Barriers Facing Nurses in Reporting Medication Administration Errors in Saudi Arabia

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Abstract The purpose of this study was to evaluate nurses’ perceptions and the barriers that decrease the likelihood of reporting a medical administration error. Medication administration errors are a significant problem within the healthcare community and may be underreported or not reported due to a variety of factors. These may include personal perceptions, fear, misunderstanding of what constitutes an error, whether the significance of the error changes the requirement that all errors should be reported, and apprehension of the consequences for reporting and handling the error. This study included a quantitative survey of nurses in the KSA region and asked questions relating to their fears, perceptions, potential barriers, perceived barriers, and beliefs regarding medication administration errors. As was found, nurses underreport errors and may not consistently understand that all errors, regardless of perceived significance, should be reported through the same channels as for all other errors. This study also found that nurses tend to lack honesty with regards to their beliefs about how they report their own medication administration errors in; leading to the assumption that nurses either do not understand the appropriate protocols for error reporting or do not believe they have committed errors when they have. Finally, this study has offered suggestions for changes to the error reporting framework to dispel misconceptions and ensure nurses understand that all errors need to be reported regardless of significance, perceptions, or related fears.

Keywords: barriers, medication administration errors, nursing, reporting, Saudi Arabia


1. Background and Overview

1.1. Introduction

Medical Administration Errors (MAEs) are occurrences of humans or are system transcription-related errors in which patients are administered incorrect dosages or incorrect medications, or in which they sustain surgical injuries, or MAEs occur when patient identity is mistaken in some form [1]. Other errors related to patient treatment can be less serious, but still result in an MAE and must be reported by the nurse within the system. Upwards of 65% of nurses have either experienced MAEs directly or have heard about MAEs from co-workers working on similar shifts [2]; however, most errors are never reported due to nurses’ fear of being reprimanded or fear of being judged due to incompetence [3]. As Alduais, Mogali, Al Shabrain, Enzazi, and Al-awad [4] explain, “the most common barriers preventing the staff from reporting the medical errors are fear of being blamed, fear of being punished, difficulty in filling the form, lack of knowledge of what should be reported, or the medical error reporting system is inadequate” (p. 72). Regardless of the reason, it is estimated that nearly 100,000 people die every year from MAEs that are never reported [4].

Further, in most cases, there is no established process for checking on and handling errors that do not also include blame on the individual [4,5]. Also, administrative staff do not generally check randomly for errors without causing additional problems among staff through suspicion [6,7]. An additional significant barrier to achieving error-reduction in healthcare systems, is the capacity for data collection on all types of medical administration errors [8]. Even though MAEs are a substantial problem for healthcare systems, MAEs remain either underreported, unreported, and/or untracked to help administrators and nurses identify where improvements to a system could be achieved to improve care [9,10]. And consistently, nurses are simply refusing to report MAEs [2].

Important to this study was the lack of research in the area of healthcare, safety, quality, and guidelines for reducing MAEs through more accessible error reporting processes. By region, Saudi Arabia is limited in its academic research as well [11]. Thus far, there is a lack of an established system geared towards error reporting, and there is a sizeable lack of research investigating and analysing the obstacles to MAE reporting among RNs in the KSA [12]. Secondly, when considering that patient safety and nursing practices are negatively affected as a result of medication errors, the study will motivate those who are responsible for developing policies and
procedures in the KSA to highlight and direct greater efforts towards ensuring MAE reporting amongst registered nurses.

Therefore, the context of this study was in Qassim, which is positioned in the KSA’s central region. In this area, there are 159 primary healthcare centres, 18 public hospitals and 5 private hospitals. Also, there are approximately 8,000 nurses tending to 2,700 beds [13]. The government of the KSA provides all citizens of the country with free healthcare services, as noted by Alkolibi [14], with the system categorised into a national healthcare system. Responsibility falls to the government to provide healthcare services through various private and public hospitals and primary healthcare centres (PHCs). The Saudi Ministry of Health (MoH) is recognised as the government agency afforded the responsibility of providing curative, rehabilitative, and preventative healthcare services.

1.2. Significance of the Study

There have been many academic studies on MAE reporting and nurse perceptions; however, there exists a gap in the literature in comparing the perceptions of nurses and perceived barriers to the reporting process. There is empirical evidence that nurses consistently refuse to report errors [6,15,16]; however, there is little in the literature to explain whether changes to a system would have an impact on nurse behaviours and feelings towards MAEs.

Aboshaiqah [11] explained that, of all the barriers to error reporting, “fear, disciplinary action, and punishment” (p. 130) were the most significant to nurses. In this, healthcare systems create a significant obstacle: principally by making the punishment for an error too serious in consequence for the error to be consistently reported, even by nurses who value their work and patients highly [17]. Reason [1] places additional criticism on healthcare system administration, noting that the entire purpose of error departments is to properly punish the individual involved, incite fear among other nurses and staff to ensure the error is not repeated, and mandate extensive or repetitive training for an incident that was potentially accidental and not negligent. This is an important distinction and has not been disproven in the available literature on this topic, making Reason [1] an important source on the barrier of punishment that nurses experience or perceive. Anderson, Kodate, Walters, and Dodds [7] cite the same; however, also note that the propensity to not report errors is generally accepted within departments because being punished or dealing with colleagues who have been punished is too difficult to manage with all of the other stressors in the day to day. This leads to the assumption that the system actually promotes the underreporting of medical administration errors.

Therefore, because medication errors adversely affect nursing practices, quality patient care, and patient safety, this study presented an important discussion in the field to determine why nurses are consistently underreporting MAEs. Further, this study explored systemic issues for the process of developing policies and procedures in Saudi Arabia to place a greater emphasis on the importance of nurses reporting MAEs.

1.3. Aims and Objectives of the Study

The primary aim of this study is to identify? Barrier elements within the Saudi Arabian healthcare system that make medication error reporting more difficult for nurses. The objectives are to examine whether improvement to these elements would change nurses’ perceptions and perceived barriers to error reporting. The study seeks to provide an understanding of MAE reporting practices amongst registered nurses, and determine reasons why nurses avoid reporting MAEs. Further, this study sought to contribute to developing organisational guidelines and medication administration policies to change the likelihood of nurses’ reporting MAEs. Finally, this study made the assumption that there are certain influencing factors at each stage of the error. This means that an occurrence management process can be used to track choices made by the nurse prior to the error, during the error, and following the error to determine whether the system for reporting the error increased the likelihood of the error’s occurrence.

1.4. Research Questions

This research hypothesizes that there are connections between demographic characteristics that link similar perceptions of error reporting by RNs in Saudi Arabia. The research questions have been formed based on the Almutary [18] study to determine whether nurses are more or less likely to report errors based on specific characteristics, perceptions, or fears. The research questions for this study included:

1. How accurately are medication administration errors reported by RNs in Saudi Arabia?
2. Are RNs working in Saudi Arabia aware of the importance of reporting medication administration errors?
3. If medication errors are not reported accurately, which factors affect the willingness of RNs to report medication administration errors in Saudi Arabia?
4. Is there a relationship between nurses’ demographic characteristics and their willingness to report medication administration errors in Saudi Arabia?

1.5. Summary

Chapter One has presented a brief overview of the background, rationale, significance, and aim of this study on perceptions and perceived barriers to nurses in regards to medical administration errors within the Saudi Arabian healthcare system. Due to the serious nature of MAEs, this study sought to identify why Saudi nurses, knowing the consequences for patients and the healthcare system, would fail to consistently report MAE occurrences. As the current literature contains a gap in the comparison between nurses’ perceived barriers and their likelihood of reporting MAEs both internationally and in Saudi Arabia, this study sought to fill the gap and, if possible,
demonstrate significance in certain barriers over others. Chapter Two reviews the available literature to examine current MAE reporting procedures in Saudi Arabia and factors most likely to contribute to inconsistent MAE reporting to determine the most impactful barriers for nurses.

2. Literature Review

2.1. Introduction

Throughout the course of patient care, medication errors can arise, whether during the prescribing, dispensing, administrating, or transcribing stage [19]. MAEs are acknowledged as a significant threat to patient safety, which results in a greater degree of mortality and morbidity [12]. In the view of Bower, Jackson, and Manning [20], medication administration errors encompass anything outside the prescribed or intended action for the patient as administered by the doctor, nurse, or nursing staff. This includes each stage of the medication administration process, from selection to administering the medication to the patient [20,21]. Alsulami, Conroy, and Choomara [15] believed that MAEs should include incomplete patient charting; and further, Shawahna et al. [22] added context to patient charting, meaning every question should be acknowledged during patient interviews. Shawahna et al. [22] also noted that proper behaviours should be followed, including any and all drug administration procedures, and any applicable dispensing and disposing instructions. As Bower, Jackson, and Manning [20] cited, the process is complex and time-consuming; which, in and of itself, can create moments for misuse, miscalculation, misreporting, and lead to incidents where nurses would prefer to avoid reporting the incident due to the immensity of the situation [21,24].

Further, error reporting is a fundamental practice in nursing; if this is not done, medication safety will not improve and system weaknesses will not be amended to reduce or altogether circumvent instances of medication error. This is because healthcare practitioners can learn from their mistakes and implement different practices. Within the system is a process for reporting in which a numerical value is given, which could provide valuable insight into the causes underpinning the medication errors and the processes that can be improved upon. Nonetheless, very few research efforts have been directed towards safety issues, such as that of MAE reporting, in the Saudi context. Accordingly, it is critical that the possible factors and issues potentially contributing to medication error reporting failure amongst nurses be identified and examined.

Error reporting and recording requires a sufficient and professional system, especially when seeking to encompass medication errors, with such a system providing consistent and accurate information relating to the reasons behind error occurrence, and further allowing changes to be made within the healthcare system so as to reduce such errors [8,10]. A system such as this is viewed as fundamental, not only in relation to patient safety but also for the organisation as a whole: essentially, the system enables the more proficient identification of errors and thus can facilitate prevention [25].

2.2. Reporting of Medication Administration Errors

When medication errors arise, it is common for nurses to be positioned at the frontline as they are responsible for administering most medication requests in hospitals [9,22]. From an ethical and professional perspective, nurses shouldering the responsibility for performing their job in the best interests of their patients and for protecting those in their care; such as through the safe administration of medications [26]. Accordingly, ensuring improved patient safety through fostering a culture that encourages the empowerment of nurses to identify, challenge, and report unsafe practices, including those relating to medication administration, is critical [27]. Notably, however, the KSA is lacking a countrywide benchmarking database for nursing quality indicators, including MAE reporting [28]. Furthermore, in regards to safety problems occurring from MAEs, data is lacking which highlights healthcare system deficiencies [12] and informs on the untouched area of research that is preventing, challenging, and reporting MAEs in the KSA. Further, in many healthcare systems in the KSA, the ease of error reporting makes the process too difficult for nurses to manage with all of their other duties during the day to day [21]. Not only can such issues cause health facility challenges in terms of implementing safety and quality standards in the KSA’s nursing practices [28], but unmanaged MAEs can exponentially reduce the overall quality of care available. Further, Asad et al. [21] noted that the entirety of the system is designed to make errors easier to create, and does not leave a lot of room for fixing them after they occur.

The difficulty in implementing a system-wide MAE reporting system is that the errors either come from the staff through negligence or accident, or the errors come from the system itself. Indeed, there are two common approaches to handling MAEs in a healthcare system: the person approach, or the system approach [1]. In the person approach, blame is placed directly on the individual involved in the medical error and “views these unsafe acts as arising primarily from aberrant mental processes such as forgetfulness, inattention, poor motivation, carelessness, negligence, and recklessness” ([1], p. 768). Other person errors tend to occur due to other errors, oversights, misunderstandings, or mishandling information due to any reasons encompassed by being an overburdened human working too many hours on an extra shift [20]. The system approach assumes that the nurses and administrators are trained well enough so that errors should never be intentional; however, errors can still occur when charts have been mishandled, when doctors give the wrong information, when patients give the wrong information, or when communication breaks down along the way between doctor, administrator, nurse, patient, and back up the line from patient to doctor [29].

Regardless of the reason or type of error, the reality is that errors are not being reported due to fear, perception of the seriousness of the mistake, perception of blame, and administrative rules. In a system where MAEs are consistently reported, barriers to reporting would not be a
concern; however, in a system limited by the barriers, the greater concern is realistically addressing the barriers. This means addressing the barriers directly; as though they are a separate element to the error reporting system. This will help ensure a better understanding of the barrier impact and the limitations created by the barriers. Once barrier impact is discovered and evaluated, then measures can be taken to address each barrier individually. It would become a systemic discovery and evaluation process in which barriers can be resolved or reduced. At the same time, the limitations created by the barriers can also be addressed. This would mean beginning an educational process among administrators, doctors, and nurses to help establish the value of error reporting for both patient safety and the overall quality of care provided in the hospital.

2.3. Types and Nature of Errors

Errors can encompass any aspect of patient care or charting. Errors can be seemingly insignificant to a nurse, critical mistakes made during patient care, or they can be exceptionally dangerous and cause immediate harm to a patient [16]. In any regard, the nature of errors is something highly discussed in the literature as numerous sources have attempted to understand what leads to more errors or why nurses consistently refuse to report those errors. Agreement has been made that fear, perception of punishment, and the role of administration in handling errors, discourage nurses from reporting errors [12,17]. However, what the literature cannot agree upon is the root cause of the barrier to medication error reporting and the framework to change the cause in a substantial manner [30,31].

Research by Reason [1] considers fear-based approaches, noting that people were more likely to commit errors when they react in fear-based situations. Errors like these may not be immediately apparent; but further, errors of this type may become systemic and repeated by the same individual over time [5,21]. This leads to the implication that human error is more substantial than believed; however, also implies that there must be consideration for the human element. Further, even in the best and most efficient systems, errors can occur due to the human element; which means that some errors can never be fully rectified, addressed, or handled in a way that would change the degree of human error responsible for accidental errors. Therefore, types and the nature of errors can be mild to extreme, depending purely on the context of the hospital and the individual’s current day-to-day stressors.

Additionally, errors can be caused by simple, unpredictable factors like monotony, competency, or simply miscommunication [32]. This can also include the variability of the day-to-day, the daily toil of caring for patients, and completing paperwork [32]; or, errors can be caused by nurses not fully understanding the technology required for entering patient information [6]. Over and over, the literature noted that time spent on the job, additional tasks added to an already busy day, too many conflicts among co-workers, additional stress from the home or work environment, and any number of other internal or external factors could drastically increase the likelihood that a seasoned nurse makes a medication error [4,11,21,31]. Indeed, stress and additional factors that influence stress were commonly discussed in the available literature, making stress and factors that influence stress one of the primary themes to the literature on the creation of medication errors. Therefore, even in organizations where nurses regularly report errors, there can be circumstances that increase the likelihood of an error. Further, errors caused by stress or workload may be errors that go unreported because nurses may forget an error was made or be too stressed to realize that an error occurred.

2.4. Causes and Factors that Contribute to Medication Administration Error

An organisation’s culture that is seen to encourage the safety of patients is closely related to healthcare staff’s errors [23]. As such, garnered insight into the barriers to MAE reporting, as perceived by nurses, is a critical stage in improving overall medication safety. In the KSA, on the other hand, researchers have directed very little emphasis to MAE reporting-related obstacles amongst the nursing population [17,27]. Despite the fact that a number of studies have considered the issue of medication errors, very few have examined the link between medication errors and the characteristics of nurses as a factor in medication error predictors [4,11,21].

This leads to the implication that research is far from understanding the real reasons for errors and linking the likelihood of errors to characteristics could potentially be an invaluable relationship. To this, Cheragi et al. [2] explained that, in many cases, demographics and characteristics can have nothing to do with the creation of errors or the lack of error reporting. The authors noted that “there were no statically significant relationships between medication errors and years of working experience, age, and working shifts” (p. 229). However, the authors also noted that “a significant relationship was found between errors and intravenous injections and gender, likewise errors in oral administration were significantly related to the number of patients” (p. 229). This means that there are some instances when the type of error is more related to certain characteristics; however, the workload, including the number of patients needing treatment in a given shift, can have as much to do as anything, with the cause of errors.

Importantly, in these circumstances, nurses may not report errors because they feel shame; but more likely, they will not report errors because they may not have noticed an error being made. This means that job stressors and workload in a given shift may be more critical to the creation of errors than any other factor. If this is the case, then, nurses are not as at fault as administration would have them believe. It also means that errors could immediately be reduced given a higher number of nurses on shift or additional staff to reduce workload where possible.

Additionally, the reporting process is not uniform across healthcare systems [3] nor is it simple for nurses even when an error is caught and reported immediately [34]. This means that the process itself, in some ways, is what makes error reporting more difficult for nurses. For instance, Tabatabaei et al. [3] gave an example in which
errors not reported leads to more errors of the same type. However, in the same instance Tabatabaei et al. [3] explained that nurses may not know the error exists or may not want to report the error due to the amount of work involved in resolving the error. For errors that seem insignificant to the nurse, like administering medication in a lesser dose, the results may not even be immediately apparent. True And, by the time the error could be reported and handled by staff or administrators, the nurse would already be administering a second dose to the patient due to the time elapsed. Thus, in this scenario, the nurse may feel that time would be wasted reporting and handling the error; especially in cases where the nurse believed the error may not have caused any harm or be noticed by any other nurse or staff.

This does not account for nurses who do not realize that an error has been made [11] or nurses who cause an error by making a previously-made error [3]. Tabatabaei et al. [3] mentions cases where nurses can be overburdened and have too many tasks on their schedule to effectively complete every task on time and without issue. In these circumstances, human error can be made, like a nurse forgetting to document a patient allergy, and errors can be made further down the line due to that initial error. However, though the nurse did not realize at the time that an error was made, there could be instances down the line where other nurses realize a mistake had been made and attempt to rectify the mistake, by noting the patient allergy in the chart, without acknowledging that a specific nurse actually made the mistake. These cases, despite being categorized as errors [11], may not be reported either, due to nurse relationships within the workplace environment [3]. These errors can extend to a nurse’s noticing an error made by a colleague and deciding to not report, and they can also extend to a nurse that sees an error in passing but does not stop to handle the error or report the error because they think another nurse is tending to the situation [3].

These instances demonstrate that error reporting may not be as simple as noticing an error and reporting that error immediately to administration for appropriate handling [4,11,21]. It also means that, in some cases, nurses may not consciously believe an error was made or that the error was significant enough, in their eyes, to be reported [3]. Therefore, the argument becomes something of a moral one, in which nurses are tasked with reporting an error, no matter the type of error or scale of error, simply because an error was made and that is the process required for errors in the medical field.

The inherent problem with this, however, as sources including Bahadori et al. [31], Almoajel [17], and Almutary and Lewis [12] discussed, is that there are ramifications for reporting that, even in circumstances where the nurse believes the consequences are insignificant, the error reported becomes a mark on the nurse. They have now confirmed an error and may be watched by superiors and others to ensure that additional errors do not occur. For errors that seem inconsequential to the nurse, the anxiety of making staff, doctors, and other nurses aware of an error may be far too significant a source of blame and create an added barrier to reporting. However, in the long-term, not reporting errors could lead to not reporting more serious errors, and even more significant errors, because the nurse did not report errors initially and the ease of not reporting again may be more desirable than reporting the error. The nurse then creates a greater barrier to reporting due to past behaviors and perceptions of non-reported incidents.

However, this does not account for errors made out of oversight, forgetfulness, belief that another nurse has reported the error, or any other circumstance brought about by a long day of work in a stressful environment [4,11,21]. Errors caused by these human circumstances, though still errors of great significance to the process of error reporting, may be easier to let slide or fail to report; especially in cases where the nurse realizes that a mistake was made but the situation was resolved without any visible consequences for the patient or quality of care [12]. Not only does this become a moral issue, but the process for error reporting becomes a decision, an active decision to not report an incident because the nurse believes the error or oversight was handled without additional issues. In these cases, the nurse may begin to report less overall and feel that errors with no visible consequences are not errors that necessarily need to be reported since they have been resolved through other means [26,33,34].

2.5. Strategy to Minimize Medication Administration Errors

Minimizing errors begins with understanding what causes reduced error reporting. This means that any strategy intended to increase error reporting must first address the causes of under or non-reported errors, errors resulting from human oversight, errors seen but not reported due to nurse relationships, errors seen but not reported due to belief that others would resolve the issue, and errors seen but forgotten about during the course of a stressful day [3]. At this stage, understanding that nurses may forget, choose, or simply fail to report an error is the primary step in acknowledging that the system needs work and an additional strategy is needed to resolve underlying reasons as to why nurses may or may not report an error. Also, this assumption implies that nurses are underreporting errors they, personally, may feel are not consequential to the overall quality of care and that serious, consequential mistakes are reported and handled immediately. However, it could be argued that, even in highly dangerous mistakes, nurses may feel the same hesitancy in reporting errors as they would in errors that seem devoid of consequences [26,36,34]. Therefore, the assumption has to be made that, regardless of circumstance, type of error, perceived seriousness of the error, or workload of the nurse on a given day, every error must be reported with the same intent to resolve the issue and improve the process for handling mistakes in the long term.

Therefore, the strategy must include a process for addressing error reporting within the hospital directly to determine whether the nurses in Saudi Arabia feel the same about error reporting as their counterparts in the literature. Then, assumptions can be made and frameworks can be implemented to determine how error reporting can be immediately improved and improved over the long term [26,33,34]. Importantly, a strategy for error reporting should include stages in which errors of
every type can be handled effectively while promoting an environment in which errors, though part of being human, are something that nurses need to acknowledge and actively work against [26,34]. Further, Mohammad, Aljasser, and Sasidhar [33] noted that sometimes altering the frequency of errors is as simple as giving nurses time off between long stretches of shifts. Many hospitals in the KSA currently do not have a limitation on the number of hours a nurse is allowed to work following an unexpected shift in which a stressful circumstance occurs [13,33].

Therefore, the system needs improvement in terms of recording and reporting errors by understanding the reasons and factors behind the occurrence of errors [33,34] along with the development of a way to reduce the number of errors caused purely by humans [24,35]. Then, the process becomes less about punishing nurses who make errors and more about improving the quality of patient care by nurses being mindful of errors that can be easy to make under stress, higher workloads, or simple forgetfulness [1]. In turn, nurses would begin to exhibit more mindfulness in regards to daily tasks and tasks undertaken during more stressful times, because it may become easier to be mindful of verifying tasks over working without conscious thought which can lead to unintentional mistakes [36]. They may even see potential errors before they occur and take steps to avoid them [32]. Once every nurse begins to shift their way of thinking, and the system begins to help better manage mistakes and resolve errors without punishment or fear, the system may begin to have higher degrees of efficacy, lower rates of error, and nurses with less fear and reduced stress over potential errors [33,36]. This type of system is essential, not only in terms of ensuring patient safety in general, but also for enabling improved error identification and, as a result, the prevention of critical errors [33,34].

Bahadori, Ravangard, and Aghili et al. [31] believed that patient safety can be ensured to an even greater degree when a priority is placed on “establishing a mechanism to improve quality rather than focus only on finding the culprits and blaming them” (p. 1). Al-Saeed [37] cautioned that even a semblance of blame can reduce error reporting; while Alghami and Urden [28] cited a need for reestablishing the value of improving quality overall instead of spending time on the faults that can occur. A blame process is not efficient, nor is it appropriate for resolving errors [1]. And more, a blame process shifts the ideological stance that the error is the only focus and not the quality of care [27]. When nurses are afraid for their job and make a mistake they feel is inconsequential, additional mistakes can cascade if that first mistake was never reported. They may even feel overwhelmed by the past mistake and fear that, if they report the mistake, they’ll make even more mistakes due to increased pressure from co-workers and administrators [38]. This can extend to situations where the nurse makes a mistake, fails to report the mistake in a timely manner, then makes another similar mistake. If they report the second mistake, they should report the first mistake; however, they may be in even more serious trouble for not reporting the first mistake in a timely manner [31,38]. As the authors found, even when nurses made an error, and were aware of the error, the likelihood of the report being made was not based on patient safety, but the nurse’s own concern of being punished [31]. To some extent, administrators and “managerial factors had [even] greater roles in the refusal” ([31], p. 1) to report an error because nurses felt insecure or fearful of being reprimanded by their leaders. They may also fear having a mark in their record or fear that a promotion may be lost due to a mistake they believe to be inconsequential [31,38]. Therefore, systems that place blame on the individual are missing the greater context of the fear that reduces the likelihood of errors being reported and that may even contribute to additional errors, even of the same type, being made in the future [34].

Additionally, Bahadori et al. [31] noted that administration was one of the primary factors for non-reporting; which means that the system for reporting is inadequate and creates a substantial barrier. The authors suggested “designing a system for reporting on medication errors properly and accurately, training nurses in the quality of reporting on medication errors and above all, establishing a mechanism to improve quality” (Bahadori et al., p. 5). This mechanism would change the rate at which nurses report errors, thus “reducing their occurrence, and, finally, improving patient safety” (Bahadori et al. p. 5). Ultimately, this would be a major change within the nursing environment and many hospitals may not be capable of implementing a more sufficient system for error reporting than the one they currently have. Much of this can also be attributed to frustration at the current system and administrators not understanding why nurses would respond to error reporting with fear or apprehension. Therefore, a change at the level required would include education from the top down, from administration to doctors to nurses, to reestablish the importance of error reporting and demonstrate appropriate methods for reporting that reduce blame and fault.

2.5.1. Changing Attitudes towards Errors and Reporting an Error

Barriers to error reporting are primarily created by the nurses themselves due to perceptions, fears, previously reported errors, and the environment in which errors are expected to be reported. Alanko and Nyholm [36] offered the thought that changing attitudes towards MAEs must first start with “developing and improving the physical environment” (p. 2) after which “error reporting, and medication management protocols [can be] emphasized as methods to prevent medication errors” (p. 2). This is a simplistic way of identifying the fact that the barriers to reporting come from the process of reporting, the process for handling errors, and the lack of encouragement from administration to report errors without punishment. That said, changing attitudes would require a shift in the framework for communication between nurses, doctors, and administrators. For this to occur, there would need to be an educational process required of all staff that imparted the importance of reporting and the significance of accountability for crossing the barrier and reporting an MAE. For instance, given that fear and negative perceptions are critical barriers, reducing the impact of these barriers would require a direct impact on nurses’ fears and perceptions regarding the reporting process. The suggestion, then, is that an accountability process be enacted that rewards nurses for reporting errors that could
have been dangerous [31,36]. Acknowledging the mistake in this way would lead to a greater response time for correcting the mistake and reduce the fear associated with reporting.

2.6. Summary

Chapter Two explored the available and relevant literature related to the severity of the problems created by barriers to medication reporting processes. Ultimately, systems are inadequate for handling error reporting; but further, an organizational system may be the root cause of error occurrence. Therefore, as is explored in the next chapter, research was conducted to evaluate a more adequate error reporting system and related educational processes needed to ensure nurses understand the significance of errors, understand that admitting fault is an important part to error recovery and handling, and, through changes to administration, alter the system of blame placed on nurses in error.

Patient care outcome improvement is often the focus for reporting medication errors. This approach to care is central to many health care facilities.

3. Methods

3.1. Introduction

The purpose of this chapter is to explain and establish the methodology and research design used during this current study. This study was designed to identify elements within the Saudi Arabian healthcare system that make error reporting more difficult for nurses. This study assumes that nurses either do not report errors due to their misunderstanding of the severity of the error or they do not report the errors due to fear or other factors which would make handling and moving on after the error more difficult. Therefore, this study has been designed to determine the factors most likely to impact a nurse’s likelihood of reporting and to determine the factors or reasons why nurses may fear reporting errors or decide to not report errors altogether. Finally, this study assumes that there may be certain factors prior to the error, during the error, and following the error that are more likely to increase the likelihood of the error’s occurrence or recurrence.

3.2. Research Design

The research design of this study has been modelled after the Saudi Arabian Nursing Medication Error study [18] which established a descriptive correlational design through the use of a structured survey that focused on identifying factors most closely related to avoidance of error reporting by nurses in Saudi Arabia. The design then follows a quantitative approach to the data to provide a rationale for the given factors that may be most related to error reporting avoidance. Therefore, the present work gathers data through the application of a structured questionnaire [39] and utilises the MAE Reporting Scales tool developed by Wakefield, Uden-Holman, and Wakefield [40] and validated by Almurary [18] to determine the overall inclination of registered nurses to report medication administration errors. Three individual items were measured: 1) demographic and background data, 2) opinions and views pertaining to MAE, and 3) possible barriers facing the reporting of MAEs. The questionnaire was administered amongst a sample of RNs working in Saudi hospitals, recruited through convenience sampling. Nurses had the opportunity to opt out of the survey prior to responding to the questions; however, as the results were anonymous, there was no feasible way to remove survey results for an individual if they decided to opt out at a later point.

3.3. Setting

The context of this study was in Qassim, which is positioned within the KSA’s central region. In this area, there are approximately 8,000 nurses tending to 2,700 beds [13]. The healthcare system in this region is free and categorised as a national healthcare system [14]. As the government, or the Saudi Ministry of Health, is responsible for providing the healthcare services, certain assumptions were made about the quality of care available throughout the healthcare system. These assumptions included basic curative, rehabilitative, and preventive healthcare services for the residents of the KSA. Therefore, this study was carried out in two public hospitals (tertiary referral centres), both of which are supervised by the Ministry of Health (MoH) in the Qassim region.

3.4. Sample

There are approximately 8,000 nurses, both domestic and international, working in the KSA. A total of 400 nurses from two Qassim hospitals in the Kingdom of Saudi Arabia (KSA) were approached to take part in a written survey, of whom 293 responded (73.25% response rate) and agreed to take part in the questionnaire. This meets the goals of the participant selection process which was to achieve between 250-300 participants. The subjects were recruited from the nursing population, regardless of the ward in which they worked, but they must have worked in their hospital setting for a minimum of one year so as to ensure their participation in the administration of medication. Both incidental and convenience sampling were applied based on the Schneider and Whitehead (2013) model for selecting participants that met the population and sample requirements. The criteria for the sample were as follows: 1) subjects needed to be enrolled and registered nurses, 2) nurses could be Saudi or non-Saudi nationals, 3) work experience in the hospital setting had to be a minimum of one year so as to ensure their involvement in medication administration practice, and 4) all nurses had to be fluent in English to avoid transcription errors during the questionnaire. There were no other inclusions necessary for this study; however, an assumption was made that nurses recruited for this study would have a basic knowledge of error reporting procedures in their ward and have knowledge about the process and procedures for error reporting. This assumption was made based on the context of this study and the inference that nurses in the KSA were expected to report errors when they occurred,
regardless of circumstance [2]. As Griffith [26] explained, “while nurses can interpret the values and principles for use in community settings, the standards are not negotiable or discretionary” (p. 458). This means that, in spite of how nurses handle error reporting, they were expected to know, understand, and follow the rules for error reporting regardless of circumstance or type of error.

3.5. Research Instrument

The questionnaire is similar to the questionnaire used in the Saudi Arabian Nursing Medication Error study [18] as this study sought to identify similar factors in error reporting avoidance. Additionally, this study used the “Unwillingness to Report medication Administration Errors’ Scale...[that measures] high internal consistency for the scale with a Kuder-Richardson Formula 20” ([18], p. 21). This means that factors are measured for consistency ratings between other factors to determine whether some factors related more consistently to others or if nurses felt more consistently towards certain factors over others. As Almutary [18] explained, there are several assets and several failures to using this particular method. On one hand, the survey process through consistently allows for themes to be connected and explored; however, in the themes there is the limitation that other factors which may be important to the study’s conclusions get left behind. Additionally, there are circumstances in which respondents may answer positively towards one factor and negatively towards another related factor, regardless of the authenticity for actually rating one positive while the other is rated negative. In these cases, a thematic approach may be equally limiting because it is important to review all factors both within and outside of the context of themes.

Therefore, based on the focus of this research, to identify possible barriers and outcomes of MAEs, there must be a framework for identifying the root cause of particular factors once the data has been collected. To meet this need, the theoretical framework for this analysis utilised the Root Cause Analysis (RCA) as explained by Doggett [42] in conjunction with API’s [30] RCA investigation to identify, describe, and eliminate errors in the reporting system caused through accident, mistype, or other fixable errors. The RCA framework asserted that the event occurring can be altered when the types of errors being caused are understood and a system is implemented in which errors can be prevented. Therefore, identifying when MAEs most often occur, and when they could be preventable, is fundamental to the thesis. API’s [30] RCA system outlined seven primary objectives to identify, describe, and plan for preventing errors by defining their root cause to form preventive outcomes in future situations. These objectives included: 1) identify the event, gather information, 2) select leadership, 3) describe incident, 4) define factors, 5) define root causes, 6) prepare changes and implement them, and 7) monitor the changes and evaluate the outcomes ([30], p. 1). For the purpose of this discussion, it was important to evaluate all factors, large or small, which could impact the nurse’s MAEs, reporting of MAEs, or prevention of MAEs while defining reasons, based on personal characteristics and from within the workplace environment, which could impact MAEs both initially and in the long-term. Based on this, the objective was to discover legitimate root causes for MAEs and prepare a framework for implementation in the KSA that could prevent or reduce MAEs and drastically improve the error reporting process for nurses. If environmental factors were most significant, changes were supported to reduce environmental factors on increased MAEs or it was determined where changes could be made to the workplace environment to remove the catalyst in MAEs.

Doggett’s [41] framework for RCA is founded in the theory that the problem must always have a cause; and further, that the cause will almost always create the same problem. Therefore, the framework reviewed the problems to determine the area of effect and the characteristic of effect, as created by the root cause. For example, Doggett [41] noted that understanding the root cause allows for correction of the issue by way of managing the root cause. Addressing the issue without understanding the root cause is, then, not necessarily addressing the issue or allowing for a complete removal of that issue in the long term.

Following the questionnaire and analysis of the content within the questionnaire, the RCA is applied to determine: 1) the precise issues in MAEs, and 2) the precise causes of MAEs. Based on varied perspectives and varied self-reported performances of nurses and their knowledge of MAEs, there may be numerous root causes or there may be just one. For the purpose of this analysis, the number of root causes does not matter; only that they can be fully defined and understood to allow for forward movement in the management of MAEs.

To utilise the framework, Doggett’s [41] Root Cause/Effect diagram was filled out to determine the characteristic or effect by defining known causes and minor causes which may impact known causes, as in Figure 1, below.

![Figure 1. Root Cause / Effect Diagram (Source: [41])](image)
Once all of the causes have been determined and their area of effect has been evaluated, the root cause is defined and preparation began for implementing a system that resolves the root cause and improves MAE reporting. Ultimately, the goal, and the rationale for choosing Doggett’s [41] RCA framework, is to best understand the root cause and contributing factors to the root cause which impact MAEs and error reporting by nurses in the KSA.

3.5.1. Demographic Questions

Demographic questions included basic personal questions about the respondents including: age, gender, years of nursing experience, education level, ethnicity, and area (ward) in which they worked. As Almutary [18] explained, “it is important to address personal factors to identify potential factors which may have contributed to the unwillingness to report MAEs” (p. 24). This extends to basic demographics, which can explain a lot about the type of background of the nurse and may inform on other factors which may help identify why certain decisions were made. Almutary [18] gave the example that “RNs may have been trained with different attitudes due to ethnicity…and other studies indicate that culture could affect nursing practice” (p. 24). This means that nurses from specific ethnicities or cultures may be more or less likely to report MAEs than other cultures or ethnicities, purely based on how they were educated about errors and whether the significance of MAEs was made a critical aspect of their training. It is important to indicate that the researcher does not believe, nor is there any obvious evidence, that one culture or ethnicity over the others may be more or less likely to report or avoid error reporting. Therefore, although the acknowledgement is made that this is a possibility, the assumption is made that these factors may not be important to the likelihood of a nurse reporting an error. Further, this leads to the implication that although demographics are important to this study for categorization purposes, there may be no data to indicate that any one demographic is critical to the error reporting process. Therefore, it is assumed that any demographic can be as important as any other to the decision of a nurse to report MAEs; however, it is also assumed that none of the demographics may be important to the error reporting process.

3.5.2. Reporting Medication Administration Errors

This section of the survey was designed to determine how nurses report MAEs and what their feelings are towards the reporting process. There were three main questions asked: 1) reflecting back over your career as a RN, have you ever made a medication administration error, 2) if you made a medication error/s in Saudi Arabian hospitals, did you report the medication error/s that you made, and 3) do you have any concerns about or do you feel that you would face any barriers if you were to report a medication error in Saudi Arabia? As can be seen, these questions serve two purposes: 1) to identify what nurses know and understand about medication errors, and 2) whether they feel they can report errors in their current situation as RNs in a Saudi Arabian hospital. These questions were important for defining the population; but also, for understanding who the nurses were and what they believed about the process for reporting MAEs. These questions also helped determine how nurses feel about error reporting avoidance and whether they feel enough fear in a given situation to refuse to report an error. An important distinction that was made during the results section of this study, was to determine how nurses feel in regards to reporting errors they may feel were small or insignificant and whether perception of significance of the error plays a critical role in the likelihood of reporting the error.

3.5.3. Potential Barriers to Reporting Medication Administration Errors

This section of the survey sought to determine participant perceptions for reporting medical errors. A total of six questions were asked, including: 1) when a medication error occurs, I think it should be reported to the department, 2) I believe that reporting medication errors is a worthy use of my time, 3) I will report a medication error even if it does not harm the patient, 4) I will report an error even if it is not possible to improve the patient’s health status subsequent to the error, 5) I am willing to report an error only when similar errors have occurred previously in the department, and 6) I would report an error even if I was not involved in it. As can be seen, participants can share their perceptions and opinions here, and begin to demonstrate which factors are more important when dealing with personally reporting an error. Of greatest importance to the results were questions asking about whether they would report an error if a patient was not injured, and whether they would report only if other errors of a similar type had been reported previously. These informed to the greatest degree on the nurse’s perceptions about reporting and the reporting process. As is discussed, personal factors, administration factors, and reporting process factors were the factors most represented by the perception-based questions.

3.6. Instrument Testing

The data collection process was validated during the Almurary [18] Saudi Arabian Nursing Medication Error study [17]. As Almurary [18] explained, the instrument “enabled the researcher to ensure that every single part included in the survey was clear and easy to understand” (p. 26). This included acknowledgement of the type of questions being asked, as well as the purpose, and “reflected the clarity of the tool...and ensured the best tool was used” (p. 26).

3.7. Data Collection

Permission, consent and ethical approval were gathered from all hospitals involved prior to the initiation of the study. Subsequently, various organised steps were followed by the researcher in gathering the data. Primarily, the study approval and a formal letter were sent to the hospital directors, nursing managers and head nurses of the hospitals. Secondly, the researcher attended nursing management meetings to provide an overview of the study, complete with information pertaining to targeting nursing management. Thirdly, the researcher carried out a brief presentation, lasting no more than ten minutes, targeting all nurses and providing a key overview of the information
relating to the scope and aims of the research so as to ensure a clear insight into the study and its individual processes.

Next, the questionnaire was distributed amongst the sample in the form of a hard copy (Appendix 2), along with the inclusion of the Participant Information Sheet (Appendix 1) and a return envelope. Survey boxes for the completed questionnaires were placed in the nursing staff rooms, and checked each week. Two weeks after distribution, a reminder poster was displayed on the notice board to remind all nurses to complete their questionnaire; this helped to ensure the greatest possible response rate and ensured the inclusion of any nurses who had not previously had time to fill out the questionnaire.

When seeking to satisfy the study purpose and provide answers to the research questions, the development of the most appropriate instruments is pivotal [39]. The data collection instrument is a 28-item self-administered questionnaire, designed by Hyfa [12]. Permission to use the instrument was gained from the author, and changes were made as necessary. The questionnaire was broken down into three sections, and was expected to take no more than ten minutes to complete. The process of data collection was to ensure adherence to the conventions of a descriptive cross-sectional study design. All nurses meeting the recruitment criteria were invited to partake in the study and to complete the questionnaire.

Before the study was carried out, the researcher provided all targeted participants with various information, including an information poster, a questionnaire, and demographic data sheet, complete with return envelope. The same population also received a reminder within seven days of the initial request. Boxes for the completed questionnaires were placed in the staff rooms.

3.8. Ethical Consideration

Prior to carrying out the data collection stage of the study, the first step was gaining approval for the research, which was afforded by the Office of Research Ethics and Integrity at Queensland University of Technology. Subsequently, the proposal was communicated to the General Directorate of Health Affairs in Qassim, Saudi Arabia for ethics approval; this was done as the two hospitals involved in the study fall under the supervision and authority of the General Directorate of Health Affairs in Qassim. Finally, there was the circulation of the official letter of approval within the two hospitals; which was done via hospital directors with the objective of ascertaining approval from each of the hospitals.

All of the target participants were invited to partake in the study. A summary of the research, detailing its scope and aims, was provided so as to ensure the target population was well informed of the study objective and its processes, including their part in the information gathering and their guaranteed privacy.

The confidentiality and privacy of participants were respected and ensured at all times, which further expanded to anonymity protection [39]. Accordingly, throughout the data collection, identification numbers or names were not used. Moreover, there was no reporting of the results in specific categories that could potentially allow for establishing which employees fell into which categories. In addition, as a further attempt to safeguard privacy, there was the inclusion of an envelope for completed questionnaires. Furthermore, all data were stored electronically, with the inclusion of a password; this information was not used for any purpose besides that of the current study. Lastly, the subjects were advised of their ability to withdraw from the study at any time [42].

3.9. Data Management and Statistical Analysis

The questionnaire asked demographic information, including: gender, age, education, and ethnicity. Questions then asked specifically about nursing, including: area of specialty, whether they had witnessed medication errors, and the protocols they were expected to follow upon witnessing any errors. Next, respondents were asked about their perceptions of medication errors within their department; this was followed by a final section on their willingness to report medication errors, impacts from administration, and reporting process factors which may or may not impact on how they are able to report medication errors. The focus of the questionnaire was to assess, using perception-based questions, what nurses believed about medication errors and whether nurses have support from administration, including appropriate processes, which may or may not impact their ability to sufficiently handle the medication error.

All data gathered during the questionnaire were entered into the Statistical Package for the Social Sciences (SPSS 12,0,01 for Windows) to find emerging themes and patterns in nurse perceptions and beliefs. Additional themes and patterns were sought from questions that involved administrative support and the reporting processes themselves, to make determinations regarding the protocols and frameworks in place for nurses to appropriately handle reporting errors.

The areas of focus within the questionnaire provided a basis for the analysis and created a collection of themes for the Root Cause Analysis by Doggett [41], which helped to define problem areas to ultimately treat and eliminate those problems. The goal, then, was to examine emergent themes and build upon perceptions by nurses to develop outcomes that would suggest where improvement to the system could be made. Using this process, the analysis was able to address the research questions, identify areas where there were significant problems, and explain how improved error identification and handling would impact the prevention of critical errors and increase overall patient safety within the healthcare system.

3.10. Summary

This chapter explained and evaluated the research design, including the survey process and content, the instrument, and expectations from the survey overall. This chapter also expressed ethical considerations and explained the process for data analysis which will be discussed in the chapter to follow.
4. Results

4.1. Introduction

This chapter will present the findings of this study and make evaluations based on the results of the survey. First, descriptive statistics were conducted, followed by a basic assessment of the variables to determine connections, links between factors, and relationships of importance between the variables. To follow will be a discussion of the results including, 1) elements within the healthcare system that contribute to a reduced rate of error reporting, 2) factors most likely to contribute to nurses’ perceptions and perceived barriers to error reporting, 3) a breakdown of personal fears and perceptions as found during the survey process, 4) nursing administration concerns, 5) demographic characteristics that alter the likelihood of reporting errors, and 6) whether nurses understand the reporting system for errors and whether they believe the system is adequate. These elements all connect back to the research questions for this study and will help in the formulation of conclusions.

4.2. Demographics

A total of 400 nurses from two Qassim hospitals in the Kingdom of Saudi Arabia (KSA) were approached to take part in a written survey, 293 of whom responded (73.25% response rate) and agreed to take part in the questionnaire. This met the goals of the participant selection process for a total of 34.9% with a high level of experience, the majority (61.9%) of nurses had between one and five years, 18.5% had between five and ten years, 16.4% had more than ten years, and only 3.1% had less than one year of experience. This indicates that there may be little disparity between perceptions, unless age is not proven to be a significant demographic variable. For age, a majority (80.1%) of the respondents were between 25 and 40, with only 11.3% being less than 25, and only 8.6% being older than 40. This is somewhat indicative of what is expected to be a normal distribution; however, it also indicates that any specific factors which may be connected to age may not be significant in regards to this study. It also indicates that the majority of nurses will probably perceive situations the same, unless age is not proven to be a significant demographic variable. For education, the majority (76.8%) of nurses had bachelor degrees, with only 2.8% having any postgraduate education, and 20.8% having only an associate’s diploma. Again, this is somewhat normal for the population, as the majority would be expected to have at least bachelor degrees for the type of work being conducted as an RN. It does demonstrate that a large percentage only have associate’s degrees, which may end up being significant to the results if perceptions are skewed based on experience.

Next, the majority (85.3%) of nurses were Asian, with 13.7% identifying as Arabian, .3% identifying as Western, and .7% identifying as another ethnicity. Again, this may or may not be significant to the results as the majority of respondents identified as a single ethnicity. It may help inform on perceptions as this study moves on to the conclusions; however, the expectation is that ethnicity will not be a significant factor to perceptions or willingness to report medical administration errors. For years of experience, the majority (61.9%) of nurses had between one and five years, 18.5% had between five and ten years, 16.4% had more than ten years, and only 3.1% had less than one year of experience. This indicates that there may be little disparity between perceptions, unless perceptions are linked to personal valuations over age or experience. Also, this indicates that a majority of nurses have around the same level of experience. This may change perceptions about error reporting; especially if a standard for not reporting or fear of reporting is represented by a group of nurses at the same level of experience. Also, there is a significant number of nurses (18.5% and 16.4%, for a total of 34.9%) with a high level of experience, the majority having between one and five years of experience. This may change the dynamic within the healthcare system; especially if nurses with more experience are less likely to report errors based on knowledge of the system or on the repercussions for error reporting. This could be a critical element to the process of exploring why nurses may be less likely to report errors.

Finally, for areas of work, there was no clear majority between wards. The highest percentage (23.9%) was represented in the intensive care unit, the next at 20.5%, then the emergency department at 16.4%, and medical wards and surgical wards tied at 15.7%; then there was a significant drop to 4.4% in pediatric wards and 2.7% in the dialysis wards. This shows that the majority of nurses...
work in the intensive care unit, the emergency department, medical wards, or in surgical wards. This may be a critical factor in determining whether ward experience plays a role in perception or likelihood of reporting errors.

To investigate the relationship between medication administration error and reporting the error, a cross tabulation and linear-by-linear association test was conducted. The linear-by-linear association test is an alternative test for the chi-square test of independency which is less sensitive to the number of participants for each category. As the number of observations for some categories is less than 5, a linear-by-linear association test was the most appropriate. In this test an assumption is made that the observations are independent. Firstly, Table 2, below, shows that reporting medication error and gender are independent based on the p-value of 0.418 >0.05.

Table 2 also shows that generally, nurses make medical administration errors; except for the two male respondents who never made an error. This indicates that every nurse made multiple errors over the course of their careers. Next, Table 3, below, shows the crosstabulation between years of experience and reporting errors.

As (Table 3) can be seen, the p-value for the independency test for years of experience and reporting medication administration error is also greater than 0.05, so a conclusion can be made that there is no statistically significant relationship between the number of years of experience and the likelihood of having made a reporting error. This indicates that not only is there not a relationship between the two variables, but the likelihood of having an error is not more likely to increase given more or less years of experience; meaning errors are based more on the individual or the individual’s skills, knowledge, and perceptions. Next, crosstabulation of education and reporting errors is shown in Table 4, below.

As (Table 4) can be seen, the results of cross tabulation of education and reporting medication error show that there is an association between education and reporting errors with a p-value of 0.003 <0.05. According to the results, nurses with diploma level education are far less likely to report medication errors despite having a potentially high number of errors that occur. Finally, a crosstabulation of age and reporting errors is shown in Table 5, below.

### Table 2. Crosstabulation of Gender and Reporting Errors

<table>
<thead>
<tr>
<th>Gender</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>2</td>
<td>110</td>
<td>112</td>
</tr>
<tr>
<td>Some</td>
<td>0</td>
<td>43</td>
<td>43</td>
</tr>
<tr>
<td>All</td>
<td>4</td>
<td>117</td>
<td>121</td>
</tr>
</tbody>
</table>

Linear-by-Linear Association test  
{p-value} = 0.418

### Table 3. Crosstabulation of Years of Experience and Reporting Errors

<table>
<thead>
<tr>
<th>Years of Experience</th>
<th>less than one year</th>
<th>between one to 5 years</th>
<th>between 5 to 10 years</th>
<th>greater than 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>2</td>
<td>66</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td>Some</td>
<td>1</td>
<td>26</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td>All</td>
<td>6</td>
<td>78</td>
<td>19</td>
<td>15</td>
</tr>
</tbody>
</table>

Linear-by-Linear Association test  
{p-value} = 0.053

### Table 4. Crosstabulation of Education and Reporting Errors

<table>
<thead>
<tr>
<th>Education</th>
<th>Diploma/Associated Diploma</th>
<th>Bachelor degree</th>
<th>Postgraduate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>36</td>
<td>71</td>
<td>5</td>
</tr>
<tr>
<td>Some</td>
<td>8</td>
<td>35</td>
<td>0</td>
</tr>
<tr>
<td>All</td>
<td>14</td>
<td>105</td>
<td>2</td>
</tr>
</tbody>
</table>

Linear-by-Linear Association test  
{p-value} = 0.003

### Table 5. Crosstabulation of Age and Reporting Errors

<table>
<thead>
<tr>
<th>Age</th>
<th>less than 25</th>
<th>between 25-40</th>
<th>greater than 40</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>12</td>
<td>89</td>
<td>11</td>
<td>112</td>
</tr>
<tr>
<td>Some</td>
<td>7</td>
<td>34</td>
<td>2</td>
<td>43</td>
</tr>
<tr>
<td>All</td>
<td>14</td>
<td>98</td>
<td>8</td>
<td>120</td>
</tr>
</tbody>
</table>

Linear-by-Linear Association test  
{p-value} = 0.489
As can be seen, age and reporting error are independent with a p-value of 0.489, meaning that there is no statistically significant relationship between age and reporting medication error. This means that not only does age not factor in to likelihood of reporting an error, but that age is not connected to the likelihood of creating a medical administration error either. Therefore, age as a demographic is not significant to the results.

4.3. How accurately are Medication Administration Errors Reported by RNs in Saudi Arabia?

To answer this research question, nurses were asked to reflect back over their career and to state whether they had caused a medication administration error. The results are shown in Table 6, below.

Table 6. Frequency of Nurses with Medication Administration Errors

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Valid Percent</th>
<th>Chi-Square</th>
<th>Asymp. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>42</td>
<td>14.4</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>249</td>
<td>85.6</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>291</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

As shown, 14.4% of nurses committed a medication administration error, with 85.6% reporting that they have never committed a medication administration error. To test whether the observed value for each category (those who answer yes and those who answered no) was different from the expected value, a chi-square goodness of fit test was conducted. The expected value for all categories was assumed to be the same. The results of chi-square goodness of fit for this question shows that the observed results (42 Yes and 249 No) are statistically different, to a significant degree, when compared with the expected value (145.5) and the p-value result for the test of <0.0001. This means that far more nurses were expected to respond in the affirmative than did. This could be due to fear, shame, or any other factor that may impact their decision to state the truth on the questionnaire; however, it could also mean that the nurses responding in the negative have committed an MAE but have not reported that MAE. Ultimately, this could indicate that either nurses believe they have not committed an MAE of serious enough consequence or because they have not reported the MAE, that they should not then claim to have committed an MAE. In any case, the expected values are far different from the actual values.

4.4. Are RNs Working in Saudi Arabia Aware of the Importance of Reporting Medication Administration Errors?

Nurses were then asked if they have committed a medical administration error and whether they reported that error to administration. The results are shown in Table 7, below.

Table 7. Frequency of Nurses who have Reported Medication Administration Errors

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Valid Percent</th>
<th>Chi-Square</th>
<th>Asymp. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>112</td>
<td>40.6</td>
<td></td>
</tr>
<tr>
<td>Some</td>
<td>43</td>
<td>15.6</td>
<td></td>
</tr>
<tr>
<td>All</td>
<td>121</td>
<td>43.8</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>276</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

As seen, 40.6% of participants have said that they never report medical administration errors, while 43.8% reported all medical errors, and only 15.6% of respondents acknowledged that they reported some medication administration errors. The observed frequency including Never (112), Some (43) and All (121) were compared with the expected frequency (92) and tested using a chi-square goodness of fit test. The p-value for this test calculated at less than 0.001, which suggests that there is a highly statistically significant difference between the observed and expected values. Again, as in the previous table, nurses are either not responding accurately or they are not responding accurately because they don’t believe they have committed a medication administration error worth reporting. This is a significant distinction to make and signals deeper issues within perceptions of nurses and potential fears of nurses that impact the error reporting avoidance or refusal to acknowledge medication administration errors that are less significant to the perception of the nurse.

4.4.1. Personal Fear and Medication Administration Error Reporting

Next, nurses were asked about their perception of reporting medical errors. Five questions were asked in this category, as shown in Table 8, below.

Table 8. Perception of Reporting Medication Errors

<table>
<thead>
<tr>
<th>Survey Question</th>
<th>Yes</th>
<th>No</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>When a medication error occurs, I think it should be</td>
<td>286 (98.3)</td>
<td>5 (1.7)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>reported to the department</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I believe that reporting medication errors is a</td>
<td>221 (78.1)</td>
<td>62 (21.9)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>worthy use of my time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I will report a medication error even if it does not</td>
<td>286 (97.6)</td>
<td>7 (2.4)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>harm the patient</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I will report a medication error even if it is not</td>
<td>274 (94.2)</td>
<td>17 (5.8)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>possible to improve the patient’s health status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>subsequent to the medication error</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am willing to report a medication error only when</td>
<td>109 (37.3)</td>
<td>183 (62.7)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>similar errors have occurred previously in the</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>department</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would report a medication error even if I was not</td>
<td>229 (79.2)</td>
<td>60 (20.8)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>involved in it (for example another nurse on my shift</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>made a medication error and I know they did not report)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As shown, 98.3% with a p-value of less than 0.001, think an error should be reported to the department, which indicates a high degree of significance. 97.6% believed that a medication error should be reported even if it wouldn’t harm the patient, while 94.2% believed that the medication error should be reported even if it was not possible to change the patient’s outcome. These questions, it is important to note, demonstrate that the majority of respondents not only believe in these outcomes but also agree that they would report the MAE in the given scenarios. This, however, is where the respondents begin to disagree. In terms of believing that an MAE should be
reported even if the nurse was not involved, only 79.2% answered in the affirmative. For believing that MAEs are a worthy use of time, only 78.1% agreed. The question with the most dissent, whether the MAE should be reported only if similar errors had occurred in the department, received 62.7% answering in the negative.

4.4.2. Potential Barriers to Reporting Medication Errors

To determine potential barriers to reporting medication errors, questions regarding personal, administration, and reporting processes were asked. The results are shown in Table 9, Table 10, and Table 11, which follow.

First, participants were asked about personal factors that may impact perception. A statistical chi-square goodness of fit test was performed to see whether the observed values were significantly different from expected values. As seen, the majority of participants answered in the negative, demonstrating that they did not believe the outcomes of the questions would occur. In total, 84.1% believed they would not be discriminated against for reporting a medical administration error, while 81.7% believed they would not be viewed as incompetent by colleagues. After this, there is a bit more disparity in the answers. For example, only 68.3% believed they would not be seen by others with a negative attitude; 68.2% believed their error would not be shared throughout the hospital; and 66.9% believed they would not face repercussions. Importantly, 37.9% believed they would face a lawsuit or legal actions. As shown in these last few questions, many nurses (though not a majority) did feel that negative consequences would be initiated upon reporting an MAE. And further, some of those consequences were severe and potentially career ending, which could indicate a significant reason to not report.

Additionally, as listed above for all questions, p-values are less than 0.001; which indicates that for all questions related to personal factors, there is a highly statistically significant difference between observed values and expected values. This means that nurses are either not reporting accurately or answers to other questions may have changed the overall outcomes for these questions. It is difficult to examine why nurses would underreport questions based on perceptions; but it could be as simple as looking at the number of nurses reporting in the affirmative to having committed an MAE and breaking down the results to show that nurses are either not answering correctly or they do not believe the MAEs they have committed are significant enough to warrant classifying them as MAEs. Therefore, other answers would be skewed to fulfill this viewpoint. Next, participants were asked about administrative factors, as seen in Table 10, below.

As seen, participants were asked about administrative factors and how those factors impacted their perception of reporting errors. In this survey the term ‘nursing administration’ means Head Nurse, Nursing Supervisor and/or Nursing Director. Interestingly 72.5% of nurses did not see nursing administration as a barrier to report medical errors. The chi-square goodness of fit test demonstrates that the observed values for this question were significantly different from the expected values (p values were less than 0.001). Again, participants have either underreported other issues impacting the way they have answered so far, or the predictions for expected values are just not correct.

Also, 68.3% participants were afraid that reporting a medication administration error could create negative feedback from nursing administration; while 46.6% of nurses agreed that nursing administration would focus on the individual nurse as the primary cause of the medication error rather than examine the system as a potential cause of, or contributor to the medication error (e.g. environmental causes, poor communication). The response to staff by nursing administration would not match the severity of the medication error as looking at the number of nurses reporting in the affirmative to having committed an MAE and breaking down the results to show that nurses are either not answering correctly or they do not believe the MAEs they have committed are significant enough to warrant classifying them as MAEs. Therefore, other answers would be skewed to fulfill this viewpoint.
potential cause of, or contributor to the medication error. For this question a chi-square goodness of fit test found that there was no significant difference between Yes and No responses as the p-value was greater than 0.05. This means that factors which may have impacted the positive or negative responses were not at play in this particular question. This could mean that more nurses, overall, believe that administration will blame the nurse with more experience; or that more nurses fear the chance that administration will blame the nurse with more experience. Finally, 60.7% answered in the negative that the nursing staff would not match the severity of the medication error. Table 11, below, shows personal valuations of reporting procedures.

Table 11. Personal Valuations of Reporting Procedures

<table>
<thead>
<tr>
<th>Survey Question</th>
<th>Yes</th>
<th>No</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incident report forms are too complicated</td>
<td>51</td>
<td>238</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Incident reporting wastes too much time</td>
<td>40</td>
<td>253</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>I would not know how to report a medication error if it occurred</td>
<td>39</td>
<td>254</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

As seen, participants were asked about the process of reporting the medication administration error and the majority of participants disagreed that the complications associated with completing the reporting forms made them less interested in reporting the error. 82.4% of participants disagreed about the complexity of incident reporting forms; while 86.3% believed that filling a reporting form was not a waste of time. Finally, only 13.3% of participants did not know how to fill in the incident forms. Chi-square goodness of fit tests for all three questions indicate that there is a highly statistically significant difference between observed and expected values. Again, this could be significant in terms of how nurses view their own behaviour and willingness to report errors made; however, it could also indicate that nurses are somewhat in denial as to the type of errors that constitute medical administration errors. This would mean that many of these perceptions are skewed because the nurse believes incorrectly about the types of errors and the reporting processes for all errors.

4.5. If Medication Errors Are Not Reported Accurately, which Factors Affect the Willingness of RNs to Report Medication Administration Errors in Saudi Arabia?

Next, nurses were asked if they had any concerns of if they felt that they would face any barriers if they were to report an MAE in their current department. The results are shown in Table 12, below.

Table 12. Frequency of Nurses with Concerns about MAEs

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Chi-Square</th>
<th>df</th>
<th>Asymp. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>79</td>
<td>27.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>202</td>
<td>68.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>281</td>
<td>95.9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As seen, 281 participants answered this question and 68.9% of those nurses responded that they did not feel, personally, there were any barriers to reporting. The chi-square goodness of fit test returned a p value of 0.05 which indicates there is a statistically significant difference between the observed and expected values (140.5). Again, this means that nurses are either underreporting this question, they have underreported other questions, or they do not believe they have committed an MAE due to the perceived significance of the error.

4.6. Is There a Relationship between Nurses’ Demographic Characteristics and Their Willingness to Report Medication Administration Errors in Saudi Arabia?

The data has shown that there are many significant connections between demographics, perceptions, and legitimate barriers to reporting. Perhaps the most significant variable to perception is the fact that the predicted values often did not match the actual values for the questions. This leads to the assumption that nurses either do not know what constitutes a medication administration error, they believe that significance determines whether the error is classified as a medication administration error, or they believe that because they have not committed a significant error that they had no reason to report an error. Also significant was the disparity in responses as to perceptions about what would happen in the workplace environment, which indicates that nurses may not be completely aware of the process for error reporting, that most nurses are indeed punished when reporting an error, or that the degree of the error makes a difference in terms of perceived or actual punishment and consequences within the workplace environment.

4.7. Summary

Chapter Four examined all of the quantitative data and made assessments about what was seen in terms of connections, correlations, and rationale for nurses answering as they did during the survey. Chapter Five will complete the discussion on the results, including a breakdown on how the results impact the research questions and what the study achieved overall.

5. Discussion

5.1. Introduction

After the results of the questionnaire were analysed, the research focused on answering the research questions and determining the connection between error reporting, perceptions of barriers to error reporting, and whether demographics had any correlation to the error reporting process. To follow are the findings of the questionnaire and the results, alongside conclusions and assumptions made about the data.
5.2. Registered Nurses’ Perceptions of Reporting Medication Administration Errors

The majority of nurses had around the same level of education, experience, and were within the same age group. These factors, though not significant on their own, may result in changes to perceptions regarding error reporting; especially if a standard for not reporting or fear of reporting is represented by a majority of nurses in a specific ward. The reason this was significant is due to the nature of the groupings, and the likelihood that nurses of similar experience will work with one another and be tasked with the same assignments and administration elements. Nurses may begin to act as a team and disregard certain aspects of the job which are not perceived as critical to the day-to-day and would not cause harm to a patient [7]. Nurses may also hide aspects that may have accidentally resulted in an error due to their being overworked or having too many patients to handle at once during the day [16]. This then leads to the assumption that nurses who underreport small errors may continue to avoid reporting errors at all and, even when circumstances may be more serious, may not report the error due to previously not having reported errors that seemed less significant [23,33].

Also seen was an indication that the likelihood of having an error is not more likely to increase based on years of experience; however, this leads to the assumption that errors were more likely to be based on the nurse’s skills, knowledge, perceptions of error reporting, and fears [7,15,33]. At the same time, age was not connected to likelihood of committing an error; however, nurses consistently responded differently in regards to predicted values and actual values. Original assumptions about this meant that perhaps nurses were not responding accurately on the survey due to shame, fear, or belief that they had not committed an error considered to be an MAE that must be reported. Additionally, this led to the assumption that nurses may not believe the errors they have committed were significant enough to warrant believing they had committed an MAE at all [7]. On the one hand, this makes sense from a practical viewpoint. Given that nurses have so much to handle during their day-to-day coupled with extreme days and days where they are overburdened [24,35], they can be led to the belief that there was a reason for an error being committed, and that that reason was not their fault [31,38]. In any case, consistently, predicted values were different from the reported values in the survey.

Further, time and again, the fact that the predicted values were different from the actual values informed that the differences were highly statistically significant to the degree that there must be an issue in the way nurses responded to the survey. Original assumptions implied that nurses who commit errors that they do not believe to be significant enough to count as an MAE, might then report on a survey of this nature that they have never committed an MAE; however, the problem with the predicted values and the actual values goes much deeper than this. There are several assumptions that can be made at this stage; however, the likelihood is that nurses who consistently underreport or avoid reporting errors may also not believe they have committed errors at all. Thus, their responses indicate that not only have they perceived to have not committed errors, but that they would not report errors if they had. Given the likelihood of nurses in this process underreporting the rate at which they have committed errors [31,38], the likelihood that they would also underreport the actuality of the errors themselves is almost solidified [33,34].

Additionally, these questions demonstrate that the majority of respondents not only believe in the outcomes for error reporting, but also agree that they would have reported the error had they committed an error. On one hand, this implies that nurses believe they would make the right decision if given the circumstance [31,38]; however, on the other, it implies that nurses are not currently upholding the decision, leaving room for additional decisions to underreport in the future [33,34]. In some cases, they may legitimately believe they have not committed a medical administration error when they have [38]; and in others, they may believe that the error was not significant enough in their eyes to be reported and thus they did not need to actually report the error as it occurred [31].

Nurses began to show dissent when asked how they believed colleagues and administration would respond to errors being reported. This is highly significant and demonstrates the critical nature of perception to the error reporting process. In some cases, nurses believed that the consequences to error reporting would be so severe as to end their careers, while in others they believed that the consequences would not necessarily reflect the severity of the error. This disparity is highly significant and demonstrates that nurses not only do not agree on how reported errors will be handled; but also, that they do not fully understand the process for reporting and handling errors, including the follow up for the short and the long term, for the nurse who committed the error. This indicates a serious breakdown in how information about medical administration errors and reporting actually is within the healthcare system; and more, that nurses may fear the consequences too much to report an error and deal with the perceived severity of the consequence.

Basic assumptions were made as to why nurses would report differently on the questionnaire; however, the most significant implication is that nurses may have felt that they could not share their true feelings on reporting errors and the error reporting process and thus, they shared what they believed to be the right answers on the survey [24,33,35]. This implication is based on the disparity between the predicted results and the actual results, and what the difference between the predicted results and the actual results would mean given the known perceptions and fears in regards to error reporting. Additionally, though it is somewhat difficult to state with confirmation why nurses would underreport on questions based on medication administration errors, or whether they fully understand what it means to make a medication administration error. These concepts, however, are difficult to clarify about the data, without extended research.

That said, there were several patterns found during the results section of this study, including: 1) differences in predicted values of survey responses, 2) nurses potentially not reporting MAEs because they did not believe the error to be an MAE or significant enough to be reported, and 3) nurses believing that the consequences would not
necessarily match the type of error reported. Using these patterns, elements of each will now be placed within the Doggett [41] Root Cause / effect diagram to determine the impact of the root cause on the characteristics of the effect. Elements for the diagram are displayed in Table 13, below.

<table>
<thead>
<tr>
<th>Root Cause (Perception or Fear-Based)</th>
<th>Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nurses may believe some errors are not significant enough to be considered medication administration errors (Perception)</td>
<td>Nurses do not report MAEs</td>
</tr>
<tr>
<td>Nurses may feel the repercussions to be too serious if they report MAEs (Fear)</td>
<td>Nurses do not report MAEs</td>
</tr>
<tr>
<td>Nurses may not report MAEs unless they are highly significant or a patient outcome is at risk (Perception)</td>
<td>Nurses under-report MAEs</td>
</tr>
<tr>
<td>Nurses have a lot of experience and know that some MAEs are less significant than others (Perception or Fear-Based Effects)</td>
<td>Nurses under-report MAEs</td>
</tr>
<tr>
<td>Nurses do not want to deal with the administration processes and consequences for handling MAEs (Perception)</td>
<td>Nurses do not report MAEs</td>
</tr>
</tbody>
</table>

As shown, nurses are, at the very least, under-reporting MAEs because they either believe the errors being caused do not count as medication administration errors, or that the errors would have too great a consequence in relation to the significance of the error [24,35]. Also, most of the root causes are based on perception, and not fear. This indicates that nurses, depending on a multitude of factors, may view medication administration errors and the significance of all errors differently; to the extent that some nurses believe some errors to be too insignificant to report. This leads to the implication that nurses do not report or avoid reporting errors because they believe the error to be unfixable, to be inconsequential, or that the effort of dealing with the error and handling the consequences of the error will be too great in relation to the error [32]. Therefore, it can be said that nurses are not accurately reporting errors, and that nurses may even be inaccurately reporting errors within their own minds; leading to avoidance of error reporting when the error does not seem as significant as other errors.

The process for implementing a system that resolves the deficiency in error reporting would require education for all nurses, changes in policy to ensure nurses understand that all errors must be reported, and changes in policy to reduce the criminalization and punishment afforded to errors that are reported. The evidence shows that nurses are either not reporting or not being honest with themselves about how often errors are committed and whether they would report them; therefore, there is a significant problem in the healthcare system in regards to ensuring nurses have the appropriate frameworks in place to report errors, manage any damage caused by the errors, and fix whatever led to the creation of the error.

5.3. Potential Barriers to Reporting Medication Administration Errors

There were several potential barriers for reporting MAEs, most specifically including: personal fears, nursing administration factors, and the reporting processes [31,38]. This was seen in the disparity between predicted results and actual results as well as in the disagreement between nurses on what would occur should an error be reported and handled by the administration. The barriers led to a lessened likelihood of reporting errors as well as to potential likelihood for not realizing that an error had been made worth reporting. The barriers also show that nurses may not fully comprehend that even small errors are classified as MAEs, that the punishment for reporting an error is part of the process but should not deter the reporting of errors, and that the degree of the error does not make a difference in terms of perceived or actual punishment and the punishment given for the reported error.

The barriers show, ultimately, that perception is everything for nurses. Perception impacts their likelihood of admitting to an error, their likelihood of reporting the error, and their likelihood of believing that reporting the error will come with significant consequences that may damage their career [26,33,34]. In all cases, perception changes the way nurses view the reporting process and the significance of reporting all errors. Therefore, though fear and misunderstanding certainly play a critical role in whether nurses report errors, it can be said that perception plays the most critical role in determining how nurses actually understand the error reporting system and determine when an error should be reported to administration [27,28].

5.4. Registered Nurses’ Demographics and Their Willingness to Report Medication Administration Errors

There is a confirmed connection between demographics and willingness to report medication administration errors. Most significantly, level of experience and years on the job were related to the likelihood of reporting an error. The assumption was made that nurses with more years on the job are more likely to not report errors that they see as less significant because the process for reporting the error may take too long and be too much of a burden in the long term. An indication was also given that nurses of similar experiences and years on the job were likely to behave and believe in the same manner. This indicates that nurses may tend to believe as others in their ward do, and not report errors unless they were significant or caused harm to a patient. This assumption is based on the significance between the variables and the results that indicated that errors were more likely to occur based on nurse’s skill, knowledge, and perceptions and not necessarily time spent on the job or overall experience. Based on this, the conclusion can be made that nurses, even nurses who have been on the job for many years, can make mistakes that have nothing to do with their experience or training. Most likely, errors are occurring due to nurses’ being overworked [24,35], being in an extreme situation with a patient [33], or being distracted by other factors either within the workplace environment or within the home environment [33,38].

5.5. Practical Implications and Recommendations

There is a significant issue within the healthcare system that makes it easier for nurses to avoid reporting medication administration errors and less likely to
acknowledge the significance of errors altogether [19]. There is evidence to indicate that nurses are making far more errors than they report on the survey and that, potentially, those errors are not deemed significant enough by the nurse to count as an error that they would have to acknowledge on something like a survey or report to their administration. Additional assumptions include nurses making far more errors than they report, nurses making errors and not reporting them at all, and nurses believing that the consequences will be too severe for reporting errors that may not seem that significant. Therefore, nurses are not reporting errors or they are underreporting errors. In either case, the situation is fairly serious because it leads to the implication that there is a significant problem in the healthcare system when nurses cannot maintain basic procedures to ensure errors are noted and handled, regardless of the significance.

Recommendations include placing greater emphasis on how to avoid mistakes during the day-to-day and during increased emergency situations or shifts where the nurse can become overburdened. A recommendation would also be made to help nurses share the burden of certain tasks to limit the chance of an error and thus reduce the likelihood that an error would occur again in the same situation. Additionally, because nurses are so reluctant to acknowledge and report errors, a recommendation would be made to increase training and increase the infrastructure to ensure nurses have what they need to accomplish tasks during the day-to-day and especially when they may become overburdened. Lessening burden would also be recommended, but the reality of emergency work would not be conducive to this recommendation. However, a suggestion would be made that, as the survey showed, the nurses in Saudi Arabia need a better system to ensure they have everything they need to improve their work situations and thus decrease the chances for errors and other incidents to occur. Overall, the most significant recommendation is to ensure nurses are educated consistently and report medication errors without recriminations, and that they are supported by a strong infrastructure that can ensure errors are avoided altogether.

5.6. Study Limitations

There are several limitations to this study, including: 1) self-reported survey, 2) lack of male participants, 3) majority of specific ethnicities as respondents, and 4) not knowing what factors nurses believe to impact their own personal belief system in regards to error reporting. First, the self-reported survey comes with a number of issues. Nurses may understand that the information is purely anonymous and that none of the answers would ever get back to their supervisors or colleagues; however, even in the best circumstances, nurses may underreport their own behaviours or make choices on a survey that would not reflect their actual day-to-day behaviours. This is, largely, due to human nature; but also, to a fear of repercussions even in anonymity. They may even fear reporting an error on an anonymous survey because they may believe that the errors they have committed were not serious enough to warrant being considered actual medication administration errors. They may excuse certain errors or behaviours and, when answering a survey, behave as though the errors never occurred or that they can be rationalized due to a long shift, difficult patient, or any other number of factors.

The lack of male participants is a limitation because, even if the target population is primarily female, the male counterpart is not represented in the survey results. This is important because males may act or behave differently from females in certain situations; but also, they may believe in reporting processes differently from the way females would as well. Next, there was a high majority of Asian respondents, leaving minority ethnicities as the remainder of respondents. This would normally not be a consideration; however, because demographic characteristics can impact on how and why nurses believe and act the way they do in regards to medication administration errors, different ethnicities may act or behave differently. Finally, not knowing what factors nurses believe to impact on their own personal belief system is a significant limitation. This comes from the discovery that many of the questions had results that were not close to the predicted results. As explained, this could be due to a variety of factors; however, it could also be due to the way nurses believe errors should be reported, the nature of errors they have seen in the past, and whether they hold themselves accountable for all errors caused, regardless of circumstance. Not having this information leads to assumptions that may be different if nurses could explain why they feel the way they do and why they have perceptions about certain aspects of the error reporting process.

5.7. Summary

Medication administration errors are a significant problem within the healthcare community and may be underreported or not reported due to a variety of factors, including personal perceptions, fear, misunderstanding on what constitutes an error, whether significance of the error changes the requirement that all errors should be reported, and apprehension of consequences for reporting and handling the error. This study has shown that using statistical analysis nurses underreport errors and may not consistently understand that all errors, regardless of perceived significance, should be reported through the same channels as all other errors. Additionally, though some demographic information was skewed and the predicted results did not match the actual results for many questions, nurses may not be honest with themselves as to what constitutes an error that must be reported. This leads to the assumption that some nurses believe the significance of the error creates a more lax environment and that some errors are not worth the time or trouble to report. Finally, this study offered suggestions for changes to the error reporting framework to dispel misconceptions and ensure nurses understand that all errors need to be reported regardless of significance, perceptions, or related fears.

6. Conclusion

The purpose of this study was to identify nurses’ perceived barriers to reporting medication administration
errors. The research asked questions through a survey of participants to gain an understanding of how accurately medication administration errors were reported by RNs in Saudi Arabia, to determine whether RNs in Saudi Arabia were aware of the importance of reporting medication administration errors, and to determine if there was a relationship between demographics and whether errors were being reported. A final concern questioned the willingness of RNs to report errors.

As found, there were several important patterns discovered during the course of this study including: 1) differences in predicted values of survey responses, 2) nurses potentially not reporting MAEs because they did not believe the error to be an MAE or significant enough to be reported, and 3) nurses believing that the consequences would not necessarily match the type of error reported. These patterns demonstrate that nurses were either not responding accurately or they were not responding accurately because they did not believe they had committed a medication administration error worth reporting. Also, nurses may have underreported some questions because they underreported other questions, or, more likely, nurses did not fully understand what types of errors should be classified as medication administration errors and rank errors caused on shift in terms of perceived significance to their work or their patient. This, of course, was the most dangerous of the assumptions presented during this study because it highlights the disparity between nurses’ perceptions, beliefs, and understanding of the protocols for medication administration errors.

Further, demographics were not shown to be exceptionally significant. This can mean one of two things. First, that error reporting and perceptions were not relegated to any particular demographic; or second, that the demographics shown in this study most certainly influence the results. Ultimately, this would mean that nurses within the target population of this study would respond in the same way as nurses who participated in the survey. Next, the research demonstrated that errors were not necessarily more likely to increase with experience; however, errors then, were more likely to be caused by other factors such as the nurse’s skills, knowledge, perceptions, or fears.

Then, the research showed that nurses believed the process for error reporting would cause more harm to their reputation than they could handle. The fear of blame or repercussions was significant enough such that many nurses may not report errors at all because they do not want to tarnish their career, they do not want to handle the fallout from the mistake, or they do not want to create additional tension between their colleagues.

Ultimately, nurses were not accurately reporting medication errors, and as a result, they may be inaccurately reporting errors in their own mind and thus do not believe they have committed an error. This leads to greater avoidance of error reporting and the concept that certain errors can seem less significant and may not need to be reported if they do not cause visible harm that would be noticed by other nurses or doctors. Finally, the barriers demonstrated that nurses, although they cite an understanding of the protocols, show that there is an exceptional deterrent for error reporting within the infrastructure of the KSA healthcare system. Therefore, changes are essential to ensure nurses understand error reporting, that barriers can be reduced for the error reporting process, and that perceptions can be altered to add greater collaboration to the error reporting procedures. In any case, nurses taking part in this study have demonstrated that the process is not as simple as it would seem and that there are significant reasons why nurses choose to underreport or refuse to report medication administration errors.

Acknowledgements

I want to thank all of the people who have helped me throughout this process including my parents and my supervisor, Dr. Alan Barnard.

A special thank you also, to Dr. Fahad Alkhaleefa, the Director of the Medical Educator, and Research Centre, Alrass Hospital; Mr. Sultan Al Salamah, Head of Training, Research and Continuous Education, MCH Buraidah; and the Ministry of Health, Saudi Arabia.

And finally, thank you to the nurses and to everyone at the two Qassim hospitals in the Kingdom of Saudi Arabia who participated in this study.

References


Appendix A

RREC Ethical Approval

Wednesday, December 21, 2016
To: Mr. Adel Saleh Alatni
Postgraduate student, School of Nursing and Midwifery, Queensland University of Technology

Supervisor: Dr. Alan Barnard


Research title: “Barriers Facing Nurses in Reporting Medication Administration Errors in Saudi Arabia”

Dear P.I.,

We are pleased to inform you that the local research ethics committee had approved your research proposal. Your efforts to meet the criteria requested by The National Bioethics Committee are highly appreciated.

- Revision type: Expedited
- Study design: Cross-sectional Study
- Decision: APPROVAL

On receiving this approval, you may commence your field work at your convenience.

- You shall be responsible for preserving participant’s data confidentiality.
- A written approval from each hospital director has to be granted to the study PI before any field work is commenced.
- Kindly, update us about your project advancement after 6 months. On completion of your project, kindly send us a summary of the project final report.
- Please, state that your proposal had been ethically approved by Qassim Research Ethics Committee in any scientific communication, e.g. presentation.
- In case of publication, kindly submit to the committee a new request specifying the name of the periodical /journal.
- Finally, be aware that this approval embraces no financial (or other) obligations or responsibilities on Saudi Ministry of Health or its health facilities.

For any questions or enquiries, please call Dr. Amel A. Suliman at telephone No. 00966163693429 ext 105, or 00966163231874 ext 111, and e-mail: qassim.ethcom@yahoo.com

Best regards,

Chairman, Regional Research Ethics Committee - Qassim Province
Dr. Abdullah M. Al Saigul

Coordinator, Regional Research Ethics Committee - Qassim Province
Dr. Amel A. Suliman

QUT Ethical Approval
Dear Dr Alan Barnard

This approval certificate serves as your written notice that the proposal has met the requirements of the National Statement on Ethical Conduct in Human Research and has been approved on that basis. You are therefore authorised to commence activities as outlined in your application, subject to any specific and standard conditions detailed in this document.

**Project Details**

**Category of Approval:** Negligible Low Risk  
**Approved From:** 12/12/2016  
**Approved Until:** 12/12/2017 (subject to annual reports)  
**Approval Number:** 160001129  
**Project Title:** Barriers Facing Nurses Reporting Medication Administration Errors in Saudi Arabia

**Investigator Details**

**Chief Investigator:** Dr Alan Barnard  
**Other Staff/Students:**  
**Investigator Name:** Mr Adel Saleh N Alaini  
**Type:** Student  
**Role:** Masters (Coursework)

**Conditions of Approval**

**Specific Conditions of Approval:**  
No special conditions placed on approval by the UHREC. Standard conditions apply.

**Standard Conditions of Approval:**  
2. Gain UHREC approval for any proposed variation (http://www.orei.qut.edu.au/human/variation) to the project prior to implementation;  
3. Respond promptly to the requests and instructions of UHREC;  
4. Declare all actual, perceived or potential conflicts of interest;  
5. Immediately advise the Office of Research Ethics and Integrity (http://www.orei.qut.edu.au/human/advisory) if:  
   o any unforeseen development or events occur that might affect the continued ethical acceptability of the project;  
   o any complaints are made, or expressions of concern are raised, in relation to the project;  
   o the project needs to be suspended or modified because the risks to participants now outweigh the benefits;  
   o a participant can no longer be involved because the research may harm them; and  
6. Report on the progress of the approved project at least annually, or at intervals determined by UHREC. The Committee may also choose to conduct a random audit of your project.

**If any details within this Approval Certificate are incorrect please advise the Research Ethics Unit within 10 days of receipt of this certificate.**
Appendix B

Participant Information

<table>
<thead>
<tr>
<th>RESEARCH TEAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principal Researcher: Mr Adel Saleh Alatni</td>
</tr>
<tr>
<td>Associate Researcher: Dr Alan Barnard</td>
</tr>
<tr>
<td>School of Nursing, Faculty of Health, Queensland University of Technology (QUT)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>This project is being undertaken as part of a Master’s research project by Adel Alatni.</td>
</tr>
<tr>
<td>The purpose of this research is to ask registered nurses their perceptions of barriers to the reporting of medication administration errors in the Kingdom of Saudi Arabia.</td>
</tr>
<tr>
<td>You are being asked to participate in a survey about medication error reporting by nurses because you are a registered nurse currently working in a hospital clinical role in Saudi Arabia.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PARTICIPATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>You will be asked to complete an anonymous survey that will take approximately ten minutes of your time.</td>
</tr>
<tr>
<td>You will be asked questions such as:</td>
</tr>
<tr>
<td>If you made a medication error/s in Saudi Arabia hospitals did you report the medication error/s that you made? (Never / Some / All)</td>
</tr>
<tr>
<td>Do you have any concerns about or do you feel that you would face any barriers if you were to report a medication error in Saudi Arabia? (Yes / No)</td>
</tr>
<tr>
<td>Participation is voluntary. You do not have to answer any questions that you are not comfortable with and may withdraw from the study at any time up until you submit the survey. However, because the survey is anonymous, once you have submitted your completed survey you will be unable to withdraw. The research is supported by your hospital and completion of the survey will in no way effect your relationship with your employer or QUT.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EXPECTED BENEFITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is not expected that this project will directly benefit you. However, your participation will contribute to a better understanding of the barriers experienced by registered nurses in reporting medication errors in Saudi Arabia and the development of nursing practice in such a way that enables nurses to report errors safely.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RISKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is no identified risk associated with participation in this project except for a possibility of you experiencing some emotional discomfort from answering questions related to drug errors. If you experience any discomfort, you will have access to counselling from a qualified professional within the hospital from the Staff Health Clinic.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PRIVACY AND CONFIDENTIALITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>All comments and responses are anonymous and will be treated confidentially. The names of individual persons are not required in any of the responses. Survey locked boxes for the completed surveys will be placed in the nursing staff rooms, and will be checked each week to ensure confidentiality.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CONSENT TO PARTICIPATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>The return of the completed survey is accepted as an indication of your consent to participate in this project.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>QUESTIONS / FURTHER INFORMATION ABOUT THE PROJECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>If you have any questions or require further information, please contact one of the researchers listed below.</td>
</tr>
<tr>
<td>Mr Adel Saleh Alatni +96 6 1633 30922 <a href="mailto:alatni@connect.qut.edu.au">alatni@connect.qut.edu.au</a></td>
</tr>
<tr>
<td>Dr Alan Barnard +61 7 3138 3893 <a href="mailto:a.barnard@qut.edu.au">a.barnard@qut.edu.au</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CONCERNS / COMPLAINTS REGARDING THE CONDUCT OF THE PROJECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>QUT is committed to research integrity and the ethical conduct of research projects. However, if you do have any concerns or complaints about the ethical conduct of the project you may contact the QUT Research Ethics Advisory Team on +61 7 3138 5123 or email <a href="mailto:ethicscontact@qut.edu.au">ethicscontact@qut.edu.au</a>. The QUT Research Ethics Advisory Team is not connected with the research project and can facilitate a resolution to your concern in an impartial manner.</td>
</tr>
</tbody>
</table>
Letter from MCH

Date: 15 November 2016

To: Queensland University of Technology
    School of Nursing and Midwifery

From: Mr. Sultan Salamah
      Department Head
      Training, Research and Continues Education
      MCH, Buraidah, Al Qassim, KSA

Subject: Barriers Facing Nurses In Reporting Medication Administration Errors

We are pleased to confirmed the acceptance of the study (Barriers Facing Nurses In Reporting Medication Administration Errors in Saudi Arabia) to be conducted in Maternity and Children's Hospital by Mr. Adel Saleh Al Aini, as a part of his master's study, upon the condition that it gains approval by the Regional Ethical Approval Committee.

If you have any further inquiries, please do not hesitate to contact us.

Thank you.

Sincerely yours,

Mr. Sultan Al Salamah
Head Training, Research & Continues Education
Buraidah, Al Qassim
Kingdom of Saudi Arabia
Email: sult25@yahoo.com
Mobile No.: +966555140806
Letter from AGH

24 October 2016

Saudi Arabia
Ahluss General Hospital
Medical Education and Research Centre (MERC)
Tel: +966163339996 Ext: 6064
Fax: +9663332120 Ext: 116
Email: ELQ-AGH-TRCE@moh.gov.sa

To: Queensland University of Technology - School of Nursing and Midwifery

We are pleased to confirm the acceptance of the study (Barriers Facing Nurses in Reporting Medication Administration Errors in Saudi Arabia) to be conducted in Alrass General Hospital by Mr Alatni, Adel Saleh, as part of his master’s study, upon the condition that it gains approval by the Regional Ethical Approval Committee.

If you have any questions, please do not hesitate to contact us.

Yours sincerely

(Dr) Fahd Alkhaleefah
MERC Director

www.qh.gov.sa
Appendix C

Questionnaire

Queensland University of Technology
School of Nursing and Midwifery

Barriers Facing Nurses in Reporting Medication Administration Errors in Saudi Arabia
Questionnaire

Instructions:
Please complete this survey. There are no right or wrong answers. All surveys are completely anonymous and no information you disclose can be linked back to you. Survey locked boxes for the completed questionnaires will be placed in the nursing staff rooms, and will be checked each week to ensure confidentiality.

PART I - Demographics and backgrounds
PART II - Perceptions of reporting medication errors
PART III - Potential barriers to reporting medication incidents

Your cooperation and time to participate in this survey is greatly appreciated.
Thank you

PART I – Demographics and backgrounds
Please complete the following background information (tick the appropriate box)

1. Gender:
   □ Male
   □ Female

2. Age:
   □ < 25 years
   □ 25 - 40 years
   □ > 40 years

3. Years of post-graduate nursing experience:
   □ < 1 years
   □ 1 - 5 years
   □ 5.1-10 years
   □ > 10 years

4. Highest level of nursing education:
   □ Diploma/ Associated Diploma
   □ Bachelor degree
   □ Postgraduate

5. Ethnicity
   □ Arabian (e.g. Saudi, Egyptian, Tunisian, Jordanian etc.)
   □ Asian (e.g. Philippine, Malaysian, Japanese, Indian etc.)
   □ Western (British, Australian, New Zealander etc.)
   □ Other

6. In which areas have you predominantly worked whilst practising as a Registered Nurse (you may tick more than one box)
   □ Medical wards
   □ Surgical wards
   □ Paediatric wards
   □ Intensive care unit
   □ Emergency department
   □ Dialysis unit
   □ Other
7. Reflecting back over your career as a Registered Nurse, have you ever made a medication administration error (e.g. this may be as simple as delivering the medication by the incorrect route or at the incorrect time, not just the wrong drug or the wrong patient)?

☐ Yes
☐ No

8. If you made a medication error/s in Saudi Arabia hospitalises did you report the medication error/s that you made?

☐ Never
☐ Some
☐ All

9. Do you have any concerns about or do you feel that you would face any barriers if you were to report a medication error in Saudi Arabia?

☐ Yes
☐ No

PART II: Perception of Reporting Medication Errors

Please read the following statements and choose ‘Yes’ or ‘No’.

<table>
<thead>
<tr>
<th>Nurse’s perception to report medication error/s</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>When a medication error occurs I think it, should be reported to the department?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I believe that reporting medication errors is a worthy use of my time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I will report a medication error even if it does not harm the patient</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I will report a medication error even if it is not possible to improve the patient’s health status subsequent to the medication error</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am willing to report a medication error only when similar errors have occurred previously in the department</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would report a medication error even if I was not involved in it (for example another nurse on your shift made a medication error and you know they did not report)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PART III: Potential Barriers to Reporting Medication Errors

Included here are three themes, which may potentially have impact upon your willingness to report your medication errors. Please read each statement and choose ‘Yes’ or ‘No’.

a. Personal Factors

<table>
<thead>
<tr>
<th>I would be hesitant to report a medication error as I believe that:</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>I would be viewed as incompetent by colleagues</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would be discriminated against by co-workers (e.g. you may feel that co-workers might consider you to be usually involved in medication errors)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other employees in the hospital would become aware of my medication error.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>It is likely I would face repercussions (e.g. salary deductions or contract termination)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>It is possible I may face lawsuit or legal action (patient or family’s suing the me)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient or family’s may develop a negative attitude toward me with a loss of confidence in my abilities</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

b. Administration Factors

<table>
<thead>
<tr>
<th>I would be hesitant to report a medication error (or would not report my medication error) due to a nursing administration concern (for this survey the term ‘nursing administration’ means Head Nurse, Nursing Supervisor and/or Nursing Director).</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>I would receive negative feedback from nursing administration if I were to report a medication error/s (e.g. this will affect my annual performance evaluation or, result in me having to complete another medication administration competency exam)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nursing administration believe that on medication errors are a measure of the quality of nursing care provided</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nursing administration would focus on the individual nurse as the primary cause of the medication error rather than examining the system as a potential cause or contributor to the medication error (e.g. environmental causes, poor communication)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The response toward staff by nursing administration would not match the severity of the medication error</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
c. Reporting Processes Factors

<table>
<thead>
<tr>
<th>Items</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incident report forms are too complicated</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incident reporting wastes too much time (e.g., filling out report, contacting the physician)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would not know how to report a medication error if it occurred</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Thank you for participating in this survey.

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