost all nurses (98%) agree that they are actively engaged in doing their tasks for improving patient safety, which implies nurses regard patient safety as a high priority in their daily working routines within their wards. Most nurses (81%) agree that mistakes on their wards have resulted in positive changes, implying that the system has been changed, which lessens the chance of the errors being repeated, and 88% agreed that changes are evaluated for effectiveness.

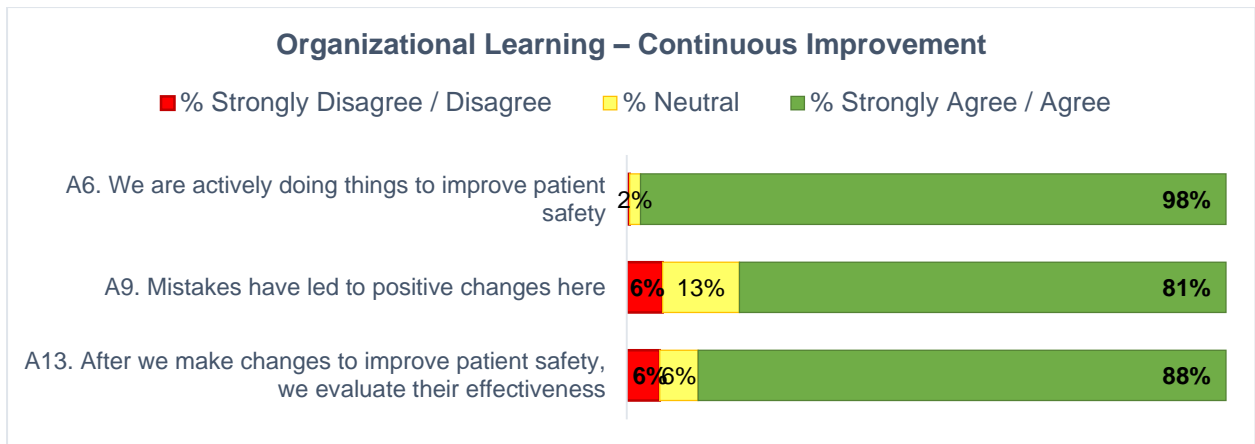


Figure 22. Response Rates for “Organizational Learning – Continuous Improvement” Dimension Items

#### 4.4.2.4. Management Support for Patient Safety

This dimension has a relatively high percent of positive responses (79%). It indicates the majority of nurses (85%) agree that hospital management maintains a work climate that promotes patient safety and that 90% of nurses agree that the hospital managers act in a way that shows that patient safety is a top priority. The majority of staff (62%) disagree that hospital management seems interested in patient safety only after an adverse event happens. This implies that management is proactive rather than reactive, and it suggests that the majority of the nurses agree that hospital units work together to provide the best patient care, which leads to better quality care.

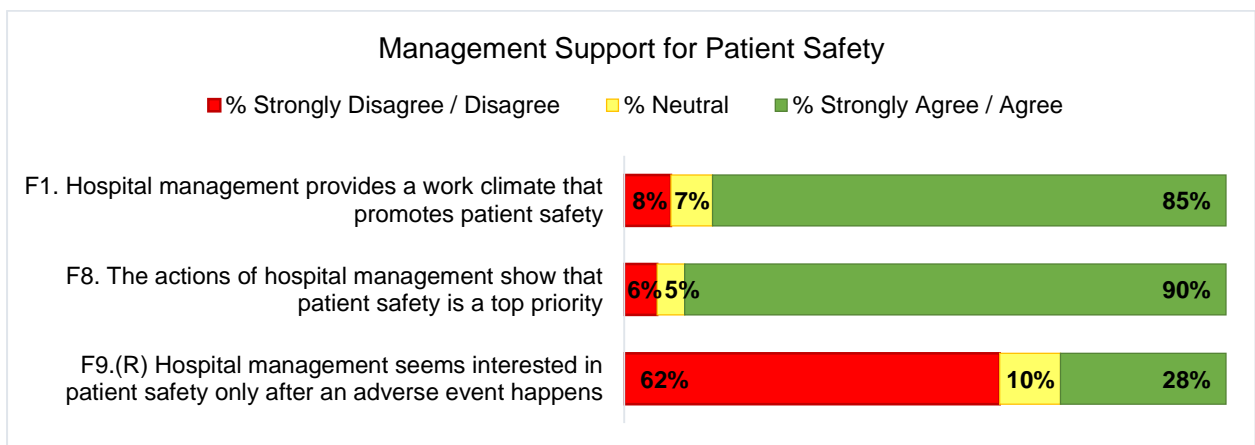


Figure 23. Response Rates for “Management Support for Patient Safety” Dimension Items

#### 4.4.2.5. Overall Perceptions of Patient Safety

Overall perceptions of patient safety reflect an average positive response of 56%. From Figure 24, it can be seen that 69% of respondents agreed that patient safety is never sacrificed to get more work done and 70% agreed that procedures and systems are good at preventing errors from happening. However, 41% believed that it is just by chance that serious errors do not occur, and 50% believed that they did not have patient safety problems in their units. This implies that nurses understand the risks in the system but also potentially that there are unsafe practices that may need to be addressed.

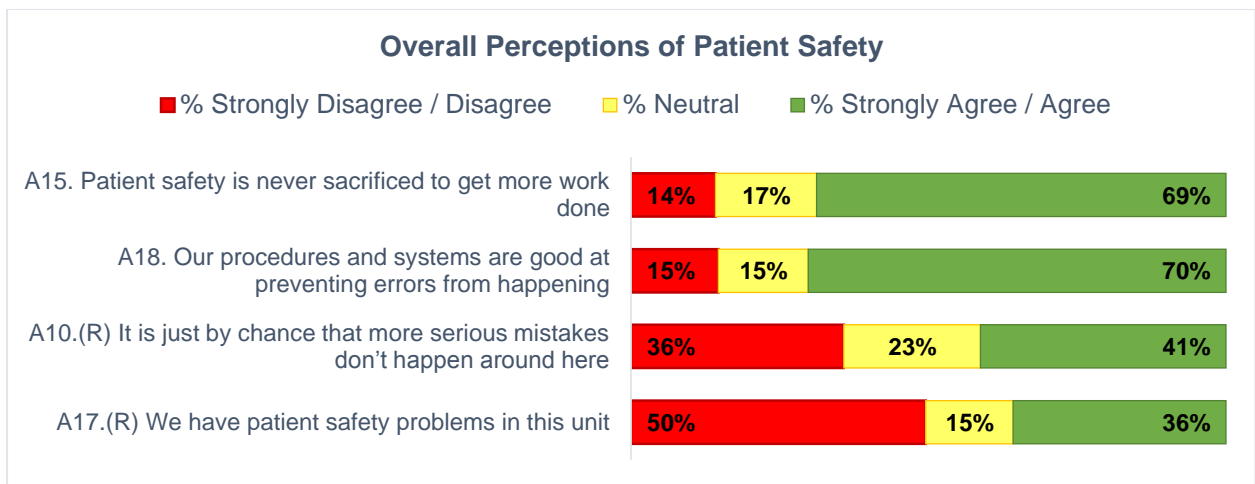


Figure 24. Response Rates for “Overall Perceptions of Patient Safety” Dimension Items

#### 4.4.2.6. Feedback & Communication about Error

This dimension had an average score of 78%, indicating a positive perception of feedback and communication regarding errors. Figure 25 shows that 60% of respondents agreed that they were given feedback about changes put into place based on event reports. The majority (88%) of the nurses indicate that they are informed about errors which take place within their wards. Feedback about events is important so that nurses become aware of errors. The majority (85%) of the nurses indicated that they discuss ways in which errors can be prevented from happening again, which means that learning is encouraged.

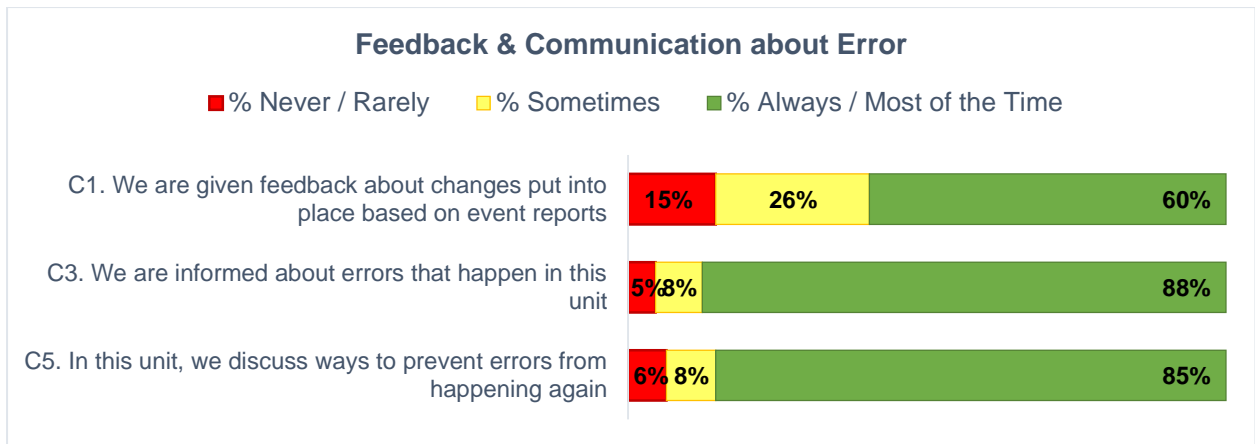


Figure 25. Response Rates for “Feedback & Communication about Error” Dimension Items

#### 4.4.2.7. Communication Openness

Communication openness had an average score of 66%. Figure 26 indicates that 72% of nurses felt that they can speak up when they see something that might be negative and that could affect patient safety. Most nurses (62%) feel free to question any decision or action of their supervisors and managers, which indicates a democratic leadership culture in these units and is positive. The nurses indicated that they were not afraid to ask questions when something did not seem right.

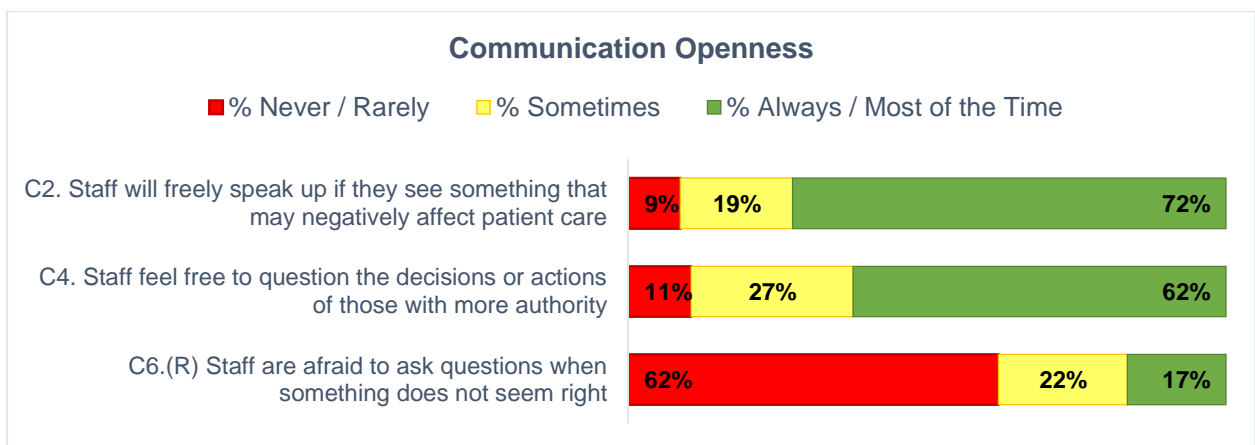


Figure 26. Response Rates for “Communication Openness” Dimension Items

#### 4.4.2.8. Frequency of Events Reported

This dimension has an average score of 64%. The rates show that 56% of nurses indicated that near misses are often reported. The reporting of near misses is important because they

indicate risks within the system that can or could lead to actual errors. Over half the nurses (60%) would report these non-harm events, which implies that the nurses understand risks and want to highlight them to avoid future errors. Three quarters of the nurses (76%) believed that in the event of discovering mistakes having been made, these events are reported. This shows a positive reporting culture within the wards.

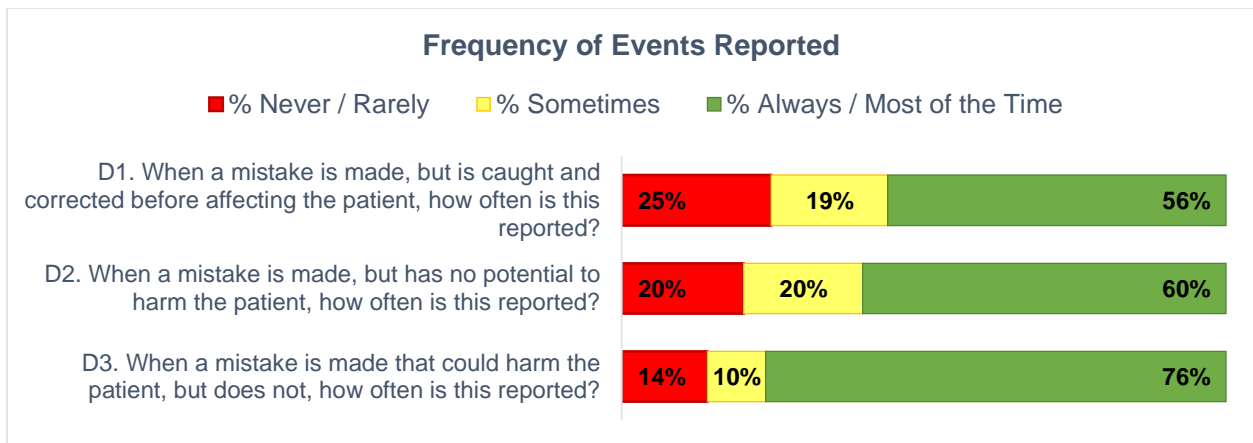


Figure 27. Response Rates for “Frequency of Events Reported” Dimension Items

However, whilst there is some trend towards a positive reporting culture, half of the nurses do not report the near misses. Furthermore, there are some discrepancies between the audit data and qualitative in this regard showing less positive reporting, which will be discussed later in the thesis.

#### 4.4.2.9. Teamwork across Units

This dimension had an average positive response of 75%. The majority (84 %) of the nurses agreed that cooperation between units in the hospitals is good, which is in itself, positive for patient safety. 88% agreed that units within the hospital work well together to provide the best care for patients. The majority (63%) of nurses do not agree that there is no coordination between the units, meaning that some coordination is evident between the units. Similarly, 65% of nurses do not agree that working with other hospital units is unpleasant. This is really



positive and implies a spirit of cooperation. There is an overall indication that nurses perceive few problems with the exchange of information across the hospital units.

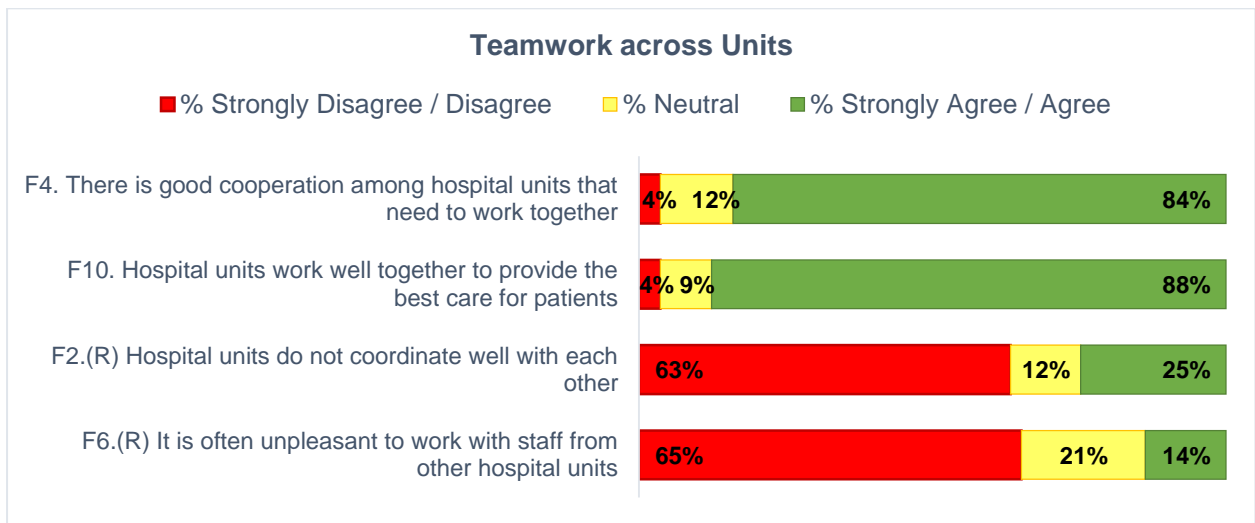


Figure 28. Response Rates for “Teamwork across Units” Dimension Items

#### 4.4.2.10. Staffing

This dimension has the lowest average positive response score (24%). Over half of nurses (59%) responded that the hospitals sometimes use temporary and agency staff especially during the holiday periods, and 58% stated that they work in “crisis mode”, trying to do too much and too quickly. On closer examination however, 56% of nurses believe that there are sufficient staff to handle the workload, and 79% indicate that they do not work longer hours than is best for patient care.

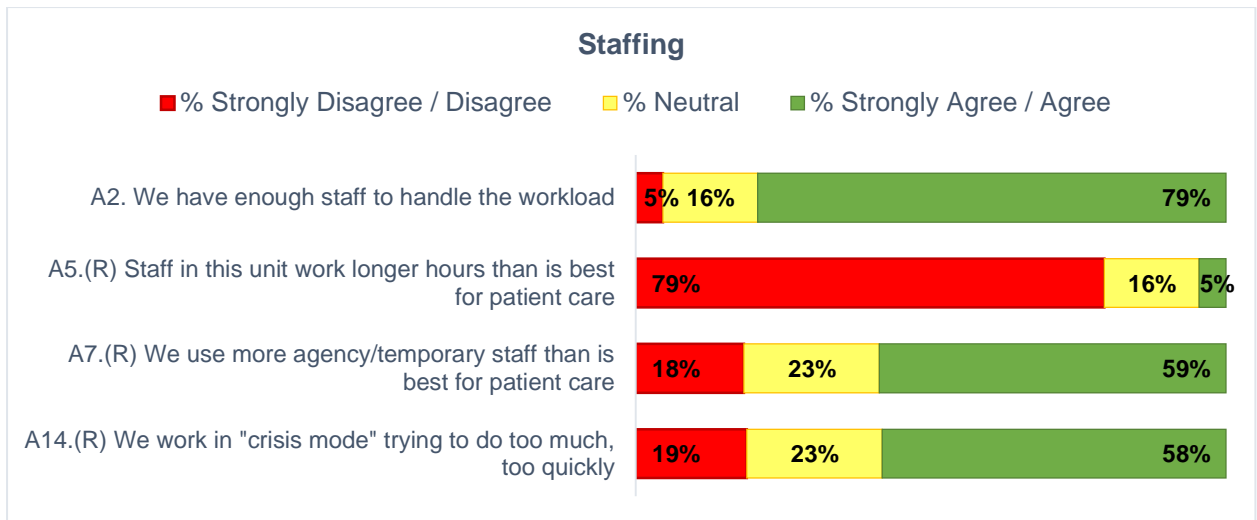


Figure 29. Response Rates for “Staffing” Dimension Items

#### 4.4.2.11. Handovers & Transitions

This dimension has an average positive score of 62%. There are mixed opinions between the nurses about the problems, which might accompany transferring patients between the units. Almost half of nurses (48%) do not agree that things “fall between the cracks” when transferring patients from one unit to another. Three quarters (76%) of the nurses do not think that important patient care information is lost during the shift changes, implying that communication between professionals across shifts is effective. More than half of nurses (56%) do not agree that problems often occur in the exchange of information across hospital units. 69% of nurses do not agree that shift changes can affect patient safety, implying effective communication overall.

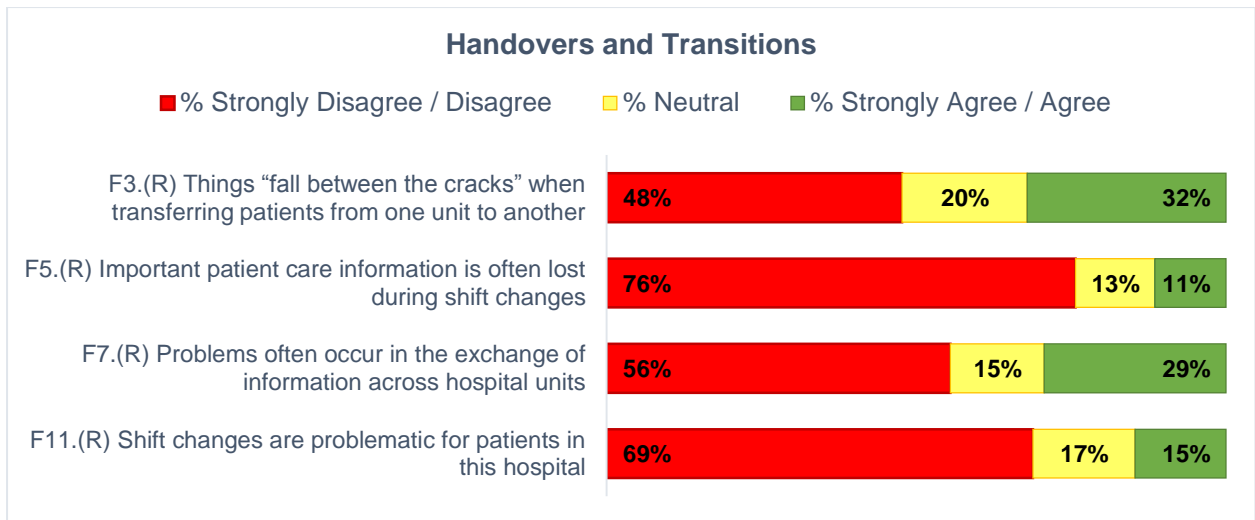


Figure 30. Response Rates for “Handovers and Transitions” Dimension Items

#### 4.4.2.12. Non-punitive Response to Errors

For this dimension, the average positive score was only 39%. Almost half of nurses (49%) disagree that their mistakes might be held against them by their managers. However, this indicates that the other half have concerns about being blamed. Fear of personal ‘blame’ related to error reporting will serve only to inhibit the reporting of errors, making a system unsafe, where errors are hidden. This needs further exploration. Only 22% showed that they do not worry that mistakes they make are kept in their personnel files.

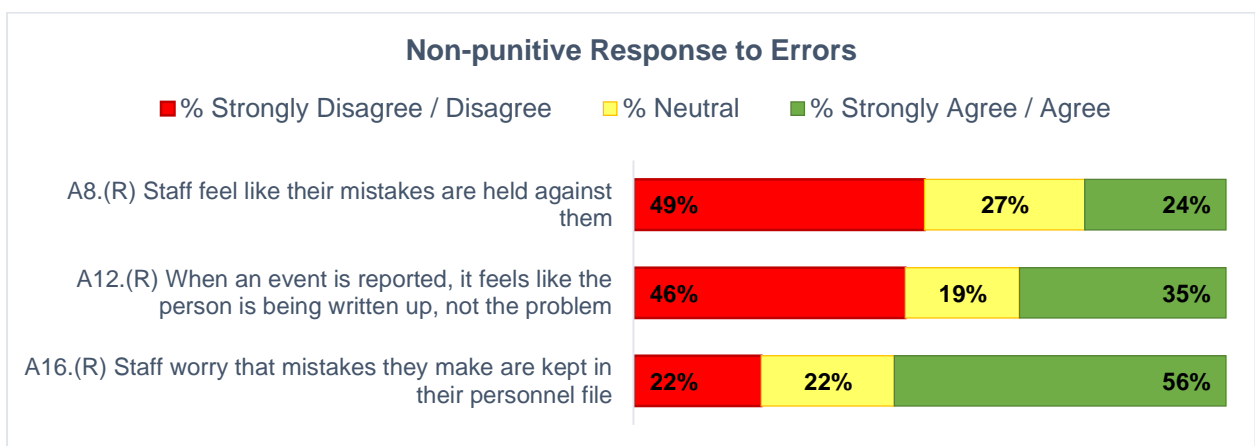


Figure 31. Response Rates for “Non-punitive Response to Errors” Dimension Items

#### **4.4.3. Inferential Analysis (HSOPSC)**

Inferential analysis is used to generalise the results obtained from a convenience sample back to the population from which the sample was drawn (Blaikie, 2003). In this sub-section, results of independent samples t tests and ANOVA are presented. Comparison among hospitals and between the two types of hospitals' wards/units is performed using a One-way ANOVA to find statistically significant differences among the four hospitals. Two-independent samples t test were also applied to find any possible statistically significant difference between the two types of hospital wards/units.

##### **4.4.3.1. A Comparison of the 12 HSOPSC Dimensions among the four Saudi Hospitals**

One-way ANOVA was used to examine the mean differences of positive response scores of each of the 12 dimensions among the four Saudi hospitals (Table 15). Overall, the one-way ANOVA revealed that there were statistically significant differences between the four hospitals,  $F = 24.918$  with  $p = .000$  for an average of mean positive scores of the 12 dimensions. A Post Hoc multiple comparisons test revealed that hospital F had a statistically significant higher mean positive score ( $M = 3.92$ ) than the other three hospitals ( $M [B] = 3.55$ ,  $M [S] = 3.58$ , and  $M [A] = 3.40$ ). It also revealed that hospital S had a statistically significant higher mean positive score ( $M = 3.58$ ) than hospital A ( $M = 3.40$ ).

On the dimension level, there were statistically significant differences in the mean positive scores of 11 dimensions, where  $p$  values  $< .05$ . Table 15 exhibits the  $p$  values for the 12 dimensions along with mean positive scores. For the dimension "1. Teamwork within Units", there were no statistically significant differences in the mean positive scores of the averaged dimension among the four hospitals,  $p = .407$ .

Post Hoc multiple comparisons tests were performed to determine any significant differences among the four hospitals. Table 16 exhibits the mean differences of the Post Hoc analysis that

showed significant differences in mean positive scores of the 12 dimensions among the four hospitals.

Table 6. One-way ANOVA Results: Significant Differences in the 12 HSOPSC Dimensions among the four Saudi Hospitals

<b>Patient Safety Culture</b>	<b>Hospital</b>				<b>Total</b>	<b>P Value</b>
	<b>(F)</b>	<b>(B)</b>	<b>(S)</b>	<b>(A)</b>		
<b>Dimensions/Items</b>						
<u>Patient Safety Culture Mean Score</u>	<u>3.92</u>	<u>3.55</u>	<u>3.58</u>	<u>3.40</u>	<u>3.64</u>	<u>.000*</u>
1. Teamwork within Units	4.37	4.26	4.35	4.24	4.32	.407
2. Supervisor/Manager Expectations & Actions Promoting Patient Safety	3.98	3.57	3.35	3.29	3.57	.000*
3. Organizational Learning – Continuous Improvement	4.37	4.21	4.15	4.24	4.24	.050*
4. Management Support for Patient Safety	4.31	3.67	3.98	3.44	3.92	.000*
5. Overall Perceptions of Patient Safety	3.84	3.08	3.34	3.34	3.42	.000*
6. Feedback & Communication about Error	4.27	3.81	4.03	3.60	3.98	.000*
7. Communication Openness	3.92	3.72	3.68	3.51	3.73	.014*
8. Frequency of Events Reported	4.23	3.62	3.61	2.87	3.68	.000*
9. Teamwork across Units	3.99	3.70	3.91	3.76	3.86	.028*
10. Staffing	2.61	2.59	2.34	2.60	2.51	.026*
11. Handoffs & Transitions	3.76	3.34	3.47	3.22	3.49	.000*
12. Non-punitive Response to Errors	3.33	3.01	2.80	2.68	2.98	.000*

\*. The mean difference is significant at  $\alpha = 0.05$  level.

Table 7. Results of Post Hoc Multiple Comparison Tests for the 12 Dimensions – Mean Differences

		<b>B</b>	<b>S</b>	<b>A</b>
<b>Patient Safety Culture Mean Positive Score</b>	<b>F</b>	.367*	.332*	.518*
* Hospital F had significantly <u>higher</u> mean positive score than hospital B, S, and A.	<b>B</b>		-.035	.151
* Hospital S had significantly <u>higher</u> mean positive score than hospital A	<b>S</b>			.186*
<b>2. Supervisor/Manager Expectations &amp; Actions Promoting Patient Safety</b>	<b>F</b>	.411*	.636*	.693*
* Hospital F had significantly <u>higher</u> mean positive score than hospital B, S, and A.	<b>B</b>		.224	.282
	<b>S</b>			.058
<b>3. Organizational Learning – Continuous Improvement</b>	<b>F</b>	.166	.218*	.135
* Hospital F had significantly <u>higher</u> mean positive score than hospital S.	<b>B</b>		.052	-.031
	<b>S</b>			-.083
<b>4. Management Support for Patient Safety</b>	<b>F</b>	.633*	.329*	.865*
* Hospital F had significantly <u>higher</u> mean positive score than hospital B, S, and A.	<b>B</b>		-	.232
* Hospital B had significantly <u>lower</u> mean positive score than hospital S.			.304*	
* Hospital S had significantly <u>higher</u> mean positive score than hospital A.	<b>S</b>			.537*
<b>5. Overall Perceptions of Patient Safety</b>	<b>F</b>	.763*	.506*	.506*
* Hospital F had significantly <u>higher</u> mean positive score than hospital B, S, and A.	<b>B</b>		-	-.257
* Hospital B had significantly <u>lower</u> mean positive score than hospital S.			.256*	
	<b>S</b>			-.001
<b>6. Feedback &amp; Communication about Error</b>	<b>F</b>	.466*	.246	.676*
* Hospital F had significantly <u>higher</u> mean positive score than hospital B and A.	<b>B</b>		-.219	.211
* Hospital S had significantly <u>higher</u> mean positive score than hospital A.	<b>S</b>			.430*
<b>7. Communication Openness</b>	<b>F</b>	.194	.238	.413*
* Hospital F had significantly <u>higher</u> mean positive score than hospital A.	<b>B</b>		.044	.219
	<b>S</b>			.175

		<b>B</b>	<b>S</b>	<b>A</b>
<b>8. Frequency of Events Reported</b>	<b>F</b>	.608*	.621*	1.359*
* Hospital F had significantly <u>higher</u> mean positive score than hospital B, S, and A.	<b>B</b>		.014	.751*
* Hospital B and S had significantly <u>higher</u> mean positive score than hospital A.	<b>S</b>			.737*
<b>9. Teamwork across Units</b>	<b>F</b>	.291*	.082	.230
* Hospital F had significantly <u>higher</u> mean positive score than hospital B.	<b>B</b>		-.208	-.061
	<b>S</b>			.147
<b>10. Staffing</b>	<b>F</b>	.015	.262*	.010
* Hospital F had significantly <u>higher</u> mean positive score than hospital S.	<b>B</b>		.247	-.005
	<b>S</b>			-.252
<b>11. Handoffs &amp; Transitions</b>	<b>F</b>	.421*	.290*	.545*
* Hospital F had significantly <u>higher</u> mean positive score than hospital B, S, and A.	<b>B</b>		-.132	.124
	<b>S</b>			.255
<b>12. Non-punitive Response to Errors</b>	<b>F</b>	.321	.536*	.656*
* Hospital F had significantly <u>higher</u> mean positive score than hospital S and A.	<b>B</b>		.216	.335
	<b>S</b>			.120

\*. The mean difference is significant at  $\alpha = 0.05$  level.

#### 4.4.3.2. A Comparison of the 12 HSOPSC Dimensions between Hospital Units/Wards

A two-independent sample t test was performed to examine any statistically significant differences between medical and surgical units/wards. On aggregate, the test revealed no significant differences between the two types of wards in the mean positive scores of the patient safety culture aggregate dimension. However, on the dimension level, there was a significant difference between the two types of wards in the mean positive scores of the two dimensions “8. Frequency of Events Reported” and “10. Staffing”.

Table 16 lists the mean positive scores of the 12 dimensions and the significance level resulted from the t tests performed. The results revealed in general that medical units had significantly higher mean positive scores ( $M = 3.84$ ) than surgical units ( $M = 3.54$ ),  $p = .03$ . On the other hand, surgical units had significantly higher mean positive scores ( $M = 2.59$ ) than medical units ( $M = 2.42$ ) with respect to staffing,  $p = .036$ .

Table 8. Two-Independent Samples T Test Results – Differences between Hospital Units/Wards

<b>Patient Safety Dimensions</b>	<b>Medical Unit</b>	<b>Surgical Unit</b>	<b>Sig. (2-tailed)</b>
Patient Safety Culture Mean Positive Score	3.62	3.66	.413
1. Teamwork within Units	4.28	4.36	.211
2. Supervisor/Manager Expectations & Actions Promoting Patient Safety	3.61	3.53	.307
3. Organizational Learning – Continuous Improvement	4.17	4.30	.055
4. Management Support for Patient Safety	3.85	3.98	.154
5. Overall Perceptions of Patient Safety	3.38	3.46	.324
6. Feedback & Communication about Error	3.96	4.00	.598
7. Communication Openness	3.72	3.74	.749
8. Frequency of Events Reported	3.84	3.54	.030*
9. Teamwork across Units	3.82	3.89	.324
10. Staffing	2.42	2.59	.036*
11. Handoffs & Transitions	3.44	3.53	.311
12. Non-punitive Response to Errors	2.96	3.00	.704



#### **4.5. Results of the MLQ 5X Questionnaire**

In order to explore the relationship between safety cultures, nursing leadership and medication errors in adult medical-surgical wards in the Qassim region of Saudi Arabia. The MLQ was developed by Bass and Avolio (1989) to measure the full range leadership model through a short but comprehensive questionnaire survey. Altogether, it aims to measure the three broader dimensions of transformational, transactional and laissez-faire leadership. Measures how respondents perceive themselves with regard to specific leadership behaviors (using the Leader/Staff form). 186 nursing staff and managers of the adult medical-surgical wards completed the MLQ-5X short form; (Bass & Avolio, 1995). The questionnaire collected basic demographic information as well as participants' perceptions. The data analysis highlights the key traits of nursing leadership from both points of view; nurse managers and clinical nurses.

The MLQ X form consisted of 45 items measuring four major constructs and 12 sub-constructs listed in Table 17. The items measuring each scale or sub-scale of the four types of leadership, based on MLQ 5X scoring guide, are listed with abbreviations to be used in tabulating findings.

For analysis purposes, the MLQ 5X form-scoring guide was used to calculate average scores for each sub-scale. For each construct (leadership style), an average score was computed by aggregating the sub-scales' mean scores and dividing by the number of sub-scales composing the leadership style construct. Independent-sample T tests were performed to find out whether there are statistically significant differences between leaders' and nurses' perceptions. T test results were computed and reported in summary tables for the four leadership types using a two tailed tests and significance level set at 0.05.

Table 9. Leadership Types and Scales – MLQ 5X

<b>Leadership Type (Construct)</b>	<b>Sub-Construct (Scale)</b>	<b>Sub-Scale</b>	<b>Items</b>	<b>Abb.</b>
<b>Transformational Leadership</b>	Idealized Influence	Idealized Influence (Attributed)	10, 18, 21, 25	IIA
		Idealized Influence (Behavior)	6, 14, 23, 34	IIB
	Inspirational Motivation	Inspirational Motivation	9, 13, 26, 36	IM
	Intellectual Stimulation	Intellectual Stimulation	2, 8, 30, 32	IS
	Individualized Consideration	Individualized Consideration	15, 19, 29, 31	IC
<b>Transactional Leadership</b>	Contingent Reward	Contingent Reward	1, 11, 16, 35	CR
	Management-by-Exception	Management-by-Exception (Active)	4, 22, 24, 27	AMBE
		Management-by-Exception (Passive)	3, 12, 17, 20	PMBE
<b>Laissez-Faire Leadership</b>	Laissez-Faire	Laissez-Faire	5, 7, 28, 33	LF
<b>Leadership Outcomes</b>	Satisfaction	Extra Effort	39, 42, 44	EEF
	Extra Effort	Effectiveness	37, 40, 43, 45	EFF
	Effectiveness	Satisfaction	38, 41	SAT

#### 4.5.1. MLQ Descriptive Analysis

The descriptive statistics of leadership styles and its variables collected through the MLQ 5X of nurses and leaders combined are presented in Table 18. Means, standard deviations, range, minimum, and maximum are reported. Interpretation of mean scores were shown (Pihie, Sadeghi & Elias, 2011). Mean scores ranged between “fairly often” and “frequently if not always”. The descriptive results reported in Table 18 show that transformational leadership had a higher total mean score than transactional leadership and laissez-faire, indicating that

transformational leadership was more likely to be more frequent. Similarly, transactional leadership had a higher total mean score than laissez-faire, indicating that transactional leadership was more likely to be more frequent than laissez-faire. Generally speaking transformational and transactional leadership styles were frequent (if not always), while laissez-faire was less frequent.

Table 10. Descriptive Statistics of Leadership Styles

Leadership Styles	M	Interpretation	SD	Range	Min	Max
<b><u>Transformational</u></b>	<u>3.38</u>	<u>Frequently if not always</u>	<u>.473</u>	<u>3.00</u>	<u>1.75</u>	<u>4.75</u>
Idealized Influence (Attributed)	3.54	Frequently if not always	.539	3.50	1.25	4.75
Idealized Influence (Behaviour)	3.47	Frequently if not always	.529	3.00	1.75	4.75
Inspirational Motivation	3.52	Frequently if not always	.539	3.50	1.50	5.00
Intellectual Stimulation	3.04	Fairly Often	.738	3.00	1.75	4.75
Individualized Consideration	3.34	Frequently if not always	.686	3.25	1.75	5.00
<b><u>Transactional</u></b>	<u>3.29</u>	<u>Frequently if not always</u>	<u>.413</u>	<u>3.42</u>	<u>1.42</u>	<u>4.83</u>
Contingent Reward	3.36	Frequently if not always	.577	3.25	1.50	4.75
Management-by-Exception (Active)	3.53	Frequently if not always	.568	4.00	1.00	5.00
Management-by-Exception (Passive)	2.99	Fairly Often	.665	3.75	1.00	4.75
<b><u>Laissez-Faire</u></b>	<u>2.62</u>	<u>Fairly Often</u>	<u>.755</u>	<u>3.50</u>	<u>1.00</u>	<u>4.50</u>

*Interpretation Score: Not at all = 0 - .8; Once in a while = .81 - 1.6; Sometimes = 1.61 - 2.4; Fairly Often = 2.41 - 3.2; Frequently if not always = 3.21 - 4*

#### 4.5.1.1. Correlation Analysis

Relationships between types of leadership style were examined by performing correlation analysis and Pearson's r correlation coefficients which are reported in Table 19. Paired-samples t tests were also performed to find whether or not each type of leadership style was significantly different in table 20.

Table 11. Pearson's r Correlation Coefficients of Leadership Styles Relationships

Leadership Style	Transactional	Laissez-Faire
Transformational	.561**	.227**
Transactional		.543**

\*\* . Correlation is significant at the 0.01 level (2-tailed).

As reported in Table 19, transformational leadership had a significant strong and positive relationship with transactional leadership (p-value = .000) and a fairly medium and positive relationship with laissez-faire (p-value = .002). Transactional leadership and laissez-faire were significantly strongly and positively correlated (p-value = .000).

Table 12. Paired-Samples T Tests of Leadership Styles

Pairs	Paired Differences			
	M	SD	t	Sig. (2-tailed)
Pair 1 Transformational - Transactional	.09	.419	2.866	.005
Pair 2 Transformational - Laissez-Faire	.76	.795	13.052	.000
Pair 3 Transactional - Laissez-Faire	.67	.634	14.477	.000

Paired-samples t tests were performed to find whether or not each type of leadership style was significantly different. The tests reported in Table 20 revealed that leadership styles were significantly different, p-value < .01. That is, transformational leadership (M = 3.38) had a significantly higher mean score than transactional leadership (M = 3.29) and laissez-faire (M

= 2.62). Also, transactional leadership (M = 3.29) had a significantly higher mean score than laissez-faire (M = 2.62). These results indicate that transformational leadership is more likely to be more frequent than transactional leadership and laissez-faire, and that transactional leadership is more likely to be more frequent than laissez-faire.

#### **4.6. Qualitative Data Analysis**

In this section, findings of the second phase of the study obtained from the semi-structured face-to-face interviews about medication errors reporting are presented. Sixteen interviews were conducted that lasted between 30 and 45 minutes. The aim of this phase of the study was to gather views from participants based on the survey findings in the first stage in order to determine the key points behind not reporting medication errors; to investigate the relationship of medication errors and perceived safety culture and nursing leadership. Findings of the two stages are then compared and triangulated.

##### **4.6.1. Participants**

Of the 186 nurses from the four hospitals who completed the questionnaires, a total number of 16 nurses were recruited to participate in the interviews. Flyers in the staff rooms gave information about the study and asked for nurses in the wards to participate (Appendix 17). Eight nursing managers working as a head nurse were chosen, and 18 nursing staff volunteered to participate; of these, 8 nursing staff were selected to represent a variety of perspectives in relation to site, gender, and years of experience. The nursing workforce in Saudi is diverse and multi-cultural with many non-Saudi nurses, and the most common shared language is English. All the interviews were conducted in English and were transcribed verbatim (Examples in appendix 18). English was the second or third language for all the participants, and readers who are native English speakers will notice different word choices than perhaps are expected; where necessary meaning has been explained.

There were a mixed range of participants. Most respondents (56%) were between 31 to 40 years old. More females than males were recruited (9 women vs 7 men). Most participants were very experienced staff members with 75% of respondents having between 6 and 15 years of experience. Table 10 illustrates the breakdown of the interview participants' demographics.

Table 13. Demographic Characteristics of Interview Participants

	<u>Nursing Managers</u>	<u>Nursing Staff</u>	<u>Total</u>	<u>Percent</u>
<b>Nationality</b>				
Saudi	2	5	7	43.75%
Non-Saudi	6	3	9	56.25%
<b>Gender</b>				
Female	6	3	9	56.25%
Male	2	5	7	43.75%
<b>Age</b>				
≤ 20				
21-30		5	5	31.25%
31-40	6	3	9	56.25%
> 40	2		2	12.50%
<b>Qualification</b>				
Diploma	1	3	4	25.00%
Bachelor	4	3	7	43.75%
Post Graduate	3	2	5	31.25%
<b>Experience (No. of Years of Experience Post Qualification)</b>				
≤ 5		1	1	6.25%
6-10	3	4	7	43.75%
11-15	2	3	5	31.25%
16-20	2		2	12.50%
> 20	1		1	6.25%

#### 4.6.2. Semi-structured Interviews Analysis Findings

Nine themes emerged from the interviews, which will be discussed in detail in the following sections, and a selection of quotes from the interviews will be used to further illustrate the findings and to allow the reader to understand the responses which formed the data. The themes are categorised as either procedural, personal, or cultural. Table 11 lists the key themes extracted from the semi-structured interviews, along with sub-themes that emerged.

Table 14. Semi-structured Interviews Extracted Themes

Category	Theme	Sub-theme
<b>Procedural</b>	<ul style="list-style-type: none"> <li>Leaders/ Managers</li> <li>Accountability/ Responsibility</li> </ul>	<ul style="list-style-type: none"> <li>Noncompliance/Adherence to policy</li> <li>Inadequacy of Learning and Education</li> </ul>
		<ul style="list-style-type: none"> <li>Response – Lack of feedback</li> <li>Resources and Capacity</li> <li>Computer Systems</li> </ul>
<b>Personal</b>	<ul style="list-style-type: none"> <li>Human Nature</li> <li>Management behaviour towards staff</li> <li>Fear</li> </ul>	
<b>Cultural</b>	<ul style="list-style-type: none"> <li>Culture</li> <li>Communication</li> </ul>	

#### 4.6.3. Procedural Themes

##### 4.6.3.1. Leaders’/ Managers’ Accountability/ Responsibility

The accountability and responsibility theme is viewed from two perspectives: (1) noncompliance / adherence to policy, and (2) learning and education.

## **Noncompliance / Adherence to Policy**

The concept of noncompliance with policy was mentioned by nurses in most of the interviews. Nurses stated that the hospitals in this study are accredited from and have passed the standards of the Saudi Central Board for Accreditation of Health Care Institution (CBAHI). Nurses interviewed mentioned that the hospitals they work for have policies, which contribute to the safety level of both the hospital and wards as well. However, most interviewees agreed that some nurses do not comply with the policy, which does not allow the hospital or wards to reach the highest level of satisfaction with regard to safety. One staff nurse stated;

*“Actually we have policy, but the compliance to it is not as expected. In terms of reporting medication errors, not all staff have full compliance to medical issues.”*

RN-MF

In addition, a nursing manager said:

*“Actually, as we passed “CBAHI” and TCI, we have complete policy. However, not all staff have 100% compliance to this policy.”* NM-MS

Within the theme of noncompliance to policy, interviewees presented an important related concept, which was ‘incomplete orders, poor handwriting or abbreviation’, which leads to occurrence of errors. Some nursing managers stated that medication errors can happen from the start of the order given by the physician. The error could be in the prescription stage; i.e. the doctor might use different or unacceptable abbreviations for medication that could be misinterpreted by the nurse and as a result medication error could occur. One of the nursing managers said:



*“If they are giving medication then I find that in the order it is written there like a little bit late or something like it is not abbreviated I can misinterpret it.” NM-SF*

Another said:

*“... from my observations and from my reporting, medication error is less in the ward when it comes to administration... I think the medication error occurs when the physician is prescribing.” RN-MB*

One of the staff nurses stated:

*“Compliance with the policy and training programs. But, it takes longer time for newly joined nurses in the ward to get the training programs.” RN-MF*

Adhering to and implementing the hospital policy was a stated key function of the senior leaders in the hospitals included in the study. A significant role of management is to adhere to the policy, which refers to the concept of accountability and responsibility of managers. A nursing manager stated:

*“As nursing managers, we are making sure that all the policies and procedures are being followed. We can revise the policy and procedures at any time, if there is any improvement or if we have any new guide, so we make sure all the staff know the policy and follow it.” NM-SA*

Another concept that can be introduced under this theme is the concept of expectations and purpose, as one nurse manager stated:

*“... the goal of the hospital itself, because our goal, our mission in the hospital is to provide health services by clinic education and implementation safety. So we see that it is fully meant we are guided by these mission, vision, and standards.” NM-SS*

## **Inadequacy of Learning and Education**

Some nurses did not feel comfortable report of medication errors due to their need for more education. A nursing manager stated:

*“Because of, maybe, lack of awareness so we need coordination with nursing education.”* NM-SA

The majority of participants from both groups, staff and managers, believed knowledge of the leader was very important to help staff maintain a positive safety culture in the ward/hospital, exemplified in the following interview extracts.

*“The most important is the knowledge of leaders.”* NM-SF

Leader’s knowledge was understood as key for improving the way how to handle and correct errors. A nursing manager stated:

*“...the manager will be the reference of the staff, which is right and which is wrong and on the wrong way the staff can also get benefit on how they could correct something. Actually, wrong is not a right word, it should be a room for improvement.”*

NM-SF

Nurses stated that their hospitals had training programs about medication errors for the nursing staff though they also felt these were not sufficient and not always available. Nurses believed more specialised training programs were needed to improve staff knowledge in medication error reporting. A staff nurse stated:

*“Well-prepared training programs are really needed for the staff; i.e., workshops, plus the knowledge and theory on how to teach the staff how to treat, send, and report real fail, and how to complete the report, etc.”* RN-SS

Nurse managers believed education programs were a key factor in promoting a positive safety culture and fewer medication errors. Nurse Leaders also need to pay attention to the education and orientation of the staff. A nursing manager said:

*“As a manager, orienting the staff, we are giving them directions, there are monthly meetings so the staff get the positive energy. There are already lectures we are arranging. So from all these things, that is the meaning that we can communicate with the staff and we can give the positive energy for them.”* NM-MF

Nursing managers believe that monitoring staff nurses after educating them in the training programs is essential. They said that it is important to evaluate their practices to make sure they engaged with the knowledge and information to promote a safety culture. One of the nursing managers stated:

*“First, education then we are monitoring to sustain the gain then evaluating if they are doing the proper thing. So, we can see if the environment or the patient staff visitors are safe.”* NM-SF

Another nursing manager stated:

*“First of all, the management itself. That is, we have here in the unit the hierarchy we are following and especially the new staff mainly are coming from the first time we are giving orientation from the education aspects and also from the general unit. So, constant monitoring and strictly following the policies and also correcting action from the management itself...”* NM-MB

#### **4.6.3.2. Response – Lack of Feedback**

Three nursing managers and two staff nurses had repeated this concept several times during the interviews, indicating that lack of feedback was one of the most important factors in

reporting medication errors among nurses. Not getting appropriate feedback from the pharmacy or quality department will not encourage nurses to report medication errors and consequently the same medication error could be repeated. For example, one staff nurse stated:

*“Nurses think if they send a report of basic or small medication errors, they would not get a feedback or training programs specified for dealing with the reported issue.”*

RN-MS

Feedback is also sometimes given inappropriately – from the perspective of nurses; i.e., in a form of a warning, or action against the nurse is taken, which frightens the nurse. A staff nurse said:

*“Sometimes we do hear from our patient safety or quality improvement committees that an action has been taken in this regard and sometimes it isn’t because sometimes I will hear it if my colleague has been given a warning letter because of mistakes. Feedback is not really given in a proper way.”* RN-MA

Nursing managers strongly believe in feedback and its significant role in avoiding future medication errors. A nursing manager stated:

*“If the medication error occurred, so it will not be repeated again. They will talk to me so it will not happen again. They will give me feedback. The feedback comes from the quality or from the pharmacy.”* NM-SF

Managers and nurses believe feedback has also a significant impact on the safety of the ward or hospital. A nursing manager stated:

*“I can say 60% (safety) only, because as I told you, we still need to encourage the staff to verbalise what their difficulties are, why they cannot do because some...”*

*maybe they do not know. Some know but they are hesitant to write and address. They wrote before, they need feedback, but we did not receive feedback, which they are waiting for them to give us.”* NM-SF

Nurses mentioned that not all medication errors are reported because they do not get feedback or recommendations so that the error would not happen again, or the way the feedback was given was very negative. It is clear that providing feedback is very important but must be done in a timely and appropriate (non-blaming) manner.

#### **4.6.3.3. Resources and Capacity**

Interviewees felt that high nursing workload is a barrier to the reporting of medication errors by nurses and that shortage of staff significantly affects medication errors. For example, a staff nurse stated,

*“Because medical wards have many patients and sometimes we have shortage in staff, which causes medication errors and as a result this affects the quality of care.”* RN-SB

As told by nurses, it can be suggested that workload and lack of time with a shortage in staffing may lead to committing medication error. That is, this may represent a key barrier to underreport medication errors by nurses.

Nursing workload has been noted as one of the factors contributing to medication errors. Nurses with high workload stated they would not report medication errors due to lack of time. A nursing manager stated:

*“I think in my own opinion, some nurses do not make reports because it is another workload for them, another process or another phase to be done from the committee from the administration.”* NM-MA

Some nurses do not feel of ease reporting medication errors; for example, this nursing manager stated:

*“...maybe it is taking time and maybe overburdening them with additional work, something like that.”* NM-SB

Another manager, when asked why nurses would not report medication errors, said:

*“Because they are hesitant and afraid, or sometimes they lack time because of their work.”* NM-MS

One of the most important practices to prevent determinants of medication errors is the double-checking process. Lack of or poor double-checking can be as a result of shortage in staffing, such that it cannot be done properly; i.e. either it is neglected or it is delayed. A staff nurse stated:

*“...due to lack of staff sometimes we care for more than 5 to 6 patients and this affects giving medication to patients on time. Sometimes, no staff are available for the double-checking of medication giving and we have to wait for staff to be available, which causes the delay in patient curing. So, double-checking is neglected most of the time.”* RN-SA

From another perspective, bad attention was being paid to the hospital computer systems. For example, electronic physician prescription help to avoid handwriting mistake. Some participants suggested that hospital management was responsible for updating and maintaining hospital systems. A nursing manager said about the hospital management:

*“They are actively updating the system and the programs of the ministry itself. Whatever the programs have in the ministry they see to it... it is fully communicated*

*in different units and there are committees that make the surveillance, the implementation, and the control system.”*NM-MF

Another nursing manager said:

*“...we have the computer information system. Here it, the physician orders if they are properly it is recorded there and also it is, they are checking with the senior nurses.”*

NM-SS

#### **4.6.4. Personal Themes**

##### **4.6.4.1. Human Nature**

Nurses, specifically managers, reported that nurses’ personal values which have significant influence on medication error reporting are the nurses’ ethics, the essence of a nurse, and their personal values. A nursing manager said:

*“We have this courage ability and based on ethics, if you are an ethical person, if the action is good but the intention is bad still it is ethically acceptable, and if the action is bad and the intention is good still it is not acceptable but if you have this knowledge in your basic foundation and you are professional then you will see/do the right thing.”* NM-SF

It is inevitable to commit mistakes, as long as we are human. A nursing manager stated:

*“Because there are certain things, which we cannot assure 100% reached... for example, we are professionals even though we are lacking with life human beings that can carry malfunctions.”* NM-MS

A clearly presented concept by interviewees is a perception of laziness about reporting errors. Nurses revealed that, as long as the medication error seemed small or was not perceived to have a significant harm on the patient, nurses felt unwilling to report it. Some nurses did not

like to report errors; maybe because they lacked the knowledge of how to report, or managers believed this to be due to laziness. For instance, a nursing manager stated:

*“... sometimes there is laziness, when they see... they say we don't want to do.”* NM-MS

#### **4.6.4.2. Management Behaviour towards Staff**

Interviewees inferred that the role of leaders is very important in affecting the occurrence of medication errors in the hospital or the ward. Unsupportive managers affect the performance of nurses, which may lead to neglecting medication error or avoiding/refusing to report it. One staff nurse said that nurses might not report errors because sometimes leaders do not support them and do not keep their error confidential. The one nurse stated:

*“I have committed a mistake, then a couple of days they gave me a warning letter because I committed a mistake or some patient's relatives went to the hospital and complained, then I will have a problem because my name will be across the hospital. When you say “confidentiality”, everything should be confidential and even though sometimes small mistakes do not cause any harm to the patient, I will have a problem. That's why sometimes they don't report errors.”* RN-SA

In contrast, leaders and managers felt they should encourage nurses to report medication errors by giving them education and orientation. A nursing manager stated:

*“As a manager, orienting the staff, we are giving them directions, there are monthly meetings so the staff get the positive energy. There are already lectures we are arranging. So from all these things, that is the medium that we can communicate with the staff and we can give the positive energy for them.”* NM-MB

Another nursing manager stated:



*“It is 80%. It depends on the leaders, the manager of each area, as we’ve said, are thinking in the social of the team, so there are some specialties and different managers and there are some managers who can easily adapt. There are some managers that you need to push for them to be able to guide the staff. So the manager itself is the depend situation to whom the staff could get benefits.” NM-MA*

And in another part of the interview the same manager said:

*“The manager base the greatest role in the safety culture. When it comes to safety itself because the manager is the one who will guide the staff. The manager will be the reference of the staff, which is right and which is wrong and on the wrong way the staff can also get benefit on how they could correct something. Actually, wrong is not a right word, it should be a room for improvement.” NM-MA*

Staff nurses stated they needed more encouragement from their managers/leaders in order to help them feel less fear of being punished if a medication error is reported. A staff nurse stated:

*“The head nurse should really encourage us to follow the guidelines and always they encourage us to follow and read the policy and from my personal perspective I think if we follow the policy and report all the problems... I will tell you something; if we have a problem and we don’t report it, we will not improve it. As a leadership, if they don’t have the problem they cannot really have the action to improve it. So encouragement in reporting the error will lead to the improvement of this issue.” RN-SB*

Nurses believe that they work hard and try not to make errors, and so question why they should be punished and discouraged from reporting errors. Conversely, nursing managers

think that the encouragement of staff should take place by providing them with proper training programs and education about safety culture. A nursing manager stated:

*“Maybe we can encourage our staff by positive education and educational trainings, follow-ups and monitoring”* NM-SA

Nurses showed that the role of the manager/leader also includes planning regular activities and updating the systems. A nursing manager stated:

*“There is a reason why, as the rule of the manager, we have to plan activities regularly and then identify the area of weaknesses and we work on it. We have strategic plans. We have improvement projects.”* NM-MB

#### **4.6.4.3. Fear**

The most frequently reported barriers to reporting medication error were those related to ‘fear’. The ‘fear’ factor included fear of punishment, fear of legal action (losing job or license), and fear of patients’ relatives making a complaint. Fear of punishment was a key barrier that impacted nurses’ reports of their own and/or others’ medication errors, as one staff nurse indicated:

*“From my experience, some staff are very frightened from being punished if they committed medication errors.”* RN-SF

It was noted that nurses need more appreciation of their hard work rather than punishment for an error, as another staff nurse explained:

*“As a nurse, encourage me to report the error... appreciate me to report the error... don’t punish me because then I am afraid to report the error, why? Because I am afraid from punishment. If you assure me there is no punishment and the purpose of reporting is improvement, I will continue reporting.”* RN-SS

A number of nurses identified that one of the main reasons they do not report medication errors was their feeling of insecurity as they were concerned that they may lose their job or work license. This is shown in the following data extract:

*“...if a patient was harmed as a result of a mistake I have committed that the patient will die or go through coma, either I will lose my job or go to jail.”* RN-MS

Nurses feel afraid when they commit a medication error that may cause a harm to the patients because the patients’ relatives may come to the hospital and complain against the nurse who did the mistake. A staff nurse stated:

*“I have committed a mistake, then a couple of days they gave me a warning letter because I committed a mistake or some patient’s relatives went to the hospital and complained, then I will have a problem because my name will be across the hospital.”*

RN-MS

Most of the nurses in this study identified “fear” as a key barrier to reporting medication errors, which included fear of consequences of error reporting, fear of peers’ or relatives’ blame, fear of loss of their reputation as a nurse, fear of losing their jobs (or insecurity), and fear of punishment.

#### **4.6.5. Cultural Themes**

##### **4.6.5.1. Culture**

Culture plays a critical role in determining the level of safety and the willingness of nurses to report medication errors. In some cultures, like the Arabian culture, nurses may not feel comfortable to report errors regarding their colleagues as this is not believed to be acceptable.

For example, one member of nursing staff said:

*“My colleagues who study abroad accept if I report their medication errors. On the other hand, those who have diploma or low education or background wouldn’t accept their colleagues to report their medication errors. In our culture, reporting errors without telling the colleague who committed it is like creating a “touch” and he/she would not accept it.” RN-MS*

In Arabian culture, a “touch” means to have a negative situation with someone and not talk to each other or help each other, and they may have negative feelings towards each other. Cultural complexity in Saudi nursing teams was also highlighted by one of the nurse manager participants who said:

*“It is a given fact that, here different cultures are working together and different cultures have their own way after they finish their degrees; they have different cultures and at the same time they have different modes of teaching and learning ..... We are educating but there is some body language barrier, then some resources are not available.” RN-SF*

Confidentiality was also an important part of culture. For example, as a consequence of a medication error that might have harmed the patient, the relatives of the patient may complain against the nurse who committed the error, and because of the lack of confidentiality everyone in the hospital would know and talk about that nurse. A staff nurse stated:

*“When you say “confidentiality”, everything should be confidential and even though sometimes small mistakes do not cause any harm to the patient, I will have a problem. That’s why sometimes they don’t report errors.” RN-MA*

Reporting of errors among peers places stress on nurses as in Arabian culture reporting errors of others without telling them first is not an acceptable action. Nurses find it difficult to report each other, as one nurse manager stated:

*“...because it’s like you are pinpointing for that person...”* NM-SF

#### **4.6.5.2. Communication**

Communication was a key tactic by both staff and managers of the nursing departments in the hospital. Because of the diversity in cultures and spoken languages, communication needs to be standardised. A nursing manager stated:

*“... for example, here not all of us are excellent in binding the language, Arabic and English, so we should have a good and strong communication process...”* NM-SA

With regard to a nursing leadership’s role in creating a positive safety culture in the hospital or ward, nurses believed that communication was very important for achieving a positive safety culture. A nursing manager said:

*“...communication is the second most important factor in promoting a positive safety culture after leaders’ knowledge.”* NM-SA

With regard to perception of nursing leadership within the hospital, a nursing manager said:

*“...we can communicate easily, not by language, but by our own expressions.”* NM-SA

#### 4.7. Relationship between Safety Culture, Leadership Style and Medication errors reporting between Hospitals

As previously shown, one-way ANOVA revealed the following statistically significant differences: From Figure 32 there was a positive relationship between perceived safety culture and medication errors reported; higher safety culture levels were associated with high errors reported. For example: King Fahad Specialist Hospital significantly had the highest mean safety culture score and highest medication errors amongst the four hospitals. Moreover, there was a positive relationship between transformational and transactional leadership styles with positive safety culture and reported medication errors (Figure 33,34)

Table 15. Relationship Analysis: safety culture, nursing leadership style and medication errors report with Hospitals

		Source of data	Hospitals				Sig.
			King Fahad Specialist	King Saud	Buraidah Central	Al Bukayriyah	
Transformational Leadership		MLQ	3.28	3.68	3.31	3.22	< .001
Transactional Leadership		MLQ	3.24	3.36	3.29	3.28	.567
Laissez-Faire		MLQ	2.47	2.83	2.54	2.63	.103
Average Safety Culture		HSOPSC	3.92	3.58	3.55	3.40	< .001
Number of event reports filled out and submitted in the past 12 months	No event reports	HSOPSC	44.3%	45.5%	59.6%	54.8%	
	At least one event reports	HSOPSC	55.7%	54.5%	40.4%	44.2%	

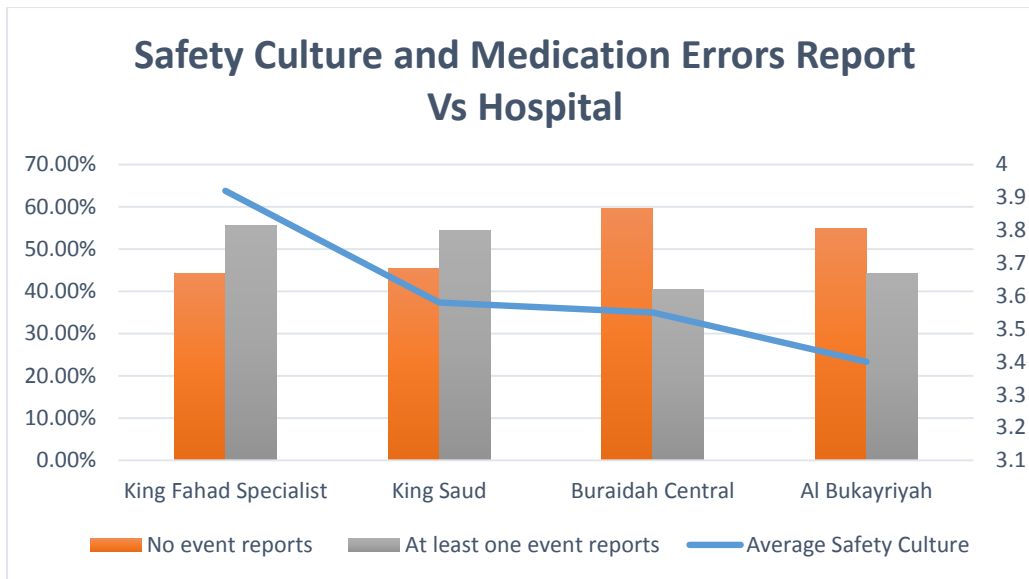


Figure 32. Relationship between Safety Culture and Medication Errors Reporting Vs Hospital

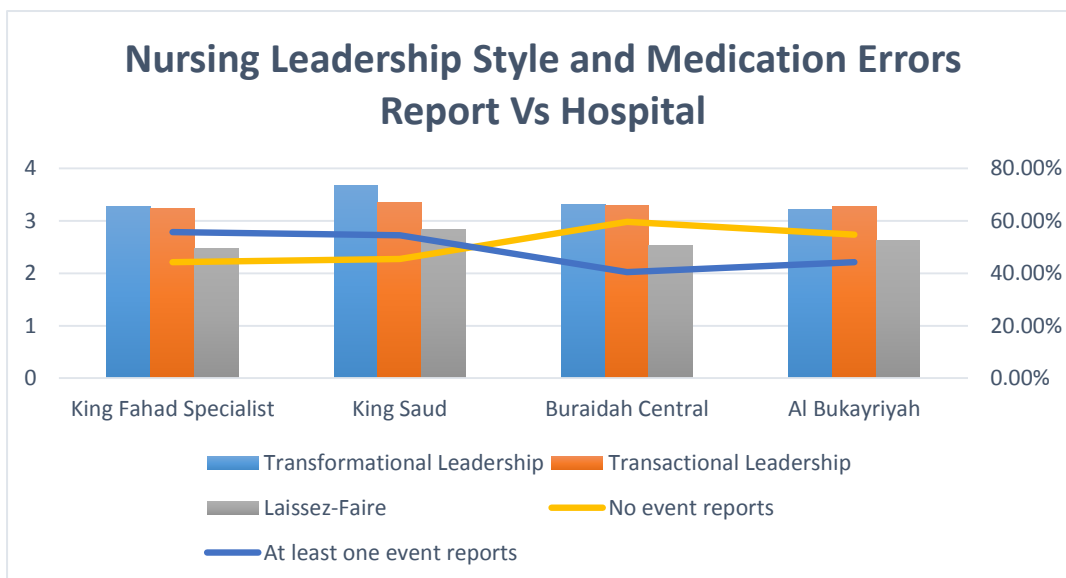


Figure 33. Relationship between Nursing Leadership Styles and Medication Errors Reporting Vs Hospital

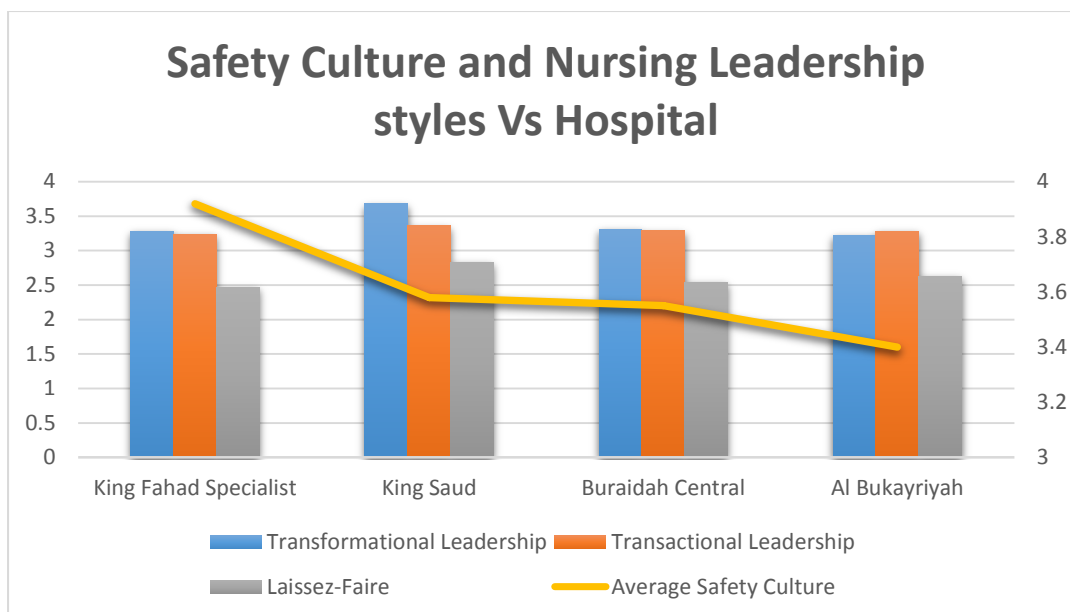


Figure 34. Relationship between Safety Culture and Nursing Leadership Styles Vs Hospital

#### 4.8. Summary

This chapter presented quantitative and qualitative findings. Quantitative findings included reported medication errors types and rates, the HSOPSC and the MLQ. Semi-structured interviews are reported in the qualitative phase. From reported medication error data just two of the four participating hospitals provided information, whilst the other two hospitals did not have any data. The data showed less than 1% of errors related to nurse error, and about 8% of errors were reported by nurses in hospital S, and 2% in hospital F. The first questionnaire (HSOPSC) has shown overall that nurses and nurse managers have positive perceptions about patient safety on both medical and surgical wards, with some notable variations however between the four hospitals. In general, there appears to be a level of positivity about effective teamwork, cooperation and coordination between the nurses. However, there are some areas of concern, which include underreporting of events during the past 12 months, with 50% of nurses concerned about being blamed. Moreover, problems related to reporting of near misses, the disagreement among the nurses on issues about patient transfer related problems, the decisions of managers, poor ratings of patient safety in some wards and pressure on



nurses to work faster. The second questionnaire, the MLQ 5X, has shown that much of the results of the questionnaire data analysis were concurrent with the results of the qualitative semi-structured interviews. The MLQ 5X questionnaire analysis revealed that transformational leadership, on average, was achieved “frequently if not always”. That is, transformational leaders have associates who view them in an idealised way; so, these leaders exert power and influence over their group. Strong feelings about such leaders displayed trust and confidence. Transformational leaders stimulate and encourage others with whom they work with a vision of what can be accomplished through further effort. Participants in the semi-structured interviews indicated that their leaders were trusted, and that they were confident their leaders supported them, and they spent extra efforts in encouraging them to follow policy in order to achieve their mission.

The analysis also showed that, on average, transactional leadership was achieved “frequently if not always”. Transactional leaders aimed to identify the roles and duties required for associates to reach desired outcomes; they also make these requirements clear for associates, thus creating the confidence they need. Transactional leaders also identify what associates need and desire, explaining how those needs will be satisfied if staff show considerable errors. This kind of motivation was mentioned by participants in the semi-structured interviews. Some nurses indicated that newcomers get trained in addition to regular training programmes which are given to existing nurses to accomplish their duties and tasks. Nursing managers also stated that they tried to identify nurses’ needs in order to prepare training programs.

The laissez-faire style indicates leaders who tend to avoid involvement. This leadership style is the exact opposite of an efficient transformational leadership style. Laissez-faire leaders refuse to adopt the responsibilities that are part of their role as leaders: they do not offer information to their staff, do not give feedback, and do not acknowledge or work towards

nurse satisfaction. The score for this leadership style was not as high as transformational and transactional leadership, yet it is not very low as, on average, it was “fairly often”. This indicates that leaders, to some extent, avoid approaching important problems, are absent when needed, avoid making decisions and have late reactions to urgent problems. This was explained by nurses in the qualitative interviews when they illustrated how they were not directed correctly when they need help regarding a medication error. That is, they stated that they rarely get feedback about their mistakes, or if they do it is late.

The analysis also showed that there is a positive relationship between perceived safety culture and medication errors reported; higher safety culture levels were associated with high error reported. On the other hand, there was also a positive relationship between transformational and transactional leadership styles, and positive safety culture and reported medication errors.

## **Chapter V: Discussion**

### **5.1. Introduction**

This thesis is original in its examination of the relationship between perceived safety culture and nursing leadership styles on reporting medication errors in the Qassim region in Saudi Arabia using a mixed methodology. No previous studies that specifically link these two concepts with medication error reporting exist as applied to Saudi Arabia. The results established in this thesis show a comprehensive understanding of nursing staff and managers' views and perceptions of safety culture, nursing leadership styles and medication error reporting which provides valuable information to support the improvement of patient safety. Knowing nursing staff's values and beliefs and their comprehension of safety in the hospitals should help managers to promote safety consciousness programs and encourage staff to deliver improved patient safety and care quality through reporting error transparency (Leonard & Frankel, 2012). It will also promote education in reporting and managing medication errors for nursing staff in Saudi Arabian hospitals.

The mixed methodology approach allowed for the comparison of perceptions of the nurses about the errors in medication reporting types and rates, perceived safety culture and nursing leadership styles, and an in-depth examination of nursing staff's views. The triangulation of data using a mixed sequential quantitative and qualitative approach minimises bias, promotes deep understanding and emphasises the integrity of evidence, which enhances the authenticity of the results (Kinn & Curzio, 2005; Murphy & Dingwall, 2003). Comprehensive data, using a sequential explanatory method (Creswell, 2003) gives evidence and validity to the overarching approach.

Understanding nurses' views in relation to the theoretical frameworks outlined in the literature review is very important to draw themes deductively and inductively. The

Yorkshire Contributory Factors Framework developed by Lawton et al., (2012) is drawn upon and used in particular because this model has the potential to be utilised in clinical settings to develop the prevention and identification of factors that cause harm to patients. Moreover, this model provides a vital way to optimise learning and take action to prevent further errors occurring.

This chapter presents a critical and contextual review of the existing international literature related to Saudi Arabia. Starting with factors affecting medication error reporting, and barriers, through to strategies to encourage reporting errors, and the strengths and limitations of the study. This then leads to identification of the original contribution of knowledge this study makes to the wider body of medication error prevention and/or methodological approaches to research in this field.

## **5.2. Factors' Effects on Medication Errors Reporting**

The reporting of medication errors was explored in this study using mixed methods. Data from the four hospitals participating in the study were collected and reported upon. These data identified: the source of medication errors, who reported the error, error types, error outcome, and in which stage the error was committed. Whilst audit data could only be collected from two hospitals (King Fahad Specialist Hospital and the King Saud Hospital) of the four participating in the study, in-depth interviews added to the richness of the data on incident reporting. Analysis of data from King Fahad Specialist Hospital indicated that the main source of medication error was physicians, as 91% of reported incidents came from physicians, while 8% came from pharmacists and only 1% came from nurses. Pharmacists mainly reported these errors; on average, pharmacists reported 96% of incidents, while nurses reported less than 2% and 8% in two hospitals respectively. Moreover, the findings from the HSOPSC questionnaire showed that 50% of nurses in this study have not made an incident

report in the last 12 months. Many factors lead to underreporting errors such as fear of losing a job, external influence, punishment, human nature, lack of feedback, workload, nursing leadership, blame, lack of knowledge, unclear policy and noncompliance with policy and safety culture. Drach (2014) stated that at any time along the continuum of the medication system medication errors will happen, from prescribing by doctors to administration by nurses.

The findings of this thesis have shown that the major types of errors included: wrong frequency, improper dose, wrong dosage form, wrong duration, and wrong medication ordered. The major outcome of these errors were near misses (92%). Kagan & Barnoy (2013) found that near-miss reporting predicted higher levels of behavioural commitment to patient safety. The findings illustrated in this thesis show that the majority of errors, on average 79%, occurred in the prescribing stage, then in the preparation stage with 21% on average. Some errors (7%) occurred in the dispensing stage and the lowest errors occurred in the administration stage with less than 1%. The study by Lisby et al. (2005) showed the most errors happened in the preparation process (56%). After that came nurse administration (41%) and prescribing process (39%), with a much lower error rate in the dispensing process by pharmacists (4%).

According to the Yorkshire Contributory Factors Framework (Lawton et al., 2012) factors that affect nursing medication errors reporting are divided into four: First, active failure and situational factors (human nature and lack of feedback). Second, local workplace conditions (workload and shortage of staff, nursing leadership and blame). Third, latent organisational and external factors (lack of knowledge and skills, unclear policy and noncompliance with policy). Fourth, general factors (safety culture and fear). These echo the classification of factors that affect errors reporting in this study, thus demonstrating applicability of findings and clear theoretical underpinnings.

## **5.2.1. Active failure and situational factors**

### **5.2.1.1. Human Nature**

Nurses and managers reported in the interviews that nurses' characteristics have a significant influence on medication error reporting, including the nurses' ethics, the essence of a nurse, and their personal values. It is inevitable to commit mistakes, as long as we are human. Reason (2009) argues that it is difficult to change the human condition to encourage reporting of medication errors in the future and instead found that when the human environment is more relaxed where people work (e.g. overcome the workload by increased numbers of staff, or provide rest by giving extra leave days), there is greater reporting.

Reason (1997) says that the errors in organisations are difficult to minimise or reduce without change in the conditions or behavior of individuals. The responsibility of organisations also includes the knowledge that means that there should be proper training of nurses to know their role and they should understand their work and job (Evans, 2009). Moreover, as Pazokian et al., (2014) say, humans are seen to be fallible and errors in medication cannot be stopped completely but they can be controlled or reduced to some extent with approaches that will result in the reduction of errors.

### **5.2.1.2. Lack of Feedback**

There was further information from the surveys and interviews concerning the demand for a support system and the need for feedback from quality offices when they submitted their incident reports; 40% of respondents stated that they received no feedback about any changes put into place based on event reports. This feedback could help to avoid error repetition and improve patients' safety. On the other hand, if there is no feedback, which might dishearten nurses from reporting errors again, this may negatively influence safety. In this regard, the role of the manager can be paramount, as seen in some of the interviews given by nurses who

said that errors have been reported by them many times but did not ever result in feedback. In addition to this, one more study by Murphy & While (2012) also found that feedback to nurses was limited; only 11% of errors that were recorded led to feedback out of a total of 69% of nurses.

Nurses in this study in Saudi Arabia stated that the feedback system is very important for improving the quality of care in the organization, whereby quality offices should give feedback to enable them to learn from their errors and to avoid errors in the future. Murphy and While's (2012) research confirmed this result and presented the significance of feedback recognising the manager's supervisory role along with the monitoring of the errors in medication. Murphy and While also reveals that the absence of feedback for nurses when they report errors in health settings was assumed to be a cornerstone of supervision. Moreover, Lawton et. al.'s (2012) findings also showed that blame culture and/or no feedback decreased medication error reports. The feedback in other disciplines was very important to obtain the highest safety and build a strong error reporting culture focusing on numbers, severity, type and place of errors that will help in developing an improved process to assess the management of errors reporting. According to the study of Pazokian et al., (2014) the planning of educational programs about giving medication safely should be comprehensive for the nurses or to those who care for patients. Moreover, feedback is also necessary that will result in learning environment hence increasing the quality of work.

## **5.2.2. Local workplace conditions**

### **5.2.2.1. Workload and Shortage of Staff**

Nurses responding to the questionnaire in this study reported that they have a large workload and that is one of the factors that affected medication errors reporting (44%). This finding was also evident from the qualitative interview findings in which nurses spoke about the

nursing workload as one of the factors contributing to medication errors reporting. Nurses with high workload for example, stated they would not report medication errors due to lack of time. Shortage of staff significantly affects medication errors. Mahmood (2011) stated that workload and lack of time coupled with a shortage in staffing, leads to medication errors and represents a key barrier to medication errors reporting given by nurses. Most of the errors found in this study were associated with either the wrong frequency or improper dose, which may be because of a lack of staff or a lack of time resulting from high workload. There must be enough people to handle the tasks on shifts in order to prevent mistakes (Pazokian et al., 2014).

According to Armitage (2009), heavy workload and busy routines for the staff may result in errors. If routines are hectic and disturbed, this will lead to fatigue. There can be an increase in workload because of staff shortages, or because the number of patients for each nurse is increased and rises the responsibilities for the nurse who gives medications, consequently pushing nurses to solve other issues whilst administering medications. Nurses are responsible for matters involving medications. In this study there were no direct questions about the workload for nurses but they talked about the workload freely, saying that they were upset and stressed because of their heavy load. This puts a pressure on them to finish their work on time.

#### **5.2.2.2. Nursing Leadership**

This current study used the MLQ 5X questionnaire to measure nursing leadership styles. Components of leadership were separately measured and analyzed. The findings revealed that a transformational leadership style had the highest total mean score compared with transactional leadership and laissez-faire styles, which indicated that transformational leadership was more likely to be more frequent than transactional leadership and laissez-faire.



Similarly, transactional leadership had a higher total mean score than laissez-faire, indicating that transactional leadership was more likely to be more frequent than laissez-faire. Overall, transformational and transactional leadership styles were frequent (if not always), while laissez-faire was less frequent, indicating there were good leadership styles (Transformational style) in the participating hospitals.

The majority of nurses (90%) agreed that supervisors and managers give positive feedback when nurses do the job according to the established procedure for patient safety. This is positive and an important incentive for nurses to provide better care. Seven nurses and managers in the interviews inferred that the role of leaders is very important in affecting the occurrence of medication errors in the hospital or the ward. Unsupportive managers affect the performance of nurses negatively, which may lead to neglecting medication error or avoiding/refusing to report them. One staff nurse said that nurses might not report errors because sometimes leaders do not support them and do not keep their error confidential.

In a study presented by Vogus and Sutcliffe (2007), the combination of organisational safety with the factor of leadership (trust in manager), and design (of care pathways) promoted the reporting of medication errors. It also showed the benefits for safety by reporting medication errors that supports the use of care pathways and trust in the role of managers, which can be difficult to achieve. Understanding patient safety by showing the importance of a mutual support system and complementary practices is key. That is, when high levels of organisational safety are combined with the use of care pathways, trusted leadership and a unit's experience, reported medication errors were reduced.

Conversely, Wong (2015) attempted to examine the link between nursing leadership and patient outcomes based on evidence. A systematic review conducted done by Wong et al. (2013) on a systematic review describes the evidence that links leadership with outcomes for patients (Wong & Cummings et al., 2010). Instead of considering the assessment of the

nurses' outcomes the reviews look at administration prospectively. It was clear that there was a relationship between safety outcomes for the patient and effective leadership. Satisfaction of the patients is also then higher. The research also suggests that the value of leaders and the required knowledge to take care of patients, their facilitation of healthy working conditions, and the quality of their interpersonal skills and the engagement of leadership behaviors encourages teams of nurses to perform at higher levels. These are the factors that help in predicting the outcomes of patients' improvement. Finally, people in power and leaders should improve reporting systems and safety cultures, sending a powerful message within their organisations about how errors should be managed within a patient safety culture. Leonard & Frankel (2012) suggest that laying the foundation for a strong safety culture where leaders are held to account for unacceptable work, which creates risk, is crucial.

#### **5.2.2.3. Blame**

With regards to blame, the survey findings in this study showed nearly half of the nurses (49%) disagreed that their mistakes might be held against them by their managers. However, this indicates that the other half have concerns about being blamed. Fear of personal 'blame' related to error reporting will serve only to inhibit the reporting of errors, making a system unsafe, where errors are hidden. One of the nurses in this study identified "fear" as a key barrier to reporting medication errors, which included fear of blame.

Hassan et al., (2009) stated that fear of blame was not only due to error on the part of any individual, but also depends on the defect of error in the system of organization itself. Waring (2002) also mentioned that fear of blame was a reason why mistakes were unreported by health professionals as a result of features including; their professional culture regarding hierarchy of occupation, impression of the medicine, self-regulation, and clinical anatomy.

Moreover, errors are normalised as a feature of the medical profession. Nurses were found to be blamed more often for medication errors, than other professional staff by colleagues (Armitage, 2009). Blame was one of the common barriers that prevented nurses from reporting errors. Lawton et al. (2012) showed that blame culture in the absence of feedback also makes reporting less likely.

There should be a shift towards a culture of safety rather than blame and shame. A supportive environment should be provided by organisational leaders that focuses on how to prevent the errors rather than who reported them; this will help promote a safer environment in reporting errors without any hesitation. Management frequently focuses on punishing and blaming people instead of finding solutions to the problems by changing behaviors, as was mentioned in the nurses' interviews. Reason (2009) argued that individual accountability is more cost effective and becomes less expensive than dealing with systems. Moreover, it is easier to blame someone than to blame the system or change the system for the better.

### **5.2.3. Latent organizational and external factors**

#### **5.2.3.1. Lack of knowledge and skills**

In this study, findings illustrated that the majority of participants from groups, staff and managers, believed knowledge was very important to help staff maintain a positive safety culture in the ward/hospital. It was found that there is a lack in the knowledge of nurses, as nurses made statements that errors were encountered due to lack of knowledge by some of the staff members. Skills and knowledge are known to be associated which means that both of them contribute at the same time. Education helps staff gain the knowledge and development needed to develop a set of skills. For instance, a new staff member may have advanced knowledge but if they lack experience, they would need time to develop in confidence and ability. Nurses added that new staff are more likely to make errors because of

their inexperience (Murphy, 2012). According to Kim & Kwon (2011), Jones & Treiber (2010), and Bohomol & Ramos (2007) it was found that a lack of skills in new staff resulted in errors. Awareness of this would help improve the quality of approaches and will help in the study of the experiences and knowledge of newly hired staff. According to Armitage & Knapman (2003), it is important to conduct collaborative research in order to inform future policies and procedures for drug administration and errors. It is also important to ensure that drug administration is introduced into the university nursing curricula.

#### **5.2.3.2. Unclear, or noncompliance with policy**

Managers and nurses, while giving interviews, were aware of the fact that the rules and regulations of organisations, along with policies, were the most important influential factors for the errors in medication reports. They believed that these procedures and policies are helpful and important to encourage nurses to report the errors. They also know that a supportive authority and environment will help them improve their skills, which will indicate the policy of the organisation to manage and report errors of medication. Ulanimo (2007) found that an organisation may have barriers to reporting errors such as a lack of clear procedures and policies which require improvement.

Pazokian et al. (2014) added that developing a policy that involves increased responsibility of nurses for pharmacotherapy will ultimately bring the development of protocols for medication therapy. Educational programmes for training and development of nurses will play a vital role in improving quality of medication management. Emphasis should be on policies and adopting procedures to ensure the personnel selection based on merit, and intelligent supervision along with a mentoring culture and adequate training to reduce the errors made by the unqualified staff with proper evaluation techniques.

It was recommended by Pazokian et al. (2014) that the use of quality improvement programs across the hospitals emphasising individual staff education, reporting policies, their training and the use of appropriate technologies may help to reduce the errors in medication.

#### **5.2.4. General factors**

##### **5.2.4.1. Safety culture**

Culture is one of the significant influences on reporting errors, including the attitudes and values of groups (Sanghera et al., 2007; Wakefield, 2001). Understanding the cultural impact on medication error reporting is important and it needs more research and prioritisation. Reason (2009) argued that individual accountability becomes easier than that of dealing with systems. Moreover, it is easier to blame someone than to blame the system or change the system to make it better. Nurses also added that managers are more focused on blame and discouragement, using punishment instead of solving the issues by changing the system. It is not possible that a person who is skilled cannot make mistakes. As acknowledged by Leonard & Frankel (2012) nursing staff can and do make practice mistakes. Taking the necessary measures toward facilitating, supporting and encouraging nurses to report their medication errors is the most effective way forward.

The current study used the HSOPSC questionnaire in the assessment of cultural safety as perceived by nursing staff in adult medical and surgical wards in four hospitals in the Qassim region of Saudi Arabia. The results indicated an overall positive perception of patient safety among the nursing population; the average patient safety positive response score was 66%. Nurses identified the main characteristics of patient safety as a learning environment in organizations, team work, support from the management to patient safety, communication about their errors, and feedback that will help them improve more and more.

The analysis of this data also showed that the majority of errors (76%) were always/mostly where there was a report on a mistake that might harm the patient but did not. 60% of errors resulted in no harm to the patient and were always/most of the time reported. Ginsburg et al. (2005) found that patient safety workshops had a significant impact on the value that nurses in clinical leadership roles placed on safety and their overall perception of a patient safety culture (PSC). Kagan and Barnoy (2013) also reported the influence that an organizational safety climate has on readiness to report errors.

Culture plays a critical role in determining the level of safety and the will of the nurses to report the errors of medication. In some cultures, such as the Arabian culture, nurses may not feel comfortable to report errors regarding their colleagues, as this is believed to be unacceptable. Communication was a key promoter by both staff and managers of the nursing departments in the hospital. Because of the diversity of cultures and spoken languages, communication needs to be standardized so that staff and management can be in continuous and proper linkage. Reason (1997) stated that errors are related to the organisational processes and systems more than to the nature of humans and behavior, moreover errors cannot be decreased or prevented by altering human behaviours or conditions. It is the core responsibility of organisations to provide knowledge to their nursing staff members, i.e. proper training to the nursing staff to ensure they are qualified to perform their duties.

#### **5.2.4.2. Fear**

Only 22% showed that they are not worried about their errors being kept on record in their files. The most frequent barrier to reporting errors in the qualitative findings were issues related to 'fear'. The 'fear' factor involves the fear of punishment, legal actions, and loss of the job or license. Punishment was a key barrier preventing nurses from reporting medication errors in this study. Findings from Pazokian et al. (2014) showed that these fears were

counted as the top reasons for not reporting medication errors among nursing students. It was noted that nurses need more appreciation for their hard work rather than punishing them if they committed an error. In addition, nurses stated that one of the main reasons they do not report medication errors is their feeling of insecurity with regard to losing their job or work license. Nurses feel afraid when they commit a medication error which may cause harm to patients because relatives may complain.

In the nursing staff interviews, a number of nurses reported that patients' health was a priority, but that self-preservation was also important. Fear is known to be an issue that is recognised by different cultures (Al-Youssif et al., 2013; Kim et al., 2011; Mrayyan, 2007). Uninsured nursing staff in Saudi health systems will lead only to more apprehension for those who would face any financial punishment for errors they have committed.

The nursing staff had an additional cultural concern about the patients' and families' attitudes or reactions towards them which helped in the formation of both environmental and individual cultures. Fear or apprehension was a prime concern and was repeatedly mentioned during interviews.

Others refrain from reporting errors to avoid any kind of punishment. Studies by Kim et al. (2011), Mrayyan (2007), Ulanimo (2007) and Al-Youssif et al. (2013) found punishment and legal actions to be a concern. Not only nursing staff but also doctors admit that fear or apprehension of punishment is the main reason for unreported errors. Doctors were also afraid or concerned about reporting errors and prosecution, although there are some professional regulations that protect and defend nurses and other staff members (Lawton et al., 2002).

### **5.3. Relationships between medication error reporting and safety culture and nursing leadership**

In this study, the main research aim was to explore the relationships between perceived safety culture, perceived nursing leadership, and medication errors reporting (involving nurses) in adult medical surgical wards in the Qassim region of Saudi Arabia. From this study, a positive relationship was found among errors that are reported and cultural safety; there are higher levels of cultural safety linked with error reporting. Transactional and transformational leadership styles had a positive relation with positive safety culture and reported medication errors. This implies that a positive safety culture and effective leadership plays an essential role in improving patient safety in general and medication error reporting systems. Nurse leaders need to pay attention to the education and orientation of staff. Monitoring staff nurses after training programs and evaluating their practices promotes a safety culture, if it is conducted in a non-blaming way.

The current study confirms that the role of leaders is very important in reporting the occurrence of medication errors in the hospital or the ward. Unsupportive managers affect the performance of nurses, which may lead to neglecting medication errors or avoiding/refusing to report them. Leaders and managers should encourage nurses to report medication errors. Staff nurses stated they needed more encouragement from their managers/leaders in order to help them feel less fear of being punished if a medication error was reported. Nursing managers think that encouraging staff should take place, providing them with training programs that promote a safety culture. Nurses showed that the role of the manager/leader also includes planning regular activities and updating systems.

One of the most important factors in neglecting reporting errors among the nurses interviewed is the lack of feedback. Not getting appropriate feedback from the pharmacy or quality department will not encourage nurses to report medication errors, and consequently



the same medication error might be repeated. Nursing managers strongly believe in feedback and its significant role in avoiding future medication errors. The incident reporting data showed that nurses reported 1% of total errors.

The literature presented some explanatory studies to define the key and hidden factors influencing medication error reporting. Drach-Zahavy et al. (2013) for example believed that attention in the ward should shift from preventing medication errors to managing them. Nevertheless, little is known in regard to the practices nurses apply to learn from errors reporting. The results of this study showed that the use of technology was significantly associated with improved reporting systems; it will be used for bar codes and to dispense technology that was earlier recommended and is known to be time saving for the nurses, while a heavy workload was significantly linked to effects on reporting systems. Of the learning practices, supervisory learning was the only practice significantly linked to improving errors reporting. Integrated and patchy learning were significantly linked to higher levels of improving reporting systems.

#### **5.4. Explanatory models**

To understand the perceptions of nurses it is important to understand the theoretical frameworks and to draw themes deductively and inductively. As discussed in the first chapter, James Reason introduced human error theory from two approaches: the person approach and the system approach. Blaming others always satisfies a person emotionally more than making improvements in their own organizations or institutions. This is a person approach (Reason, 2000). The system approach says that although the practice of individuals is important when it comes to responsibility for quality work, errors will only be accurately removed or eliminated by improving the system and then focusing on individuals.

Several different models have been used to describe aspects of safety and risk, for example, the Swiss Cheese Model (1990) and Organizational Accident Model (1997), as described by Reason. Reason's SCM makes it easy to visualize the complexity of systems failures, because of the compound and timing of multiple small failures. The OAM asks for the link of the various factors in a sequence that is coherent and that runs upward in causation and downward in investigation. Finally, the YCFE developed by Lawton et al., (2012) was used in this study because there is a potential for this framework to be utilised across clinical settings to develop, prevent and identify the factors that cause harm to patients. Moreover, this model gives an imperative to optimise learning and take action to prevent further errors occurring.

The YCFE (Lawton et al., 2012) is a framework that is empirical and developed from many frameworks that have been applied in clinical purposes in the world by using different methods of data collection. There were 20 factors that contributed to the safety of patients, identified independently from 95 international studies (e.g., supervision and leadership). The factors were coded by two reviewers. Active failures were shown by the most of the studies (errors and violations) that contribute to the safety of patients if any incident is caused. This Framework has the potential to be used to attain health among the patients and help in enabling practitioners to know and then prevent those attributes threatening the safety of patients.

The framework YCFE (Lawton et al., 2012) has been taken from a systematic review of factors that contributes to hospital patient safety incidents. These 20 factors are divided into five domains: situational factors, active errors (errors that occur whilst delivering patient care), external latent factors, organisational latent factors and local working situations. Latent factors are the conditions that make active errors more likely to occur or more likely to result in patient harm, by defeating barriers in place to prevent this. This framework can be helpful

to improve the modification of factors after identifying their contribution to incidents happening to patients. In this case YCFF will enable us to identify the circumstances contributed by the human errors that caused the incidents, with 20 different types of potential, including leadership and cultural safety (Figure 34).

The finding of the research presented in this thesis contribute new knowledge to the YCFF by demonstrating the relationship between nursing leadership and safety culture through statistical methods. Effective nursing leadership styles had a positive relation with positive safety culture. These theories and models raise awareness of the complexity of the system in which patients receive care and in which providers work. They explain that organisational leaders must become "system thinkers" who demand in-depth analyses of safety concerns. Health care leaders must also advocate a culture of safety that replaces disciplinary reactions to mistakes with an open environment that encourages staff to report errors so that they can be dissected and addressed.

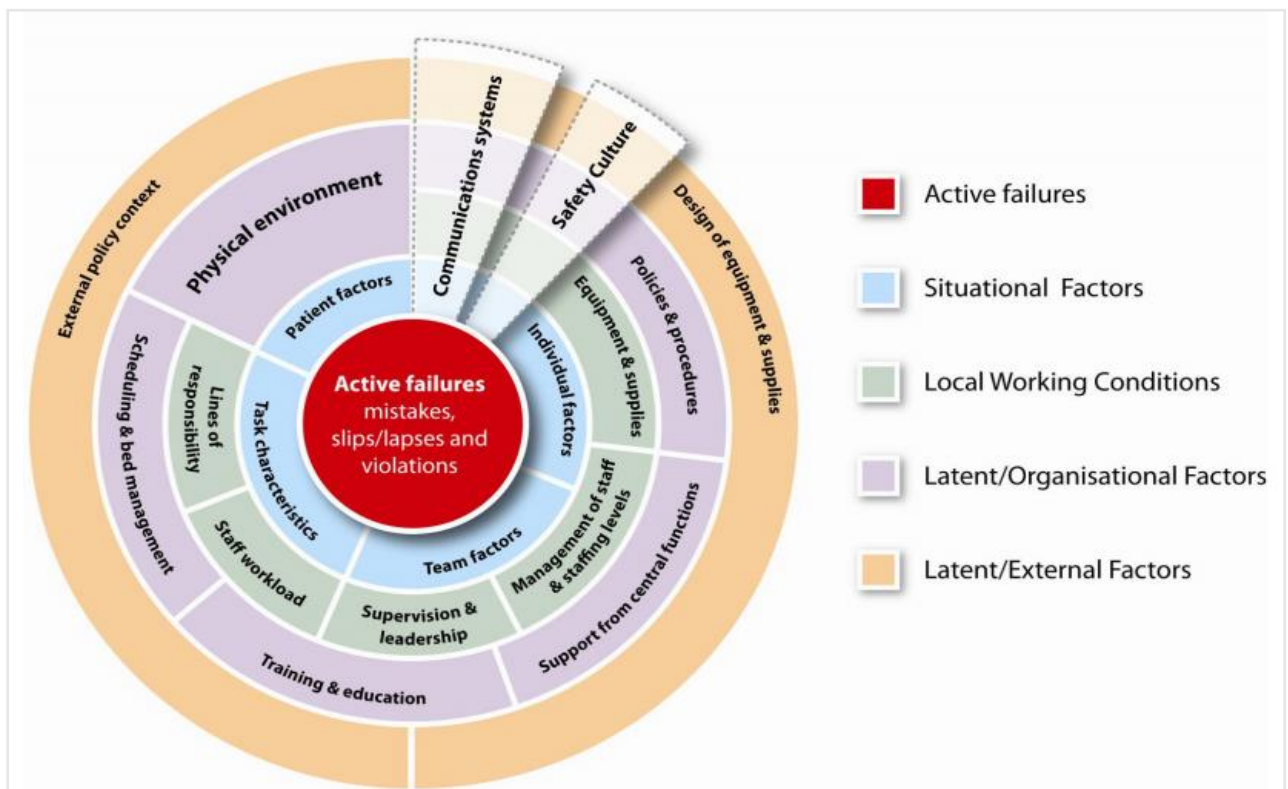


Figure 35. The Yorkshire Contributory Factors Framework (Lawton et al., 2012)

## **5.5. Strategies to Encourage Reporting Errors**

Respondents in the current study suggested that education and training are greatly needed for nurses to feel more comfortable to report medication errors. They believe that the knowledge of leaders is very important to help both groups maintain a positive safety culture in the ward/hospital. Nurses, however, stated that training programs alone are currently not sufficient in their place of work to improve staff knowledge in medication error reporting. They need specific training programs in promoting a positive safety culture. As discussed, Aljadhey (2012) suggested that efforts must be made at a national level to increase the adoption of practices needed to improve medication safety. In 2013, Aljadhey suggested that policymakers and practitioners should consider factors affecting medication safety when outlining future programs aimed at promoting the safe use of medications in Saudi Arabia. A statement by Lawton and Parker (2003) state that a number of solutions can be effective to improve care quality and that help in preventing mistakes and errors, such as checking and training, good quality guidelines, providing necessary resources and implementation of policies.

Furthermore, nurses emphasized the need for feedback and gave information regarding this. This will help in preventing harmful happenings and to protect the patients; however, the lack of a feedback system may lead to discouragement of nurses from reporting errors, which will ultimately affect the safety of the patients. The role played by managers can be given emphasis, as was said by some nurses, particularly as they report that they do not get regular feedback. Murphy (2012) also supported the findings mentioned above, and says 69% of nurses reported errors but the percentage from this was just 11% who receive feedback. Therefore, 58% would feel that reporting errors was not an issue when feedback was not received and ultimately would stop reporting.

Another important issue was raised here that although insurance is provided to the doctors in Saudi Arabia nurses do not get insurance against medication errors (MOH, 2002). Compensation is given to the patients if any damage is caused to them, depending on the type. For instance, damage of an organ or a partial disability. This compensation is paid by nurses which will prevent reports of errors because of the fear of financial losses or penalties which they have to pay if they get reported. In UK the nurses are provided with the facility of insurance, if there is any claim made against them. If they are insured they are protected through their policy of insurance by their employers.

It is important to note that many of countries have achieved or have already made advanced changes in the development of their policies and regulations. They must help and guide others to implement such policies according to the conditions prevailing in the country. Countries should behave logically and try to take some advantage from the advanced policies of the other nations and save their time and energy by creating country-specific policies, regulations and protocols to improve the health around them (WHO, 2014).

In comparison to other countries, the culture in Saudi Arabia for instance, UK or USA policies may not effectively apply. Updated policies with broader contexts can help using guidelines that have been developed internationally. In this way the policies would be implemented according to the local and international standards but meeting the multicultural context of the country.

## **5.6. Strengths and Limitations**

The approach used is the mixed methods approach. This holds the objective of gathering qualitative and quantitative information to present a deeper understanding of connections between safety culture and nursing leadership style and the reporting medication errors in four hospitals in Qassim region in Saudi Arabia. This study has targeted just one area in

Saudi Arabia. The strength of this study is that it is the first study to explore the relationships between perceived safety cultures and nursing leadership style and medication errors reporting by nurses. Moreover, the findings of the research presented in this thesis contribute new knowledge to the Yorkshire Contributory Factors Framework by statistically evidencing the relationship between nursing leadership and safety culture and nurses' medication errors reporting. Positive safety culture and effective leadership played an essential role in improving patient safety in general and medication error reporting systems in this study. The strength of using a mixed method approach was that it provided a more complete and comprehensive understanding of the research problem than either quantitative or qualitative approaches alone (Schulze, 2003). Using mixed methods research combines the strengths of both quantitative and qualitative research and minimizes their individual weaknesses (Creswell & Plano Clark, 2007). Another advantage of applying the mixed method of research allows the researcher to tackle a broader and a more complete range of research questions, as the researcher is not confined within the limitations of a particular method of research. As Bryman (2006) found, most researchers say the rationale for using mixed methods was to enhance the findings.

A sequential explanatory design was used; this design is straightforward to implement because the steps fall into clear separate stages to undertake and report on. The response rate was relatively high in the recruited sample for the quantitative method and some generalisations can be made to similar Saudi Arabian settings.

The qualitative phase of the study targeted additional in-depth information to the survey outcomes to understand nurses' medication error reporting further. The questions in the interviews were different from those of the questionnaire and the findings from the interviews gave complementary information that was used to explain the questionnaire results, providing meaning and depth. A number of rules were followed in the qualitative phase to ensure

accuracy, credibility, transferability, trustworthiness and conformability of qualitative findings and avoid bias. The framework analysis was used (Miles & Huberman, 1994) to analyse the data thematically. So, this allowed for some predefined themes to be categorised, but also inductively generated new themes that were not part of the questions in the survey.

On the other hand, there were limitations to utilising a mixed-methods approach. Firstly, two of the four participating hospitals provided information on reported medication errors, but the other two hospitals did not collect this data. The hospitals that provided information on type and rates of reported medication errors were also the hospitals that the research identified as having good leadership and better safety cultures.

The application of the mixed methodology in one study can prove difficult to handle by any one single researcher. This is the case especially when the researcher has to apply two or more approaches concurrently. Furthermore, a researcher choosing to rely on this method of research has to learn about multiple methods and approaches and understand how to appropriately mix them. Mixed method research is often more expensive and time consuming. Finally, since it is a mixture of two quite different approaches to research, researchers and methodologists have to work out problems of interpreting conflicting results and traditional ideas of paradigm mixing, which was attended to in this study through using a critical realist approach. The findings of the quantitative and qualitative research were limited by gathering this information from two groups of people, who were not necessarily related, or analogical (i.e. the interview information could not be linked to a specific survey response). However, the two methods used in this approach produced two sets of information that sequel one another, leading to a more integrated comprehension of nurses' reports of medication errors.

## **5.7. Summary**

In conclusion, this study shows that a positive safety culture and effective leadership play an essential role in improving a medication errors reporting system. The nursing staff emphasised the importance of errors reporting and improving the patient safety and health sector. However, the findings reveal that fear was a key causal factor for underreporting of medication errors. Nurses feared punishment and legal action or losing their jobs. In addition, lack of feedback from quality or patient safety offices when nurses did report errors discouraged them from reporting future errors. Further barriers to reporting were human nature, workload or shortage of staff, nursing leadership problems, blame, lack of knowledge or skills, unclear, or noncompliance with policy and safety culture. However, in cases where a patient's life was endangered, nurses' sense of duty overcame their fear of punishment, and their fears of reporting their errors. Support of educational training and development along with the feedback facility will encourage the nursing staff in reporting any medication error.

The findings of the research presented in this thesis contribute new knowledge to the Yorkshire Contributory Factors Framework by evidencing the relationship between nursing leadership and safety culture through statistical methods. Moreover, the main methodological contribution of the research field has been the first mixed methods study to investigate the relationships between perceived safety cultures and nursing leadership style and medication errors reporting by nurses. In addition, this thesis was the first study in Saudi Arabia to give a comprehensive understanding of nurses' views and experience about safety culture and nursing leadership styles and medication errors reporting. The information is valuable and can help introduce developments in professional education to improve medication errors reporting systems. The findings of the study will definitely help to develop strategies that are effective in decreasing errors in the health sector, and improving the quality and safety of the care provided to the patients.



## **Chapter VI: Conclusions and Recommendations**

### **6.1. Introduction**

Exploring the relationship between perceived safety culture and leadership style and reporting errors made by nurses was the main point of this study. Nurses have a control role in reporting errors; the nursing staff takes responsibility for detecting and handling errors, for they are the first to aid the patient and considered to be the care interface. This study was structured for the Qassim region in Saudi Arabia, where the nursing staff is of a multicultural nature and national and international nurses with different levels of education and culture work in various medical and surgical divisions. By utilising a mixed methods approach, this study aimed to explore the relationships between perceived safety culture, nursing leadership and medications errors (by nurses) in adult medical and surgical wards in the Qassim region in Saudi Arabia.

This study presents the views of nursing staff and their managers working in the Qassim region in Saudi Arabia about safety culture and nursing leadership styles and how they affect medication error reporting in their hospital. This will provide the management with suitable information to develop an accurate culture of safety in the country's hospitals and will help in designing training and educational programs that will assist the nursing staff to manage and report errors in the hospitals of Saudi Arabia.

Here the results are discussed in brief, reflecting the implications of these results on clinical areas and research; it will facilitate the reduction of medication errors and improve the reporting errors system by the implementation of a number of suggested solutions, as explained. This research therefore supports an approach to handle a gap in the literature and covers a number of objectives compared to previous studies. Furthermore, recommendations have been given considering the practices of nurses; research on nursing and a dissemination plan are provided at the end of this chapter.

## **6.2. Relationships between perceived safety culture and leadership styles and medication errors reporting**

From the findings of this study, there was a positive relationship between safety culture and reported medication errors; and higher safety culture levels were associated with the reporting of errors. Moreover, there was a positive relationship between transformational and transactional leadership styles with positive safety culture and reported medication errors. HSOPSC survey data showed most nurses were creating a positive safety culture with 69% in their work area. However, 50% of respondents had not submitted or completed any medication error report in the last year. In addition, half of the nurses had concerns about being blamed. From MLQ 5X survey data, leadership aspects were significantly more likely to be given higher rates by leaders themselves than by nurses in terms of transformational, transactional, and laissez-faire leadership styles. However, both leaders and nurses equally rated overall leadership outcomes. Finally, two of the four participating hospitals could provide statistics on reported medication errors, while other two hospitals did not have any data.

## **6.3. Implications of the Study**

The implications of this study are:

This is the first study to explore the relationships between perceived safety cultures and nursing leadership style and medication errors reporting in Saudi Arabia. It is apparent from the literature review chapter that there is no previous research that specifically links these three concepts together in a Saudi Arabian context or worldwide. Related to this lack of evidence in a Saudi Arabian context, and the resulting difference in beliefs between cultures, confirmed the need for an in-depth study of nurses' views of reporting medication errors in Saudi Arabia.

The findings of the research presented in this thesis contribute new knowledge by extending the Yorkshire Contributory Factors Framework (Lawton et al., 2012) by evidencing the relationship between nursing leadership and safety culture through statistical methods. A positive safety culture and effective leadership were found to play an essential role in improving patient safety in general, and medication error reporting systems in this particular sample.

This study's methodological contribution to the research field was in being the first mixed methods study to specifically investigate the relationships between perceived safety cultures and nursing leadership styles and medication errors reporting by nurses. Information obtained from the literature review supported the choice of surveys and interview questions in this study. This ambitious design was intentional, to promote a concentration on the quality, issues and components of medication errors reporting in relation to perceived safety culture and nursing leadership.

This study established that the decision by nursing staff whether to report an error or not depended to some extent on the degree of danger to patients in an inverse relationship; more nurses will report if the harm is serious to the patient regardless of their fear of the consequences. This means we need guidance and understanding for the perceptions of multicultural nurses and their managers of reporting systems in Saudi Arabia. The findings of this study will assist in the creation of suitable medication safety education and procedures for Saudi nursing staff, for it is based on the opinions and beliefs of those working in Saudi Arabia. Further, nurses need to have the same indemnity insurance as doctors to overcome their fear of reporting errors. Nurses should feel able to report errors confidently and sincerely without fear of unequal disciplinary or financial consequences.

## **6.4. Recommendations**

### **6.4.1. Recommendations for practice**

Based on the results of this study and the literature reviewed, a number of recommendations are suggested for nurses' training concerning medication errors and how to report errors. The study results have an important effect on nursing staff, nurse managers, administration of the hospitals and the healthcare system in promoting the safety of the patients and error reduction. Preventing errors must involve open communication channels and the collaboration of all employees in the hospital. To encourage reporting errors there are two main strategies: reactive and proactive. Firstly, the reactive strategy depends on learning from reported incidents (experience) to avoid mistakes. Secondly, the proactive strategy's concern is to prospectively identify weak points in the organization that will prevent errors reporting, and address these weaknesses before a harmful event occurs (Lawton et, al., 2012). The strategies are meant to be implemented (i.e. to develop and improve education and the environment) to report errors and administer medication safety.

There should be a shift towards a culture of safety rather than blame and shame. The leaders of the organisation who focus on ways to prevent the errors should try to provide an environment that is supportive instead of pointing out those making errors; this will allow people to report errors without hesitation. Good and effective leadership along with training can help to get this done effectively. Moreover, heavy workload that is considered one of the barriers to reporting errors results from increased numbers of patients and a shortage of nursing staff. Nursing staff shortages should be addressed to overcome this issue.

The system factor (e.g. policy, a decision or a technology) plays a significant role regarding patient safety improvement and an improved reporting system, according to YCFF (Lawton et al., 2012). Management should provide training or orientation programmes for new nurses, which should include training on how to report medication errors.

Finally, fear is considered as the most significant barrier to reporting medication errors in Saudi Arabia. The insurance system needs nurses to have the same insurance as doctors to overcome the fear of reporting errors. Nurses should feel able to report errors confidently and sincerely without fear of punishment.

#### **6.4.2. Recommendations for research**

For further research, there are many recommendations as offered in the followed points:

- Additional investigation of barriers to medication errors reporting is required, considering different geographical locations in Saudi Arabia. This would give comprehensive figures for highly susceptible populations, as for example in the capital city (Riyadh).
- Research should focus on accurate incident reporting figures and the possible factors associated with reporting errors.

#### **6.5. Dissemination plan**

The results from different elements of this study have been presented at local and international conferences and received good feedback (see Appendix 19). This thesis will be available through the University of Central Lancashire library. The study results will be published in professional, national and international journals for example, Saudi Journal of Nursing and Health Care, British Journal of Nursing, and Journal of Nursing Education, to disseminate the findings to wider audiences. An Executive Summary of the research and key findings will be sent to all the participants from different hospitals in the Qassim region in Saudi Arabia, and to policy makers in the Saudi Ministry of Health, in order to assist policy makers, hospital management and nurse leaders to develop suitable medication safety education and procedures to encourage nurses to report errors. Moreover, to improve the safety of medication use in these hospitals, the decision and policy makers and clinical

leaders need to support education programmes, medicine administration regulations and research. Presentations will be organised at the Saudi hospitals to present the overview of the study to nurses and their managers. This will disseminate findings to nurses and managers, facilitating their understanding of the issues that related to the medication errors reporting system, and how to overcome the barriers of reporting medication errors in the future.

## **6.6. Summary**

The above study presents a comprehensive understanding of the relationships between perceived safety culture and nursing leadership styles and medication errors reporting by nurses in the Qassim region in Saudi Arabia. The findings of the research presented in this thesis contribute new knowledge to the Yorkshire Contributory Factors Framework by evidencing the relationship between nursing leadership and safety culture through statistical methods. Moreover, the main methodological contribution of the research field has been the first mixed methods study to investigate the relationships between perceived safety cultures and nursing leadership style and medication errors reporting by nurses. In addition, this thesis was the first study in Saudi Arabia to give a comprehensive understanding of the nurses' views and experiences about safety culture and nursing leadership styles and medication errors reporting. The research findings have provided valuable information that assists in managing medication errors reporting and is directed towards reduced medication errors across the world. It will contribute to reducing medication errors globally because previous studies have looked at single aspects and do not consider all the active and situational factors, local conditions and latent failures and external factors that can either contribute to errors reporting or be used to reduce errors. The present study is original in its comprehensive examination of nurses' perceptions regarding medication errors reporting and nursing leadership styles within a culturally unique, diverse population context using a mixed method research design to integrate the data from different sources.

The main findings of this study are in line with those in the international literature, which shows that there are a range of barriers and factors that contribute to errors reporting. However, in Saudi Arabia the highest perceived factors were fear of punishment, culture (e.g. blame and personal characteristics), and leadership issues (e.g. lack of feedback, lack of knowledge and skills, unclear and noncompliance with policy). Most of the nurses, along with their managers, agreed that permanent, continuous education with updated and advanced knowledge are major solutions to preventing medication errors and increase reporting. One of the most significant strategies to improve the reporting errors system is training. It is hoped that these results will result in evidence that will help to improve education for nursing, which leads to improving the reporting system and increasing best quality practice throughout Saudi Arabia.

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## Appendices

Appendix 1: Hawker's Assessment Tool

Author & title:					
Date:	Score				
	4 Good	3 Fair	2 Poor	1 Very Poor	Comments
1. Abstract and title					
2. Introduction and aims					
3. Method and data					
4. Sampling					
5. Data analysis					
6. Ethics and bias					
7. Findings/results					
8. Transferability/generalisability					
9. Implications and usefulness					
Total score					

1. Abstract and title: Did they provide a clear description of the study?

Good            Structured abstract with full information and clear title.

Fair             Abstract with most of the information.

Poor             Inadequate abstract.

VeryPoor      No abstract.

2. Introduction and aims: Was there a good background and clear statement of the aims of the research?

Good	Full but concise background to discussion/study containing up-to-date literature review and highlighting gaps in knowledge. Clear statement of aim AND objectives including research questions.
Fair	Some background and literature review. Research questions outlined.
Poor	Some background but no aim/objectives/questions, OR Aims/objectives but inadequate background.
Very Poor	No mention of aims/objectives. No background or literature review.

3. Method and data: Is the method appropriate and clearly explained?

Good	Method is appropriate and described clearly (e.g., questionnaires included). Clear details of the data collection and recording.
Fair	Method appropriate, description could be better. Data described.
Poor	Questionable whether method is appropriate. Method described inadequately. Little description of data.
Very Poor	No mention of method, AND/OR Method inappropriate, AND/OR No details of data.

4. Sampling: Was the sampling strategy appropriate to address the aims?

Good	Details (age/gender/race/context) of who was studied and how they were recruited. Why this group was targeted. The sample size was justified for the study. Response rates shown and explained.
Fair	Sample size justified. Most information given, but some missing.
Poor	Sampling mentioned but few descriptive details.
Very Poor	No details of sample.

5. Data analysis: Was the description of the data analysis sufficiently rigorous?

Good Clear description of how analysis was done.  
 Qualitative studies: Description of how themes derived/  
 respondent validation or triangulation.  
 Quantitative studies: Reasons for tests selected hypothesis driven/  
 numbers add up/statistical significance discussed.

Fair Qualitative: Descriptive discussion of analysis.  
 Quantitative.

Poor Minimal details about analysis.

VeryPoor No discussion of analysis.

6. Ethics and bias: Have ethical issues been addressed, and what has necessary ethical approval gained? Has the relationship between researchers and participants been adequately considered?

GoodEthics Where necessary issues of confidentiality, sensitivity, and consent were addressed.

Bias: Researcher was reflexive and/or aware of own bias.

Fair Lip service was paid to above (i.e., these issues were acknowledged).

Poor Brief mention of issues.

VeryPoor No mention of issues.

7. Results: Is there a clear statement of the findings?

Good Findings explicit, easy to understand, and in logical progression.  
 Tables, if present, are explained in text.  
 Results relate directly to aims.

Sufficient data are presented to support findings.

Fair Findings mentioned but more explanation could be given.  
 Data presented relate directly to results.

Poor Findings presented haphazardly, not explained, and do not progress logically from results.

VeryPoor Findings not mentioned or do not relate to aims.

8. Transferability or generalizability: Are the findings of this study transferable (generalizable) to a wider population?

Good Context and setting of the study is described sufficiently to allow comparison with other contexts and settings, PLUS high score in Question 4 (sampling).

Fair Some context and setting described, but more needed to replicate or compare the study with others, PLUS fair score or higher in Question 4.

Poor Minimal description of context/setting.

Very Poor No description of context/setting.

9. Implications and usefulness: How important are these findings to policy and practice?

Good Contributes something new and/or different in terms of understanding/insight or perspective.

Suggests ideas for further research.

Suggests implications for policy and/or practice.

Fair Two of the above (state what is missing in comments).

Poor Only one of the above.

Very Poor None of the above

No	Author/ year	1. Abstract and title:	2. Introduction and aims:	3. Method and data:	4. Sampling:	5. Data analysis:	6. Ethics and bias:	7. Results:	8. Transferability or generalisability:	9. Implications and usefulness: How important are these findings to policy and practice?	Quality Score= 36
1	Aljadhey et al.  (2012)  (Saudi Arabia)	3	4	4	3	4	1	3	4	3	29
2	Aljadhey et al  (2013)  (Saudi Arabia)	4	4	4	4	3	1	3	2	3	28
3	Drach- Zahavy et. al (2014)  (Israel)	4	3	4	3	4	3	4	2	4	31
4	Hofmann & Mark	2	3	4	3	3	3	4	2	3	27

	(2006) (USA)										
5	Kagan & Barnoy 2013 (Israel)	4	3	4	3	3	3	4	2	3	29
6	Lawton et. al (2012) (UK)	3	4	3	4	3	4	3	1	3	28
7	Pazokian et. al (2014) (Iran)	4	4	4	3	3	3	4	1	2	28
8	Vogus & Sutcliffe (2007a) (USA)	4	3	3	3	4	2	4	3	1	27
9	Vogus & Sutcliffe (2007b) (USA)	4	3	3	3	4	3	4	3	1	28
10	Wong (2015) (Canada)	4	4	3	4	3	1	4	1	4	28

## Appendix 2: Patient Safety Culture Measuring Instruments

	<b>Hospital Survey On Patient Safety Culture (HSOPSC)</b>	<b>Safety Attitude Questionnaire (SAQ)</b>	<b>Safety Climate Survey (SCS)</b>
<b>Purpose</b>	To assess the patient safety culture of hospital staff.	To identify attitudes of patient care providers (health care professionals) to patient safety.	To gain information about the perceptions of: - Frontline clinical staff about safety in their clinical area - Management's commitment to safety.
<b>Target group</b>	<ul style="list-style-type: none"> <li>• Hospital staff: - who have direct contact with patient care - whose roles impact on patient care</li> <li>• Physicians</li> <li>• Supervisors, managers and administrators.</li> </ul>	<ul style="list-style-type: none"> <li>• Clinical and non-clinical staff involved in patient care within all health care contexts.</li> </ul>	<ul style="list-style-type: none"> <li>• Clinical staff – departmental or organisational.</li> </ul>
<b>Elements measured</b>	<ul style="list-style-type: none"> <li>• Leadership</li> <li>• Safety culture</li> <li>• Communication and teamwork</li> </ul>	<ul style="list-style-type: none"> <li>• Clinical governance</li> <li>• Safety culture</li> <li>• Communication and teamwork</li> </ul>	<ul style="list-style-type: none"> <li>• Clinical governance</li> <li>• Leadership</li> <li>• Safety culture</li> <li>• Communication and teamwork</li> </ul>
<b>Structure</b>	<ul style="list-style-type: none"> <li>• The survey incorporates nine dimensions of safety culture accruing 49 questions, and four outcome variables: - overall perceptions of safety, - frequency of event reporting, - patient safety grade, and - number of events reported.</li> <li>• Questions are responded to on a five-point Likert scale.</li> </ul>	<ul style="list-style-type: none"> <li>• Assesses safety climate overall and six dimensions of safety climate: - Teamwork climate, - Safety climate, - Job satisfaction, - Perceptions of management, - Working conditions, and - Stress recognition.</li> <li>• The 'Teamwork and safety climate survey' contains 27 items, and the 'Safety attitudes questionnaires' contain between 58 and 65 items.</li> <li>• Items are responded to on a five-point Likert scale: disagree strongly/disagree slightly/neutral/agree slightly/agree strongly. There is also a not applicable option.</li> </ul>	<ul style="list-style-type: none"> <li>• The short form comprises 21 items, and assesses dimensions of safety climate including teamwork, leadership and commitment of management.</li> <li>• Items are responded to on a five-point Likert scale: disagree strongly/disagree slightly/neutral/agree slightly/agree strongly. There is also a not applicable option.</li> </ul>
<b>Strengths</b>	<ul style="list-style-type: none"> <li>• Clear presentation.</li> <li>• Simple, easy and brief administration.</li> <li>• Accompanied by a comprehensive user's guide.</li> <li>• Can be modified.</li> <li>• Available in electronic or hard copy.</li> <li>• Can be administered serially</li> </ul>	<ul style="list-style-type: none"> <li>• Clear presentation, simple, easy and brief administration.</li> <li>• Has been customised for specific health care environments.</li> <li>• May be administered in different health care settings to diverse staff groups.</li> <li>• Accompanied by sound technical attributes data.</li> </ul>	<ul style="list-style-type: none"> <li>• Simple, easy and brief administration.</li> <li>• May be administered in different health care settings to diverse staff groups</li> <li>• Accompanied by a user's guide.</li> <li>• Can be administered serially to monitor change.</li> </ul>

	<b>Hospital Survey On Patient Safety Culture (HSOPSC)</b>	<b>Safety Attitude Questionnaire (SAQ)</b>	<b>Safety Climate Survey (SCS)</b>
	<p>to monitor change.</p> <ul style="list-style-type: none"> <li>Has formal assessment of validity and reliability.</li> </ul>	<ul style="list-style-type: none"> <li>Use of Likert scale allows a depth of responses to be collected.</li> <li>Development is based on long standing literature from the aviation industry.</li> </ul>	<ul style="list-style-type: none"> <li>Use of Likert scale allows a depth of responses to be collected.</li> <li>Development is based on long standing literature from the aviation industry.</li> <li>Has moderate to high reliability.</li> </ul>
<b>Limitations</b>	<ul style="list-style-type: none"> <li>Limited to administration in hospitals.</li> <li>May require some data analysis.</li> </ul>	<ul style="list-style-type: none"> <li>Scoring may be time consuming.</li> </ul>	<ul style="list-style-type: none"> <li>Scoring may initially be time consuming.</li> <li>No formal assessment on validity available.</li> </ul>
<b>Technical attributes (Validity &amp; Reliability)</b>	<ul style="list-style-type: none"> <li>Extensive information on the technical attributes of this tool is available and based on a pilot study conducted with a sample of 21 hospitals and 1437 staff.</li> <li>Validity and reliability derived from this piloting is detailed in the survey user's guide.</li> <li>Very good face validity – items developed based on sound literature review and other published and unpublished surveys.</li> </ul>	<ul style="list-style-type: none"> <li>Very good face validity – items developed based on sound literature review around safety climates in the aviation industry. Pilot testing during development was conducted in the USA, UK and New Zealand. Good psychometric properties have been reported.</li> <li>Extensive information is available on validity or reliability.</li> </ul>	<ul style="list-style-type: none"> <li>Very good face validity – items developed based on sound literature review around safety climates in the aviation industry, however no formal assessment of the content validity available.</li> <li>Reliability studies found to have moderate to high test retest reliability and high internal consistency.</li> </ul>
<b>Reference</b>	<a href="http://www.ahrg.gov/professionals/quality-patient-safety/index.html">http://www.ahrg.gov/professionals/quality-patient-safety/index.html</a>	<a href="https://med.uth.edu/chqs/surveys/safety-attitudes-and-safety-climate-questionnaire/">https://med.uth.edu/chqs/surveys/safety-attitudes-and-safety-climate-questionnaire/</a>	<a href="https://med.uth.edu/chqs/surveys/safety-attitudes-and-safety-climate-questionnaire/">https://med.uth.edu/chqs/surveys/safety-attitudes-and-safety-climate-questionnaire/</a>

*Source: Measurement for Improvement Toolkit, Australian Commission on Safety & Quality in Health Care*



# Hospital Survey on Patient Safety

## Instructions

This survey asks for your opinions about patient safety issues, medical error, and event reporting in your hospital and will take about 10 to 15 minutes to complete.

If you do not wish to answer a question, or if a question does not apply to you, you may leave your answer blank.

- An “**event**” is defined as any type of error, mistake, incident, accident, or deviation, regardless of whether or not it results in patient harm.
- “**Patient safety**” is defined as the avoidance and prevention of patient injuries or adverse events resulting from the processes of health care delivery.

## SECTION A: Your Work Area/Unit

In this survey, think of your hospital and the work area or unit of the hospital.

What is your work hospital? Select ONE answer.

- a. King Fahad Specialist Hospital
- b. Buraidah central hospital
- c. King Saud Hospital
- d. Al Bukayriyah Hospital

What is your primary work area or unit in this hospital? Select ONE answer.

- a. Medical Unit
- b. Surgical Unit

Please indicate your agreement or disagreement with the following statements about your work area/unit.

	Strongly Disagree ▼	Disagree ▼	Neither ▼	Agree ▼	Strongly Agree ▼
Think about your hospital work area/unit...					
1. People support one another in this unit.....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>
2. We have enough staff to handle the workload .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>
3. When a lot of work needs to be done quickly, we work together as a team to get the work done .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>

4. In this unit, people treat each other with respect..... <sub>1</sub>    <sub>2</sub>    <sub>3</sub>    <sub>4</sub>    <sub>5</sub>
5. Staff in this unit work longer hours than is best for patient care..... <sub>1</sub>    <sub>2</sub>    <sub>3</sub>    <sub>4</sub>    <sub>5</sub>

**SECTION A: Your Work Area/Unit (continued)**

<b>Think about your hospital work area/unit...</b>	<b>Strongly Disagree</b> ▼	<b>Disagree</b> ▼	<b>Neither</b> ▼	<b>Agree</b> ▼	<b>Strongly Agree</b> ▼
6. We are actively doing things to improve patient safety .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>
7. We use more agency/temporary staff than is best for patient care.....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>
8. Staff feel like their mistakes are held against them .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>
9. Mistakes have led to positive changes here.....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>
10. It is just by chance that more serious mistakes don't happen around here.....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>
11. When one area in this unit gets really busy, others help out.....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>
12. When an event is reported, it feels like the person is being written up, not the problem.....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>
13. After we make changes to improve patient safety, we evaluate their effectiveness .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>
14. We work in "crisis mode" trying to do too much, too quickly .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>
15. Patient safety is never sacrificed to get more work done .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>
16. Staff worry that mistakes they make are kept in their personnel file .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>
17. We have patient safety problems in this unit.....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>
18. Our procedures and systems are good at preventing errors from happening .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>

**SECTION B: Your Supervisor/Manager**

**Please indicate your agreement or disagreement with the following statements about your immediate supervisor/manager or person to whom you directly report.**

	<b>Strongly Disagree</b> ▼	<b>Disagree</b> ▼	<b>Neither</b> ▼	<b>Agree</b> ▼	<b>Strongly Agree</b> ▼
1. My supervisor/manager says a good word when he/she sees a job done according to established patient safety procedures.....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>
2. My supervisor/manager seriously considers staff suggestions for improving patient safety .....	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>

3. Whenever pressure builds up, my supervisor/manager wants us to work faster, even if it means taking shortcuts ..... <sub>1</sub>    <sub>2</sub>    <sub>3</sub>    <sub>4</sub>    <sub>5</sub>
4. My supervisor/manager overlooks patient safety problems that happen over and over ..... <sub>1</sub>    <sub>2</sub>    <sub>3</sub>    <sub>4</sub>    <sub>5</sub>

**SECTION C: Communications**

**How often do the following things happen in your work area/unit?**

**Think about your hospital work area/unit...**

- |  | Never<br>▼                            | Rarely<br>▼                           | Some-<br>times<br>▼                   | Most of<br>the time<br>▼              | Always<br>▼                           |
|--|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| 1. We are given feedback about changes put into place based on event reports .....               | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> |
| 2. Staff will freely speak up if they see something that may negatively affect patient care..... | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> |
| 3. We are informed about errors that happen in this unit.....                                    | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> |
| 4. Staff feel free to question the decisions or actions of those with more authority.....        | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> |
| 5. In this unit, we discuss ways to prevent errors from happening again .....                    | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> |
| 6. Staff are afraid to ask questions when something does not seem right ...                      | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> |

**SECTION D: Frequency of Events Reported**

**In your hospital work area/unit, when the following mistakes happen, how often are they reported?**

- |  | Never<br>▼                            | Rarely<br>▼                           | Some-<br>times<br>▼                   | Most of<br>the time<br>▼              | Always<br>▼                           |
|--|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| 1. When a mistake is made, but is <u>caught and corrected before affecting the patient</u> , how often is this reported? ..... | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> |
| 2. When a mistake is made, but has <u>no potential to harm the patient</u> , how often is this reported? .....                 | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> |
| 3. When a mistake is made that <u>could harm the patient</u> , but does not, how often is this reported? .....                 | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> |

**SECTION E: Patient Safety Grade**

**Please give your work area/unit in this hospital an overall grade on patient safety.**

- |                          |                          |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b>A</b>                 | <b>B</b>                 | <b>C</b>                 | <b>D</b>                 | <b>E</b>                 |
| Excellent                | Very Good                | Acceptable               | Poor                     | Failing                  |

**SECTION F: Your Hospital**

**Please indicate your agreement or disagreement with the following statements about your hospital.**

- |   | Strongly<br>Disagree<br>▼             | Disagree<br>▼                         | Neither<br>▼                          | Agree<br>▼                            | Strongly<br>Agree<br>▼                |
|---|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| <b>Think about your hospital...</b>   |                                       |                                       |                                       |                                       |                                       |
| 1. Hospital management provides a work climate that promotes patient safety ..... | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> |

2. Hospital units do not coordinate well with each other ..... <sub>1</sub>   <sub>2</sub>   <sub>3</sub>   <sub>4</sub>   <sub>5</sub>
3. Things “fall between the cracks” when transferring patients from one unit to another ..... <sub>1</sub>   <sub>2</sub>   <sub>3</sub>   <sub>4</sub>   <sub>5</sub>
4. There is good cooperation among hospital units that need to work together ..... <sub>1</sub>   <sub>2</sub>   <sub>3</sub>   <sub>4</sub>   <sub>5</sub>

**SECTION F: Your Hospital (continued)**

- | <b>Think about your hospital...</b>  | <b>Strongly Disagree</b><br>▼         | <b>Disagree</b><br>▼                  | <b>Neither</b><br>▼                   | <b>Agree</b><br>▼                     | <b>Strongly Agree</b><br>▼            |
|--|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| 5. Important patient care information is often lost during shift changes .....                     | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> |
| 6. It is often unpleasant to work with staff from other hospital units..                           | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> |
| 7. Problems often occur in the exchange of information across hospital units .....                 | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> |
| 8. The actions of hospital management show that patient safety is a top priority.....              | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> |
| 9. Hospital management seems interested in patient safety only after an adverse event happens..... | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> |
| 10. Hospital units work well together to provide the best care for patients.....                   | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> |
| 11. Shift changes are problematic for patients in this hospital .....                              | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> |

**SECTION G: Number of Events Reported**

**In the past 12 months, how many event reports have you filled out and submitted?**

- |  |  |
|--|--|
| <input type="checkbox"/> a. No event reports     | <input type="checkbox"/> d. 6 to 10 event reports    |
| <input type="checkbox"/> b. 1 to 2 event reports | <input type="checkbox"/> e. 11 to 20 event reports   |
| <input type="checkbox"/> c. 3 to 5 event reports | <input type="checkbox"/> f. 21 event reports or more |

**SECTION H: Background Information**

**This information will help in the analysis of the survey results.**

**1. How long have you worked in this hospital?**

- |  |  |
|--|--|
| <input type="checkbox"/> a. Less than 1 year | <input type="checkbox"/> d. 11 to 15 years   |
| <input type="checkbox"/> b. 1 to 5 years     | <input type="checkbox"/> e. 16 to 20 years   |
| <input type="checkbox"/> c. 6 to 10 years    | <input type="checkbox"/> f. 21 years or more |

**2. How long have you worked in your current hospital work area/unit?**

- |  |  |
|--|--|
| <input type="checkbox"/> a. Less than 1 year | <input type="checkbox"/> d. 11 to 15 years |
| <input type="checkbox"/> b. 1 to 5 years     | <input type="checkbox"/> e. 16 to 20 years |

- c. 6 to 10 years                       f. 21 years or more

**3. Typically, how many hours per week do you work in this hospital?**

- a. Less than 20 hours per week                       d. 60 to 79 hours per week  
 b. 20 to 39 hours per week                       e. 80 to 99 hours per week  
 c. 40 to 59 hours per week                       f. 100 hours per week or more

**SECTION H: Background Information (continued)**

**4. What is your staff position in this hospital? Select ONE answer that best describes your staff position.**

- a. Registered Nurse  
 b. Nurse manager/charge nurse

**5. In your staff position, do you typically have direct interaction or contact with patients?**

- a. YES, I typically have direct interaction or contact with patients.  
 b. NO, I typically do NOT have direct interaction or contact with patients.

**6. How long have you worked in your current specialty or profession?**

- a. Less than 1 year                       d. 11 to 15 years  
 b. 1 to 5 years                       e. 16 to 20 years  
 c. 6 to 10 years                       f. 21 years or more

**SECTION I: Your Comments**

**Please feel free to write any comments about patient safety, error, or event reporting in your hospital.**

***THANK YOU FOR COMPLETING THIS SURVEY.***

## Appendix 4: Multifactor Leadership Questionnaire (MLQ 5x)

For use by Bader Alrasheadi only. Received from Mind Garden, Inc. on March 19, 2015

### Multifactor Leadership Questionnaire **Leader Form**

My Name: \_\_\_\_\_ Date: \_\_\_\_\_ Organization ID#: \_\_\_\_\_ Leader ID#: \_\_\_\_\_

This questionnaire is to describe your leadership style as you perceive it. Please answer all items on this answer sheet. **If an item is irrelevant, or if you are unsure or do not know the answer, leave the answer blank.**

Forty-five descriptive statements are listed on the following pages. Judge how frequently each statement fits you. The word “others” may mean your peers, clients, direct reports, supervisors, and/or all of these individuals.

Use the following rating scale:

Not at all	Once in a while	Sometimes	Fairly often	Frequently, If not always
0	1	2	3	4

1. I provide others with assistance in exchange for their efforts.....0 1 2 3 4
2. I re-examine critical assumptions to question whether they are appropriate.....0 1 2 3 4
3. I fail to interfere until problems become serious.....0 1 2 3 4
4. I focus attention on irregularities, mistakes, exceptions, and deviations from standards.....0 1 2 3 4
5. I avoid getting involved when important issues arise.....0 1 2 3 4
6. I talk about my most important values and beliefs.....0 1 2 3 4
7. I am absent when needed.....0 1 2 3 4
8. I seek differing perspectives when solving problems.....0 1 2 3 4
9. I talk optimistically about the future.....0 1 2 3 4
10. I instill pride in others for being associated with me.....0 1 2 3 4
11. I discuss in specific terms who is responsible for achieving performance targets.....0 1 2 3 4
12. I wait for things to go wrong before taking action.....0 1 2 3 4
13. I talk enthusiastically about what needs to be accomplished.....0 1 2 3 4
14. I specify the importance of having a strong sense of purpose.....0 1 2 3 4

15. I spend time teaching and coaching.....	0	1	2	3	4
16. I make clear what one can expect to receive when performance goals are achieved.....	0	1	2	3	4
17. I show that I am a firm believer in "If it isn't broke, don't fix it." .....	0	1	2	3	4
18. I go beyond self-interest for the good of the group.....	0	1	2	3	4

Continued →

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<b>Not at all</b>	<b>Once in a while</b>	<b>Sometimes</b>	<b>Fairly often</b>	<b>Frequently, If not always</b>
0	1	2	3	4

- 19. I treat others as individuals rather than just as a member of a group ..... 0 1 2 3 4
- 20. I demonstrate that problems must become chronic before I take action ..... 0 1 2 3 4
- 21. I act in ways that build others' respect for me ..... 0 1 2 3 4
- 22. I concentrate my full attention on dealing with mistakes, complaints, and failures ..... 0 1 2 3 4
- 23. I consider the moral and ethical consequences of decisions ..... 0 1 2 3 4
- 24. I keep track of all mistakes ..... 0 1 2 3 4
- 25. I display a sense of power and confidence ..... 0 1 2 3 4
- 26. I articulate a compelling vision of the future ..... 0 1 2 3 4
- 27. I direct my attention toward failures to meet standards ..... 0 1 2 3 4
- 28. I avoid making decisions ..... 0 1 2 3 4
- 29. I consider an individual as having different needs, abilities, and aspirations from others ..... 1 2 3 4
- 30. I get others to look at problems from many different angles ..... 0 1 2 3 4
- 31. I help others to develop their strengths ..... 0 1 2 3 4
- 32. I suggest new ways of looking at how to complete assignments ..... 0 1 2 3 4
- 33. I delay responding to urgent questions ..... 0 1 2 3 4
- 34. I emphasize the importance of having a collective sense of mission ..... 0 1 2 3 4
- 35. I express satisfaction when others meet expectations ..... 0 1 2 3 4
- 36. I express confidence that goals will be achieved ..... 0 1 2 3 4
- 37. I am effective in meeting others' job-related needs ..... 0 1 2 3 4
- 38. I use methods of leadership that are satisfying ..... 0 1 2 3 4
- 39. I get others to do more than they expected to do ..... 0 1 2 3 4
- 40. I am effective in representing others to higher authority ..... 0 1 2 3 4
- 41. I work with others in a satisfactory way ..... 0 1 2 3 4



42. I heighten others' desire to succeed..... 0 1 2 3 4
43. I am effective in meeting organizational requirements ..... 0 1 2 3 4
44. I increase others' willingness to try harder ..... 0 1 2 3 4
45. I lead a group that is effective ..... 0 1 2 3 4

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# MultifactorLeadershipQuestionnaire

## Rater Form

Name of Leader:

Date:

Organization ID:

Leader ID:

This questionnaire is used to describe the leadership style of the above-mentioned individuals you perceive it. Answer all items on this answer sheet. **If an item is irrelevant, or if you are unsure or do not know the answer, leave the answer blank.** Please answer this questionnaire anonymously.

**Important** (necessary for processing): Which best describes you?

I am at a higher organizational level than the person I am rating.

The person I am rating is at my organizational level.

I am at a lower organizational level than the person I am rating.

Other than the above.

Forty-five descriptive statements are listed on the following pages. Judge how frequently each statement fits the person you are describing. Use the following rating scale:

Not at all	Once in a while	Sometimes	Fairly often	Frequently, if not always
------------	-----------------	-----------	--------------	---------------------------

**The Person I Am Rating. . .**

- 1. Provides me with assistance in exchange for my efforts..... 0 1 2 3 4
- 2. \*Re-examines critical assumptions to question whether they are appropriate ..... 0 1 2 3 4
- 3. Fails to interfere until problems become serious..... 0 1 2 3 4
- 4. Focuses attention on irregularities, mistakes, exceptions, and deviations from standards ..... 0 1 2 3 4
- 5. Avoids getting involved when important issues arise ..... 0 1 2 3 4
- 6. \*Talks about his/her most important values and beliefs ..... 0 1 2 3 4
- 7. Is absent when needed ..... 0 1 2 3 4
- 8. \*Seeks differing perspectives when solving problems ..... 0 1 2 3 4
- 9. \*Talks optimistically about the future..... 0 1 2 3 4
- 10. \*Instills pride in me for being associated with him/her ..... 0 1 2 3 4
- 11. Discusses in specific terms who is responsible for achieving performance targets ..... 0 1 2 3 4
- 12. Waits for things to go wrong before taking action ..... 0 1 2 3 4
- 13. \*Talks enthusiastically about what needs to be accomplished ..... 0 1 2 3 4
- 14. \*Specifies the importance of having a strong sense of purpose ..... 0 1 2 3 4
- 15. \*Spends time teaching and coaching ..... 0 1 2 3 4

Continued →

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	<b>Notatall</b>	<b>Onceinawhile</b>	<b>Sometimes</b>	<b>Fairlyoften</b>	<b>Frequently, Ifnotalways</b>
	0	1	2	3	4
16. Makes clear what one can expect to receive when performance goals are achieved .....	0	1	2	3	4
17. Shows that he/she is a firm believer in "If it ain't broke, don't fix it." .....	0	1	2	3	4
18. *Goes beyond self-interest for the good of the group.....	0	1	2	3	4
19. *Treats me as an individual rather than just as a member of a group .....	0	1	2	3	4
20. Demonstrates that problems must become chronic before taking action.....	0	1	2	3	4
21. *Acts in ways that builds my respect .....	0	1	2	3	4
22. Concentrates his/her full attention on dealing with mistakes, complaints, and failures .....	0	1	2	3	4
23. *Considers the moral and ethical consequences of decisions .....	0	1	2	3	4
24. Keeps track of all mistakes.....	0	1	2	3	4
25. *Displays a sense of power and confidence .....	0	1	2	3	4
26. *Articulates a compelling vision of the future.....	0	1	2	3	4
27. Directs my attention toward failures to meet standards .....	0	1	2	3	4
28. Avoids making decisions .....	0	1	2	3	4
29. *Considers me as having different needs, abilities, and aspirations from others .....	0	1	2	3	4
30. *Gets me to look at problems from many different angles .....	0	1	2	3	4
31. *Helps me to develop my strengths.....	0	1	2	3	4
32. *Suggests new ways of looking at how to complete assignments.....	0	1	2	3	4
33. Delays responding to urgent questions .....	0	1	2	3	4
34. *Emphasizes the importance of having a collective sense of mission .....	0	1	2	3	4
35. Expresses satisfaction when I meet expectations .....	0	1	2	3	4
36. *Expresses confidence that goals will be achieved .....	0	1	2	3	4
37. Is effective in meeting my job-related needs .....	0	1	2	3	4
38. Uses methods of leadership that are satisfying.....	0	1	2	3	4
39. Gets me to do more than I expected to do .....	0	1	2	3	4
40. Is effective in representing me to higher authority.....	0	1	2	3	4
41. Works with me in a satisfactory way .....	0	1	2	3	4
42. Heightens my desire to succeed .....	0	1	2	3	4

- 43. Is effective in meeting organizational requirements ..... 0 1 2 3 4
- 44. Increases my willingness to try harder ..... 0 1 2 3 4
- 45. Leads a group that is effective ..... 0 1 2 3 4

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Appendix 5: Permission for using the Multifactor Leadership Questionnaire (MLQ 5x)

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To whom it may concern,

This letter is to grant permission for the above named person to use the following copyright material for his/her research:

Instrument: *Multifactor Leadership Questionnaire*

Authors: *Bruce Avolio and Bernard Bass*

Copyright: *1995 by Bruce Avolio and Bernard Bass*

Five sample items from this instrument may be reproduced for inclusion in a proposal, thesis, or dissertation.

The entire instrument may not be included or reproduced at any time in any published material.

Sincerely,  
Robert Most  
Mind Garden, Inc.

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## Appendix 6: Leadership Measuring Instruments

	Authors	Description	Structure	Reliability & Validity	Access
<b>Multifactor Leadership Questionnaire (MLQ)</b>	Bruce J. Avolio & Bernard M. Bass	<ul style="list-style-type: none"> <li>Evaluates three different leadership styles: Transformational, Transactional, and Passive-Avoidant.</li> <li>Measures how respondents perceive themselves with regard to specific leadership behaviors (using the Leader/Self form)</li> <li>Was designed with the 360-degree feedback method.</li> </ul>	45 items in the MLQ 5x-Short (the current, classic version) using a 5-point behavioral scale (“Not at all” to “Frequently if not always”)	<ul style="list-style-type: none"> <li>well-established instrument, extensively researched and validated</li> <li>strong evidence for validity</li> <li>Construct validity thoroughly explained with factor analyses which resulted in a six-factor model</li> <li>A study conducted by Antonakis, supported the nine-factor leadership model and its stability in homogeneous situations.</li> <li>Reliability ranged from moderate to good.</li> </ul>	<ul style="list-style-type: none"> <li><a href="http://www.mindgarden.com/16-multifactor-leadership-questionnaire">http://www.mindgarden.com/16-multifactor-leadership-questionnaire</a></li> </ul>
<b>Leader Attributes Inventory (LAI)</b>	Moss, J., Jr., & Liang, T	<ul style="list-style-type: none"> <li>Measures the degree to which individuals possess each of 37 attributes (characteristics, knowledge, skills, and values possessed by individuals) that predispose successful leadership performance as a leader in vocational education.</li> <li>Can be used for an assessment of leader attributes at a point in time, to measure change in leader attributes over time, or to evaluate the impact of leadership development programs.</li> </ul>	<ul style="list-style-type: none"> <li>a Self-Rating Form and an Observer-Rating Form</li> <li>Each item is a positive statement of a different attribute accompanied by a 6-point response scale ranging from 1 (very undescriptive) to 6 (very descriptive)</li> </ul>	<ul style="list-style-type: none"> <li>Satisfactory reliability, evidence of test-retest reliability, internal consistency, and interrater reliability (Liang, 1990; Moss, Johansen, &amp; Preskill, 1991; Moss, Lambrecht, &amp; Jensrud, 1994).</li> <li>Face and content validity (Finch, Gregson, &amp; Faulkner, 1991; Moss, et al., 1992).</li> <li>High construct validity</li> </ul>	<ul style="list-style-type: none"> <li><a href="http://eric.ed.gov/?id=ED37433">http://eric.ed.gov/?id=ED37433</a></li> </ul>

	Authors	Description	Structure	Reliability & Validity	Access
Leader Competency Inventory (LCI)	Stephen D. Kelner, 1993	<ul style="list-style-type: none"> <li>A method for measuring an individual's use of four specific dimensions of leadership – information seeking, conceptual thinking, strategic orientation, and service orientation.</li> </ul>	<ul style="list-style-type: none"> <li>46 items in which participants state the degree to which they have demonstrated or seen various behaviors</li> </ul>	N/A	<ul style="list-style-type: none"> <li><a href="http://www.creativorgdesign.com/tests_page.php?id=124">http://www.creativorgdesign.com/tests_page.php?id=124</a></li> </ul>
Leadership Practices Inventory (LPI)	James M. Kouzes & Barry Z. Posner	<ul style="list-style-type: none"> <li>Measures the 5 Practices of Exemplary Leadership</li> <li>Leaders complete the Self, rating themselves on the frequency with which they think they engage in each of the thirty behaviors. Five to ten other people—typically selected by the leaders—complete the Observer questionnaire, rating the leaders on the frequency with which they think they engage in each behavior.</li> </ul>	<ul style="list-style-type: none"> <li>30 item questionnaire containing five subscales</li> <li>Each subscale contains six questions, with a 10-point Likert response scale</li> </ul>	<ul style="list-style-type: none"> <li>Reliability: Items in the LPI are highly correlated within each scale and test-retest reliability is high. Internal reliability, as measured by Cronbach's Alpha, is strong, with all scales above the .75 level.</li> <li>Validity: Scores on the LPI relate significantly to other measures of leadership.</li> </ul>	<ul style="list-style-type: none"> <li><a href="http://www.leadershipchallenge.com/home.aspx">http://www.leadershipchallenge.com/home.aspx</a></li> <li><a href="http://eu.wiley.com/WileyCDA/Section/index.html">http://eu.wiley.com/WileyCDA/Section/index.html</a></li> <li><a href="http://www.leadershipchallenge.com/professionals-section-lpi.aspx">http://www.leadershipchallenge.com/professionals-section-lpi.aspx</a></li> </ul>
Leadership Skills Inventory (LSI)	Terry D. Anderson, 1999	<ul style="list-style-type: none"> <li>designed primarily for leaders, letting them assess their own abilities in relation to a leadership model created by the author</li> <li>Anderson's model is based off of five dimensions: Self-Management Skills, Interpersonal Communication Skills, Consulting Skills for Developing Groups and Organizations, and Versatility Skills.</li> </ul>	<ul style="list-style-type: none"> <li>56-item self-assessment using a 10 point scale.</li> <li>Response range from "this skill is new to me" to "I can perform the skill well. I can teach others, too."</li> </ul>	N/A	<ul style="list-style-type: none"> <li><a href="http://www.crgleader.com/home">http://www.crgleader.com/home</a></li> </ul>

	Authors	Description	Structure	Reliability & Validity	Access
Leadership Skills Inventory – Karnes (LSI – Karnes)	Frances A. Karnes & Jane C. Chauvin, 1985.	<ul style="list-style-type: none"> <li>Measures an individual's abilities in the area of leadership.</li> <li>Nine domains are used in the LSI assessing strengths and weaknesses related to leadership.</li> </ul>	<ul style="list-style-type: none"> <li>Participants are asked to answer a series of competency statement and then several items using 4-point scale (“Almost Always” to “Almost Never”).</li> </ul>	<ul style="list-style-type: none"> <li>Karnes's test manual data for validity could be more extensive to support that the Leadership Skills Inventory does measure leadership skills</li> <li>Scores for reliability are moderate to good. The internal reliability and split-half coefficients were mostly at 0.80 and above. Over a specified time period of 4 weeks, the test-retest reliability showed up as 0.49 and under in one of the samples.</li> <li>construct and concurrent validity was also absent</li> </ul>	N/A
Leadership Skills Profile (LSP)	Douglas N. Jackson, 2003	<ul style="list-style-type: none"> <li>Identifies which individuals have the best leadership qualities.</li> <li>Each organization can use this model due to the customizable format for their specific interest.</li> </ul>	<ul style="list-style-type: none"> <li>352 items using a 5-point scale (“Strongly Disagree” to “Strongly Disagree”)</li> </ul>	<ul style="list-style-type: none"> <li>There is no reliability or validity for the 360-degree feedback instrument provided in the LSI</li> </ul>	<ul style="list-style-type: none"> <li><a href="http://www.sigmaassessmentsystems.com/assessments/leadership-skills-profile-selection/">http://www.sigmaassessmentsystems.com/assessments/leadership-skills-profile-selection/</a></li> </ul>
Toxic Leadership Scale (TLS)	Andrew Alexander Schmidt	<ul style="list-style-type: none"> <li>Developed to better study behaviors that make effective leaders</li> <li>scale can be used with both qualitative and quantitative methodologies and is different from other leadership constructs or scales in that it can significantly predict employee outcomes such as job satisfaction and satisfaction with the supervisor</li> </ul>	<ul style="list-style-type: none"> <li>157 items composing five scales measured on different scales scores</li> </ul>	<ul style="list-style-type: none"> <li>This instrument is reliable, each of the five scales has high reliability (Abusive Supervision: <math>\alpha=0.93</math>, Authoritarian Leadership: <math>\alpha=0.89</math>, Narcissism: <math>\alpha=0.88</math>, Self-Promotion: <math>\alpha=0.91</math>, Unpredictable Leadership: <math>\alpha=0.92</math>).</li> </ul>	<ul style="list-style-type: none"> <li><a href="http://drum.lib.umd.edu/bitstream/handle/1903/8176/umi-umd-5358.pdf;jsessionid=E94BC25E7ECBF5B6997F4C42031EF132?sequence=1">http://drum.lib.umd.edu/bitstream/handle/1903/8176/umi-umd-5358.pdf;jsessionid=E94BC25E7ECBF5B6997F4C42031EF132?sequence=1</a></li> </ul>

Sources: the Statistics Solutions Consultancy (<http://www.statisticssolutions.com/leadership/>)



Appendix 7: Patient Safety Composite Reliability

<b>Patient Safety Composite</b>	<b>Reliability Coefficient (<math>\alpha</math>)</b>
<b>1. Communication openness</b>	.73
<b>2. Feedback &amp; communication about error</b>	.78
<b>3. Frequency of event reporting</b>	.85
<b>4. Handoffs &amp; transitions</b>	.81
<b>5. Management support for patient safety</b>	.79
<b>6. Non-punitive response to error</b>	.78
<b>7. Organizational learning--Continuous improvement</b>	.71
<b>8. Overall perceptions of patient safety</b>	.74
<b>9. Staffing</b>	.62
<b>10. Supervisor/Manager expectations &amp; actions promoting patient safety</b>	.79
<b>11. Teamwork across units</b>	.79
<b>12. Teamwork within units</b>	.83

Appendix 8. Cronbach's  $\alpha$  for dimensions of the Hospital survey on patient safety culture in China

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<b>Dimension</b>	<b>Reliability Coefficient (<math>\alpha</math>)</b>
<b>1. Teamwork Within Units</b>	.72
<b>2. Supervisor/Manager Expectations &amp; Actions Promoting Patient Safety</b>	.51
<b>3. Organizational Learning – Continuous Improvement</b>	.74
<b>4. Management Support for Patient Safety</b>	.67
<b>5. Overall Perceptions of Patient Safety</b>	.64
<b>6. Feedback &amp; Communication About Error</b>	.64
<b>7. Communication Openness</b>	.47
<b>8. Non-punitive Response to Errors</b>	.75
<b>9. Teamwork Across Units</b>	.63
<b>10. Staffing</b>	.63

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Appendix 9: Internal Consistency Statistics

<b>Composite</b>	<b>Items</b>	<b>Cronbach's alpha</b>
<b>1. Teamwork within units</b>	4	.73
<b>2. Supervisor/Manager expectations &amp; actions promoting patient safety</b>	4	.72
<b>3. Management support for patient safety</b>	3	.77
<b>4. Organizational learning – continuous improvement</b>	3	.71
<b>5. Overall patient-safety perceptions</b>	4	.62
<b>6. Feedback and communication about error</b>	3	.76
<b>7. Communication openness</b>	3	.67
<b>8. Frequency of events reported</b>	3	.90
<b>9. Teamwork across units</b>	4	.69
<b>10. Staffing</b>	4	.48
<b>11. Handoffs and transitions</b>	4	.71
<b>12. Non-punitive response to errors</b>	3	.57
<b>Entire scale</b>	<b>42</b>	<b>.91</b>

*Source: The hospital survey on patient safety culture in Portuguese hospitals: Instrument validity and reliability*

Appendix 10. Descriptive Statistics and Reliability Scores for MLQ 5X (Total Sample: N=2154)

<b>Scale</b>	<b>Mean</b>	<b>SD</b>	<b>Reliability Coefficient (<math>\alpha</math>)</b>
<b>Idealized Influence (Attributed)</b>	2.56	.84	.86
<b>Idealized Influence (Behavior)</b>	2.64	.85	.87
<b>Inspirational Motivation</b>	2.64	.87	.91
<b>Intellectual Stimulation</b>	2.51	.86	.90
<b>Individual Consideration</b>	2.66	.93	.90
<b>Contingent Reward</b>	2.20	.89	.87
<b>Management by Exception (Active)</b>	1.75	.77	.74
<b>Management by Exception (Passive)</b>	1.11	.82	.82
<b>Laissez Faire</b>	.89	.74	.83

*Source: An Investigation of Bass' Leadership Theory on Organizational Performance of Small and Medium Enterprises in Trinidad and Tobago*



## Participants CONSENT FORM: INTERVIEWS

Title of Project: The relationship between Safety Culture, Nursing Leadership and Medications administration errors (by nurses) in a Saudi Arabian Context

Name of Researchers: Bader Awadh Alrasheadi

Please  
initial  
box

1. I confirm that I have read the information sheet dated ...../...../..... for the above project. 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 or my legal rights being affected.

3. I understand that that quotes from the interview (that do not identify me) may be used in the Presentation of results

4. I agree to my interview being audio recorded.

5. I agree to take part in the above study.

Name of Participant

Date

Signature

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Name of Person

Date

Signature

taking consent

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## Appendix 12: Interview Guide

### **Nurses interview guide**

1. At the beginning the nurses will be given the consent for and will be told that the interview will be audio recorded
2. Then the demographic data: education, gender, age, years of experience will be taken
3. The interview:  
The nurses will be asked about 10- 12 questions covering;
  - i. General questions related to safety culture in the hospitals
  - ii. Their perception about the safety culture in their wards
  - iii. What role do the nursing leadership plays in the process of promoting safety culture in this hospital
  - iv. Which factors do nurses consider to promote the safety culture in medical surgical wards
  - v. To assess the leadership in term of managing the overall nurses tasks within the hospital
  - vi. Other questions relevant to nursing leadership
4. There are some issues emerged from the questionnaire section, which are of concern and they are need to be raised during the interviews, these:
  - i. Reporting of the events during 12 months as half of the nurses have not reported an event during this period
  - ii. The working hours are too long and that might make the nurses tired and exhausted
  - iii. Un safe practices within the wards
  - iv. The democratic leadership culture in the hospitals

## **Managers interview guide**

1. At the beginning the managers will be given the consent form and will be told that the interview will be audio recorded
2. Then the demographic data: education, gender, age, years of experience will be taken
3. The interview:  
The managers will be asked about 12 questions covering;
  - vii. General questions related to safety culture in the hospitals
  - viii. Their perception about their safety culture in medical surgical wards
  - ix. What role do the nursing managers play in the process of promoting safety culture in this hospital
  - x. Which factors do managers consider to promote the safety culture in the medical surgical wards
  - xi. To assess the leadership in term of managing the overall nurses tasks within the hospital
  - xii. Other questions relevant to nursing leadership and promotion the quality of healthcare
4. There are some issues emerged from the questionnaire section, which are of concern and they are need to be raised during the interviews, these:
  - v. Reporting of the events during 12 months as half of the nurses have not reported an event during this period
  - vi. The working hours are too long and that might make the nurses tired and exhausted
  - vii. Un safe practices within the wards
  - viii. The democratic leadership culture in the hospitals

Appendix 13: STEMH Ethics Committee at University of Central Lancashire (UCLan)  
Approval



1<sup>st</sup> May 2015

Bader Awadh A Alrasheadi/Lyvonne Nicole Tume  
School of Health  
University of Central Lancashire

Dear Bader/Lyvonne,

**Re: STEMH Ethics Committee Application**

**Unique reference Number: STEMH 333**

The STEMH ethics committee has granted approval of your proposal application 'The Relationship between Safety Culture, Nursing Leadership and Medications administration errors (by nurses) in a Saudi Arabian Context'. Approval is granted up to the end of project date\* or for 5 years from the date of this letter, whichever is the longer. It is your responsibility to ensure that

- the project is carried out in line with the information provided in the forms you have submitted
- you regularly re-consider the ethical issues that may be raised in generating and analysing your data
- any proposed amendments/changes to the project are raised with, and approved, by Committee
- you notify roffice@uclan.ac.uk if the end date changes or the project does not start
- serious adverse events that occur from the project are reported to Committee
- a closure report is submitted to complete the ethics governance procedures (Existing paperwork can be used for this purposes e.g. funder's end of grant report; abstract for student award or NRES final report. If none of these are available use e-Ethics Closure Report Proforma).

Please also note that it is the responsibility of the applicant to ensure that the ethics committee that has already approved this application is either run under the auspices of the National Research Ethics Service or is a fully constituted ethics committee, including at least one member independent of the organisation or professional group.

Yours sincerely,

Paola Dey

Deputy Vice Chair

**STEMH Ethics Committee**

\* for research degree students this will be the final lapse date

*NB - Ethical approval is contingent on any health and safety checklists having been completed, and necessary approvals as a result of gained.*



Appendix 14: Qassim Regional ethics committee Approval

KINGDOM OF SAUDI ARABIA  
MINISTRY OF HEALTH  
GENERAL DIRECTORATE OF HEALTH AFFAIRS  
AL-QASSIM REGION



المملكة العربية السعودية  
وزارة الصحة  
(٢٧٥)  
المديرية العامة للشؤون الصحية بمنطقة القصيم  
(٤٠٠)

المشروعات : ١٤٣٦/٧/١٧ التاريخ : ٢٠/٤٤/١٥٢ الرقم :

الموضوع :

Monday , April 6 , 2015

المحترم  
To : Mr. Bader Awadh Alrasheadi (principle investigator)  
(PhD student, University of Central Lancashire-UK)  
Supervisor : Dr. Dr L Tume (University of Central Lancashire-UK)  
From : Regional Research Ethics Committee  
Registered in National Committee of Bio. & Med. Ethics  
Registration # (H-04-Q-001)

**Research title: The Relationship between Safety Culture, Nursing Leadership and Medications Errors (by nurses) in a Saudi Arabian Context**

Dear/ P.I

Thank you for submitting your research project to MERC for approval. we appreciate your efforts to meet the criteria requested by Qassim Regional Ethics Committee.

- **Decision: APPROVAL**
- **Revision type: Regular**
- **Study design: Mix Method study**

**Your research proposal is APPROVED by the Qassim Regional Research Ethics Committee**

- You can start your research proceedings at your convenience.
- Also, you shall be responsible for preserving nurses information & confidentiality.
- In case of exceeding the project ceiled time, a new approval is needed.
- A written approval from KFH-Buraidha, MCH-Buraidha, King Suad Hospital, Unaizah and Al Bukairiah General Hospital Directors has to be granted by the study PI before any field work to be done.
- Kindly be aware that this approval embraces no financial (or other) obligations or responsibilities from the side of the Saudi Ministry of Health and all it is health facilities.
- Please, send us copy of the final draft.

**For any questions or enquiries ,please call Dr. Amel A. Suliman at telephone # (016)3231874 ext.111 (Email: qassim\_ethicom@yahoo.com).**

١٤٣٦/٧/١٧

Best regards,,,,,

**Chairman , Regional Research Ethics Committee Al Qassim Province  
Dr. Omer Abdul Aziz Al Yahia**

www.qh.gov.sa

بريدة - ص.ب. : ٢٢٩٥ هاتف : ٠١٦٢٢٣١٧١٨ - ٠١٦٢٢٣٥٥٠٦ - تليكس : ٣٠١٢٩٩ فاكس : ٠١٦٢٢٣١١٥٨

## Appendix 15: Participant Information Sheet

### **Participant Information Sheet – AHRQ Questionnaire**

You are being invited to participate in a study the first part of this is to measure the safety culture from the perspective of a group of nurses working in adult medical-surgical wards in 4 hospitals in the Qassim region hospitals. This is done by an anonymous survey.

#### **The purpose of the study**

The project forms part of a PhD degree at the University of Central Lancashire of Mr Bader Awadh Alrasheadi

#### **Why I have been invited**

You have been chosen because you work on an adult medical surgical ward in one of the 4 hospitals in the Qassim region.

#### **Do I have to take part?**

No, taking part in the project is entirely voluntary and you can withdraw at any time without giving a reason.

#### **What will happen to me if I take part?**

The anonymous survey will consist of 9 sections (53 QUESTIONS). It will take around 10 - 15 minutes to complete. No personal information will be recorded and you will not be identifiable.

#### **What are possible disadvantages and risk of taking part?**

There is no risk or disadvantage involved in the survey except the time it takes you to complete the survey.

#### **What are the possible benefits of taking part?**

There are no direct benefits to you however your participation will help investigate the relationship between safety culture, nursing leadership and medication administration error in a Saudi Arabian context. We hope this will lead to improvements in the future.

#### **What if there is a problem ?**

Concerns should be addressed to either Dr Lyvonne Tume the student's academic supervisor or to the University Officer for Ethics at [OfficerForEthics@uclan.ac.uk](mailto:OfficerForEthics@uclan.ac.uk). Information provided should include the study name or description (so that it can be identified).

#### **Will my taking part in the project be kept confidential?**

Your answers will be anonymous and no personal data will be recorded. The completed questionnaire will be stored in accordance with the University data protection and governance

regulations. Data Protection Act 1998 principles will be followed data will be kept for the duration of the project and then be destroyed.

**What will happen to the results of the research project?**

The data will be analyzed and used in the first part (MPhil) of the student's PhD project.

**Who is organizing the project?**

The project is part of Mr Bader Awadh Alrasheadi PhD studies at the University of Central Lancashire, Preston, England.

**Further information and contact details:**

Researcher contact details:

Bader Awadh Alrasheadi

Address: University of Central Lancashire

Tel: +966555135937 , +447466397165

E-mail:baaalrasheadi@uclan.ac.uk

Researcher supervisor:

Dr Lyvonne Tume

Intume@uclan.ac.uk

University of Central Lancashire

Preston,

Lancashire,UK

PR1 2HE

**Participant Information Sheet – MLQ Questionnaire**

You are being invited to participate in a study the second part of this is to measure the perceived nursing leadership culture of nurses working in adult medical-surgical wards in 4 hospitals in the Qassim region hospitals. This is done by an anonymous survey.

**The purpose of the study:**

The project forms part of a PhD degree at the University of Central Lancashire of Mr Bader Awadh Alrasheadi.

**Why I have been invited?**

You have been chosen because you work on an adult medical surgical ward in one of the 4 hospitals in the Qassim region.

**Do I have to take part?**

No, taking part in the project is entirely voluntary and you can withdraw at any time without giving a reason.

**What will happen to me if I take part?**

The anonymous survey will consist of two questionnaires (Leader form 45descriptivestements and Rater form 45descriptivestements). It will take around 15 -20 minutes to complete. No personal information will be recorded and you will not be identifiable.

**What are possible disadvantages and risk of taking part?**

There is no risk or disadvantage involved in the survey except the time it takes you to complete the survey.

**What are the possible benefits of taking part?**

There are no direct benefits to you, however your participation will help investigate the relationship between safety culture, nursing leadership and medications administration error in a Saudi Arabian context. We hope this will lead to improvements in the future.

**What if there is a problem?**

Concerns should be addressed to either Dr Lyvonne Tume the student's academic supervisor or to the University Officer for Ethics at [OfficerForEthics@uclan.ac.uk](mailto:OfficerForEthics@uclan.ac.uk). Information provided should include the study name or description (so that it can be identified).

**Will my taking part in the project be kept confidential?**

Your answers will be anonymous and no personal data will be recorded. The completed questionnaire will be stored in accordance with the University data protection and governance regulations. Data Protection Act 1998 principles will be followed data will be kept for the duration of the project and then be destroyed.

**What will happen to the results of the research project?**

The data will be analyzed and used in the student's PhD project.

### **Who is organizing the project?**

The project is part of Mr Bader Awadh Alrasheadi PhD studies at the University of Central Lancashire, Preston, England.

### **Further information and contact details:**

Researcher contact details:

Bader Awadh Alrasheadi

Address: University of Central Lancashire

Tel: +966555135937, +447466397165

E-mail:[baaalarasheadi@uclan.ac.uk](mailto:baaalarasheadi@uclan.ac.uk)

Researcher supervisor:

Dr Lyvonne Tume

[ltume@uclan.ac.uk](mailto:ltume@uclan.ac.uk)

University of Central Lancashire

Preston,

Lancashire,UK

PR1 2HE

### **Participant Information Sheet: Interviews**

**Study Title:** The relationship between Safety Culture, Nursing Leadership and Medications administration errors (by nurses) in a Saudi Arabian Context.

I would like to invite you to take part in an interview in relation to nursing leadership and how this affects safety culture and medication errors in this area of Saudi Arabia.

The project is a part of the PhD degree of Mr. Bader Awadh Alrasheadi from the University of Central Lancashire.

### **Why I have been invited?**

You have been invited because you are a nurse or nurse manager working on one of the adult medical surgical wards in the 4 hospitals in this region.

**Do I have to take part?**

No, taking part in the study is entirely voluntary and you can withdraw at any time without giving a reason. ,

**What will happen to me if I take part?**

An interview will be arranged at a time convenient to you with Mr. Bader Awadh Alrasheadi within the hospital setting. The interview should take no more than around 30 minutes and will ask your thoughts about nursing leadership, safety culture and medication errors. There are no right or wrong answers it is your views we are interested in. With your permission the interview will be audio recorded and then transcribed (written out on paper) with any identifying features (ward names or anything else removed). You will not be identified from the interviews, but we will ask information about how long you have worked in the ward, how long you have been a nurse and your age.

**What are possible disadvantages and risk of taking part?**

There are no risks involved in the interview, except the disadvantage of your time.

**What are the possible benefits of taking part?**

There are no direct benefits to you however the participation will investigate the relationship between safety culture, nursing leadership and medication administration errors (by nurses) in a Saudi Arabian context and we hope this will help improve practice in the future.

**What if there is a problem?**

Concerns should be addressed to either Dr Lyvonne Tume the student's academic supervisor or to the University Officer for Ethics at [OfficerForEthics@uclan.ac.uk](mailto:OfficerForEthics@uclan.ac.uk). Information provided should include the study name or description (so that it can be identified).

**Will my taking part in the project be kept confidential?**

Your participation in the study will be confidential. Any personal data will be confidential in accordance with University of Central Lancashire data protection regulations and policies. All data will be stored in accordance with the University data protection and governance regulations. Data Protection Act 1998 principles will be followed data will be kept for the duration of the project and then be destroyed. All participant details and geographical locations (wards) will be coded and anonymised. The only exception to breaking

confidentiality would be if you disclosed a previously unreported crime or error that caused harm or unprofessional conduct that would need to be reported to their your supervisors.

**What will happen if I don't carry on with the project?**

Up until your interview has been transcribed and the audio file deleted you can withdraw and we will delete your interview and any data pertaining to you. After this the data will be anonymised and your data will not be able to be withdrawn. If, at any point in the interview you do not wish to carry on, please advise the researcher and the interview can be stopped.

**What will happen to the results of the research project?**

The results of the interviews will be combined in the student's larger PhD project with questionnaire data and will be written up for his thesis and for publication and presentation at conferences. Direct quotes may be used with your permission but would not be identifiable to you or the ward or the hospital. The hospitals will also receive anonymous reports of the findings.

**Who is organizing the project?**

This is Mr Bader Awadh Alrasheadi's PhD project being undertaken at the University of Central Lancashire, Preston, England, UK.

**Further information and contact details:**

Student contact details:

Name: Bader Awadh Alrasheadi

Address: University of Central Lancashire

Tel: +966555135937, +447466397165

E-mail: [baaalarasheadi@uclan.ac.uk](mailto:baaalarasheadi@uclan.ac.uk)

Research supervisor contact:

Dr Lyvonne Tume

[ltume@uclan.ac.uk](mailto:ltume@uclan.ac.uk)

University of Central Lancashire

Preston,  
Lancashire, UK  
PR1 2HE

Appendix 16: Audit Incident Reporting Data

Analysis Category		Hospital F		Hospital S	
		1436 (2014- 2015)	1437 (2015- 2016)	1436 (2014- 2015)	1437 (2015- 2016)
Source of Medication Error	Physician	979	699		
	Pharmacist	101	54		
	Nurses	7	4		
Reported by	Physician				
	Pharmacist	1079	746	1378	1054
	Nurses	8	11	75	81
Type of Error	Wrong Route of Admin	79	38		
	Improper Dose	212	148		
	wrong drug preparation	25	5		
	Wrong dosage Form	118	82		
	Wrong Frequency	382	287		
	wrong medication ordered	70	41		
	Wrong Duration	122	54		
	Therapeutic Duplication	36	39		
	Missed Med. Protocol	1	2		
	Medication Given without Documentation	3	2		
	Dose Duplication	1	1		
	Dose Omission	2	3		
	Wrong Patient	7	1		
	Wrong Strength	2	3		
	No Physician Order For Medication	4	1		
	Frequency Duplication	6			
	Order of Contraindicated Medication	3	1		
	Wrong Rate	12	7		
	Order of Resistant Antibiotic	2	5		
	HAM indicator		50		



<b>Outcome of Error</b>	A Potential Risk*		1		
	B Near miss*	980	710		
	C*	106	46		
	D*	1			
<b>Stage Involved</b>	Prescribing	975	689	965	794
	Preparation	104	64	505	360
	Dispensing	104	39	65	82
	Administration	8	4	4	3
	Monitoring				
<b>Total Medication Error Reports</b>		<b>1087</b>	<b>757</b>	<b>1453</b>	<b>1135</b>



***STUDY: The relationship between Safety Culture,  
Nursing Leadership and Medications administration  
errors in a Saudi Arabian Context***

**Can you help?**

**I am exploring nurses' and nurse managers' perceptions of nursing leadership, safety culture and how these relate to medication errors in adult medical-surgical wards in the Qassim region.**

**If you are interested in taking part in a short interview which will be held in the hospital at a time convenient to you, please contact me using the details below. All interviews will be confidential.**

For more information please contact:

**Bader Awadh Alrasheadi PhD student, University of Central Lancashire**

**Phone:00966555135937**

**Email:baaalarasheadi@uclan.ac.uk**

## Appendix 18: Interviews transcript examples

### 1st Nursing Managers Interview Transcript

#### 1. Interview Information

Interviewer	Interviewee
<b>How many years nursing experience do you have?</b>	<i>My experience as a whole is around 20-25 years, because I worked in the hospital ER for 2 years, then I worked in the occupational health nurse in the company and I started in this hospital last December 2007 until today.</i>
<b>What nursing education do you have and where did you undertake this?</b>	<i>I've my postgraduate course in occupational health practitioner, that is my speciality, and I have my intensive care experience.</i>
<b>How old are you?</b>	<i>45</i>
<b>Gender</b>	<i>Male</i>
<b>Is this a medical or surgical ward?</b>	<i>Medical</i>

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#### 2. Interview Questions

Interviewer	Interviewee
<b>How safe do you think your hospital is?</b>	<i>I think it is not 100% safe. I grade this hospital as 80-90% safe.</i>
<b>Why do you say this?</b>	<i>Because according to our compliance monitoring for safety like the International Patient Safety rules, some of our IPSGs reach the paradox but some like the hand hygiene do not reach the target; maybe because we've new staff coming in and old staff going out of the hospital, so we need training orientation, so it takes time.</i>
<b>How safe is the hospital with regard to medication errors? Why do you say</b>	<i>I think our hospital is safe with regard to medication errors, because according to our monitoring our target is</i>

**this?** *only 5% errorness in the medication error in the hospital. For the reporting, it is less. But the reporting from the pharmacy like dispensing and prescribing it is more than 50%.*

**What role does nursing leadership (and ward managers) have in creating a positive safety culture at this hospital (your ward)?** *Maybe we can encourage our staff by positive education and educational trainings, follow-ups and monitoring*

**What things do you think promote a positive safety culture in your medical ward? Specifically around medication errors?** *From my own experience, I go a safe clinical as a management coordinator, I go to the wards to check how safe their practicing. So, from my observations and from my reporting, medication error is less in the ward but it comes to administration. I think the medication error occurs when the physician is prescribing.*

**To assess the leadership in terms of managing the overall nurses' tasks within the hospital, What is your perception of nursing leadership within this hospital?** *Supportive, because they are collaborating with us, from the top management until the lowest staff nurse. So, whenever we have an activity or a project they are supporting the project because we have explained to them what our purpose of the project is as long as they will understand the purpose of the project they are collaborating with us and supporting us emotionally and everything.*

### 3. Other questions

**Interviewer**

**Interviewee**

**In the last year, I asked the nursing staff in this hospital to complete a questionnaire regarding to measure safety culture and some issues emerged from the** *Maybe they were afraid. I think the hesitance is there. There are some mistakes, but they avoid to report because they were afraid of the consequences of reporting.*

**questionnaire! One of them was reporting of the events (errors) during 12 months as half of the nurses have not reported an event during this period, what do you think, why?**

**Do you think nurses feel comfortable in reporting medication errors a) of themselves and b) of their colleagues?** *Some of them are hesitated. On a scale of 1 to 10, it is 8; i.e., 80% are hesitated. For their colleagues, sometimes they report, but not 100% of them.*

**Why do you say this?** *They do not report as a medication error, they report as an incident because I receive so much occurrence by less reporting by all the reports for medication errors but for the reports of the pharmacy there are less medication errors reporting.*

**Why do you think they do not report?** *Because, I told you, they are hesitant and afraid, or sometimes they lack time because of their work.*

**What about the knowledge of reporting?** *They have the knowledge of reporting. They are all oriented during orientation; there is orientation for OVRs reporting and incidents reporting.*

**Do you think all medication errors are reported?** *No, not all medication errors are reported.*

**How do you think nurses feel if they report a medication error here?** *They are confident, some of them maybe like 40% are confident.*

**What happens to nurses if they report medication errors they have made?** *For the nurses who report medication errors, they are corrective in a non-tentative way, no punishment. They are just educative, so next time they do not do it again. Or if it is reported as medication error from another unit the pharmacy will make an action, not administrative action, like education. They will go to the unit and educate the nurse what to do next time.*

**How do nurses find out about any medication errors that have occurred on the ward?** *Actually, if there is a medication error happened in the ward, it is confidential. Nobody will know or ask. The one who will know only is the nurse who did the mistake and the chief of the department, the head nurse.*

**How do you think (if they do) that the nurses and ward 'learn' from medication errors?** *Education from the pharmacy.*

**Do you think nurses feel free to 'speak up' about medication errors?** *Maybe they can discuss in the ward, what was the mistake, what was the incident, but it is confidential that the name of the person is confidential, so maybe through learning the purpose. Sometimes they are free to speak but sometimes they are not confidential enough to inform the admins what she learned about the incident.*

## 1. Interview Information

Interviewer	Interviewee
<b>Thank you very much for agreeing to be interviewed for my study, are you happy for me to audio record the interview?</b>	Yes, my pleasure.
<b>It is just to help me remember what you have said, but once the interview is finished I transcribe it and then delete the tape. So just to reiterate everything you tell me is confidential and I am interested to hear your thoughts and views, there are no right or wrong answers. Have you got any questions before we start?</b>	No, thank you.
<b>How many years nursing experience do you have?</b>	12 years (7 in this hospital)
<b>What nursing education do you have and where did you undertake this?</b>	First I finished my diploma of nursing 2005 from El-Bkayeria Health Institute Saudi Arabia, then I took a 3 years Scholarship Bachelor degree from Australia, finally I won a Scholarship in Nursing Education UK Stanford University 2014
<b>How old are you?</b>	38
<b>Gender</b>	Male

Is this a medical or surgical *Medical*  
ward?

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## 2. Interview Questions

Interviewer	Interviewee
<b>How safe do you think your hospital is?</b>	<i>In general, my hospital is very good.</i>
<b>Why do you say this?</b>	<i>Because the hospital has passed the standards of the "Sabahi" test.</i>
<b>Can you give me any examples that relate to this?</b>	<i>Recently it became mandatory for all hospitals to go through a test called "Sabahi", which is Saudi accreditation and those who joined Commission International which evaluate all the hospital with regard to its policy, how the process is going, staff and what level of compliance they have to the hospital policy and patient care. This creates a good patient safety culture. Even though, there is still no compliance from some staff members to the policy.</i>
<b>How safe is the hospital with regard to medication errors? Why do you say this?</b>	<i>Actually we have policy, but the compliance to it is not as expected. In terms of reporting medication errors, not all staff have full compliance to medical issues.</i>
<b>How safe do you think your ward is?</b>	<i>My ward is not the best among other wards of the hospital.</i>
<b>Why do you say this?</b>	<i>Because medical wards have many patients and sometimes we have shortage in staff, which causes medication errors and as a result this affects the quality of care.</i>
<b>Can you give me any examples that relate to this?</b>	<i>As I mentioned, due to lack of staff sometimes we care for more than 5 to 6 patients and this affects</i>



*giving medication to patients on time. Sometimes, no staff are available for the double-checking of medication giving and we have to wait for staff to be available, which causes the delay in patient curing. So, double-checking is neglected most of the time.*

**How safe is the ward with regard to medication errors?** *Actually, as we passed “Sabahi” and TCI, we have complete policy. However, not all staff have 100% compliance to this policy.*

**Why do you say this?** *Because sometimes medication errors occur with no reporting.*

**You mentioned that the policy is complete after “Sabahi”, do you mean that there was no policy before “Sabahi”?** *Before “Sabahi”, there was a policy but not meeting the standards of MH. We have been passing “Sabahi” for more than 6 years.*

**What role does nursing leadership (and ward managers) have in creating a positive safety culture at this hospital (your ward)?** *Since the medication errors go through head nurses and nurse leaders, they know exactly what is happening and they try to create training programs to educate and encourage nurses to follow the policy and procedures, but the problems are from the quality or the pharmacy in sending the feedback.*

**Which factors do nurses consider to promote the safety culture in medical surgical wards?** *Compliance with the policy and training programs. But, it takes longer time for newly joined nurses in the ward to get the training programs.*

**What things do you think promote a positive safety culture in your medical ward? specifically around medication errors?** *Well-prepared training programs are really needed for the staff; i.e., workshops, plus the knowledge and theory on how to teach the staff how to treat, send, and report real fail, and how to fill the report, etc.*

**And do you have training programs related** *Not all the time. There are training programs for*

**to medication safety?** *how to fill reports and targeting any surrounding to avoid medication errors.*

**To assess the leadership in terms of managing the overall nurses' tasks within the hospital, What is your perception of nursing leadership within this hospital?** *In my opinion, not all nursing managers and leaders deserve the positions they hold.*

**Why do you say this?** *Because some of them hold leadership or nursing managing roles with only basic education and qualifications, while there are staff nurses with higher qualifications even from abroad i.e. Bachelor's and Master's degrees from different countries but holding non-leader roles. Like the old systems, this is because stakeholders and decision-makers give the positions to the staff who have been working for longer periods in the hospital. Of course, this is for only some nursing leaders and not all of them.*

**Can you give me any examples that relate to this?** *In my department, there is nurses holding diploma, I am doing my Master's and we have 12 nurses holding Bachelor's degree working as staff and they hold this positions for years. In some nursing departments in this hospital, the leaders even if they don't have the required qualifications they are supportive and they have the skills to support the nursing staff.*

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### **3. Other questions**

**Interviewer**

**Interviewee**

**In the last year, I asked the nursing staff in this hospital to complete a questionnaire** *From my experience, some staff are very frightened from being punished if they committed medication*

**regarding to measure safety culture and some issues emerged from the questionnaire! One of them was reporting of the events (errors) during 12 months as half of the nurses have not reported an event during this period, what do you think, why?**

**You've mentioned fear of punishment; however, as I read in the policy the person filling the report is unknown, how the leaders know who committed the error?**

*errors. Moreover, the reason could be lack of supervision to assure compliance to the policy and lack of deep training programs, specifically in how to avoid or report medication errors.*

*Because when a cure happens I have to fill the report, have to give it to the head nurse, and the head nurse give it to the nursing leader or manager, then go to medical directors. And minor events or errors usually are neglected and not reported. However, if these errors caused any harm to the patient, the medical director has to take action as it would be a big problem to the hospital if the patient is harmed. So an action should be taken to correct the error or to avoid it. Through this process, directors would ask about the person who committed the error.*

**Do you think nurses feel comfortable in reporting medication errors a) of themselves and b) of their colleagues?**

*I do not think that all nurses feel comfortable about reporting medication errors of their colleagues, they may feel comfortable about reporting medication errors of themselves.*

**Why do you say this?**

*For me, I feel comfortable reporting medication errors of myself as I have a different background, I study abroad. In our culture, reporting errors of others is not accepted.*

**Can you give me any examples?**

*My colleagues who study abroad accept if I report their medication errors. On the other hand, those who have diploma or low education or background wouldn't accept their colleagues to report their medication errors. In our culture, reporting errors*

*without telling the colleague who committed it is like creating a “touch” and he/she would not accept it.*

**Do you think all medication errors are reported here?** *I don't think so.*

**Why or why not?** *From what I observe here, minor medication errors occur but neglected and no one knows about them and even if they are reported no action is taken to correct them. When major medication errors occur, they are either neglected (and unreported), or if reported decision-makers take action by punishment, which causes stress on the staff and they feel afraid to report these errors.*

**How do you think nurses feel if they report a medication error here?** *Nurses think if they send a report of basic or small medication errors, they would not get a feedback or training programs specified for dealing with the reported issue.*

**Why do you say this?** *If the error is major and have significant impact on the patient, the nurse who made the error would go under investigation by leaders and their career is affected.*

**Can you give me any examples?** *I have sent many small medication error reports and got no feedback or training programs or statistics, no actions were taken. I have sent 5 reports last year.*

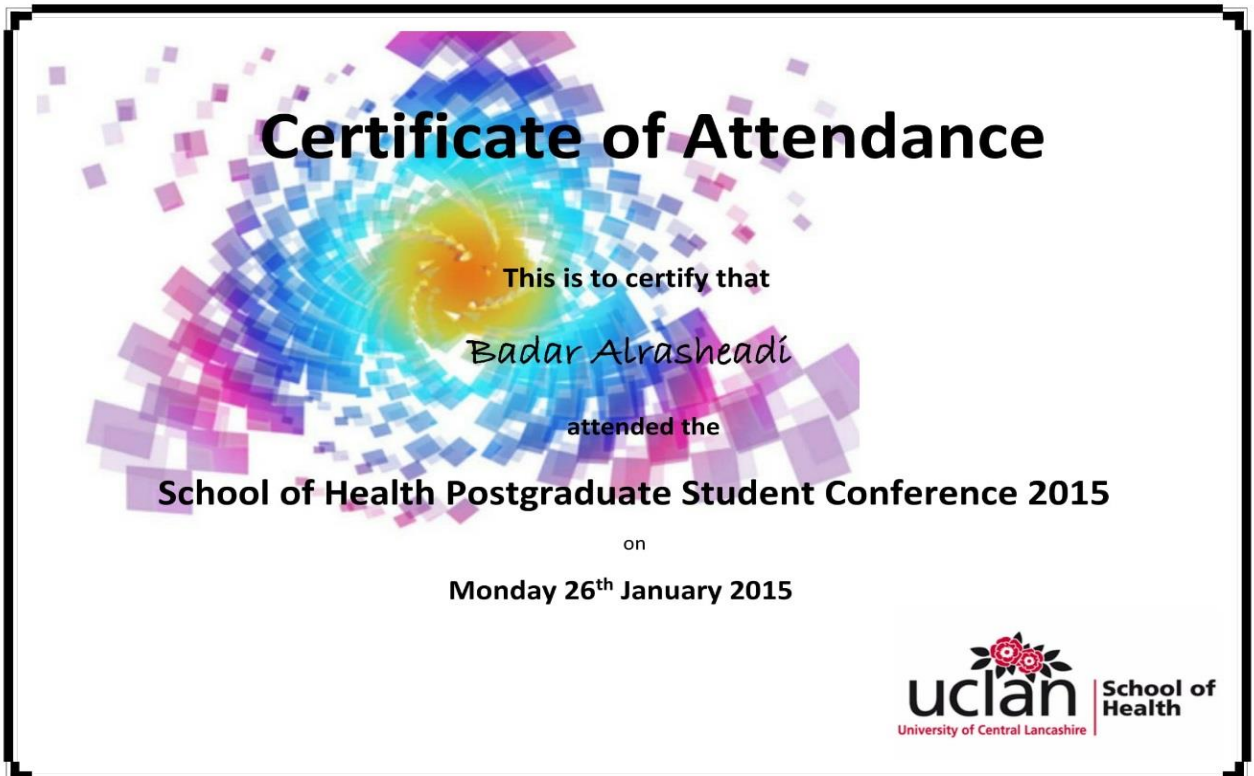
**How do nurses find out about any medication errors that have occurred on the ward?** *It's difficult to find out about all medication errors that occur in this department. Usually, small medication errors are neglected and no clear action is taken about it, but actions are taken for clear major errors affecting the patient even there is no specific statistics for this error.*

**How do you think (if they do) that the nurses and ward 'learn' from medication errors?** *When a medication error occurs and reported, it can be avoided next time. The nurse would know how to report it and expect the feedback.*

**Do you think nurses feel free to 'speak up' about medication errors?** *Actually, this issue is very sensitive and I don't think all nurses would feel free to speak up about medication errors, especially if the patient has been harmed and the error is not reported, the nurse would be investigated and consequently punished because they did not report it or no action was taken to treat it. It is not accepted to speak out about self-mistakes in our culture.*

## Appendix 19: Conferences Participant and Attendance





# HEALTH INSIGHTS

REGIONAL ONE DAY EVENTS

## CERTIFICATE OF ATTENDANCE

### THE WORKSHOP ADDRESSED THE FOLLOWING:

- Population health data
- Data science
- HIMSS Analytics
- Learning from a Global Digital Exemplar

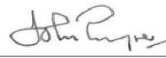
I certify that:

**Bader Alrasheadi**

Attended the **HEALTH INSIGHTS** workshop at:

Manchester Date: 06.06.2017

**John Rayner**



*Director of Professional Development*

Presented by:

**HIMSS** UK

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