UNIVERSITY OF CAPE COAST

ASSESSMENT OF MEDICATION ADMINISTRATION ERRORS AMONG NURSES AND MIDWIVES AT HOLY FAMILY HOSPITAL, NKAWKAW-GHANA

VERA LOVE OTOO

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BY

VERA LOVE OTOO

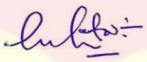
Thesis submitted to the Department of Adult Health Nursing of the School of Nursing and Midwifery, College of Health and Allied Sciences, University of Cape Coast, in partial fulfilment of the requirements for award of Master of Nursing degree.

NOVEMBER 2023

DECLARATION

Candidate Declaration

I hereby declare that this thesis is the result of my own original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate Signature:  Date: ……

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Supervisor's Declaration

I hereby declare that the preparation and presentation of the thesis was supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

Supervisor's signature …… Date: …….

Name: Dr. Mrs. Christiana Asiedu

ABSTRACT

Background: Medication administration errors affect patients' health and increase mortality among patients. This study assessed medication administration errors among nurses and midwives at the Holy Family Hospital, Nkawkaw.

Methods: Using census 231 nurses and midwives were selected. Descriptive statistics using frequencies and percentages, chi-square test and logistic regression analyses were conducted at p-value of 0.05 and at 95% confidence interval.

The greater proportion of participants had experienced medication errors in their professional practice. Nurses and midwives' contribution to medication errors was more than that of other health professionals. Being despondent about nursing/midwifery, unfamiliar with drugs, high volume of work, and department's style of supervision and control were causes of medication errors. Unfavourable institutional protocols to reporting errors was a barrier to reporting medication errors. Also, males were 0.349 times less likely to report medication errors than females. Also, participants who had worked for 6-10 years were 24.0 times more likely to report medication errors than those who had worked for less than six years at a health facility. Further, the likelihood of reporting medication errors was high among those who work at the theatre (AOR=7.519), female ward (AOR=19.721) and those who work at the maternity ward (AOR=15.930) than those who work at the emergency ward.

Conclusion: Medication error prevention and reporting interventions should be implemented in all facilities especially the emergency wards to reduce medication errors and increase medication error reporting.

KEY WORDS

Drug administration,

Medication Errors,

Midwives,

Nurses,

Holy Family Hospital,

Nkawkaw Eastern Region

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DEDICATION

In memory of my late father Worthy Bro. John Kweku Otoo

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CHAPTER ONE

INTRODUCTION

Medication errors are one of the patient safety problems that have a high prevalence in several countries. These errors frequently involve a lack of collaborative communication between various members of the medical community, such as nurses, doctors, and pharmacists (Salmasi, Khan, Hong, Ming, & Wong, 2015). According to Kiersma, Plake, and Darbishire (2011), patient safety is gradually being incorporated into nursing programs around the world that are based on actual health care delivery). According to the World Health Organization [WHO] (2016), nurses play a crucial role in the prevention of medication errors and the administration of safe medications. However, evidence indicates that nurses continue to be susceptible to drug errors, particularly during clinical practice. Errors in nursing can result in patient mortality, lengthy hospital stays, and bad consequences for nurses (Ajri-Khameslou, Abbaszadeh, & Borhani, 2017). It is essential to do research on medication errors committed by nurses and the beliefs of their causes as a foundation for the development of more effective nursing education programs, particularly on medication safety. This study aimed to evaluate drug administration errors committed by nurses and midwives at Holy Family Hospital, Nkawkaw, Kwahu West, Eastern Region, Ghana.

Background to the Study

In every healthcare system, patient safety comes first. After cardiovascular disease and cancer, poor patient safety in health systems is the third leading cause of death worldwide (Alanazi, Ali, Alanazi, & Hussein, 2017). Medication Administration Errors (MAEs) are responsible for at least

one fatality and injury every day, or around 1,300,000 individuals per year in the United States alone (You, Choe, Park, Kim, & Son, 2015). Studies estimate that around 250,000 deaths each year are attributable to pharmaceutical errors (You, Choe, Park, Kim, & Son, 2015). Globally, the estimated yearly cost of MAEs is approximately $42 billion (Kerari & Adnan, 2021).

A medication error (MAE) occurs any time a health care provider, patient, or consumer loses control of a medication and the error leads to improper use or harm to the patient. Prescription, order communication, product labeling, packaging, and nomenclature, compounding, dispensing, distribution, administration, education, monitoring, and use are all examples of professional practice, health care items, procedures, and systems that could be at the root of such occurrences (Medication Error Reporting and Prevention, 2015). Reporting and Preventing Medication Errors (2015). Prescription, pharmacy, and patient-related factors all contribute to medication errors (Covell & Ritchie, 2011). Same authors indicate that there is some variation in the frequency of these mistakes from one facility to the next, but in most cases, they occur during the process of administering medication.

No one in the medical field is more adamant than those responsible for patient safety (Kachalia & Bates, 2014). The safety of healthcare workers is just as important as the safety of patients. All points along the healthcare system worry about the possibility of medication errors. Over the years, researchers have noticed that MAEs increase mortality and morbidity rates in some cases, as well as affect hospital costs and patient lengths of stay (WHO, 2016).

The Patient Safety Curriculum Guide Report (2011) states that all healthcare workers have a duty to provide their patients with the highest quality

care possible while making no more than necessary mistakes (World Health Organisation, 2011). Medication is a therapeutic intervention that can help patients feel better by reducing their symptoms, speeding up their recovery, and enhancing their overall health and quality of life. All drugs, however, carry the potential for side effects (Metsala & Vaherkoski, 2014). Care for individuals of all ages, families, groups, and communities, in both health and illness, is central to nursing, as defined by the International Council of Nurses (2002). Care for the sick, disabled, and dying are all aspects of nursing.

A midwife is a woman who has been regularly admitted to and graduated from a midwifery educational program that has been properly recognized in the country in which it is located and who has successfully completed the prescribed courses of study in midwifery and acquired the requisite qualifications to be registered and/or legally licensed to practice midwifery (International Confederation of Midwives, 2005). Many rules and policies have been made to help stop mistakes from happening when drugs are given. Most nurses know the five rights of giving medicines: the right patient, drug, dose, route, and time (Eisenhauer, Hurley, & Dolan, 2007). By extension, these rights can be put into 10 groups: Right Patient, Right Reason, Right Medicine, Right Route, Right Time, Right Dose, Right Form, Right Action, Right Documentation, and Right Response. These medication rights are meant to keep patients safe and keep them from getting hurt (Elliot & Liu, 2010). Just like there are different kinds of medication errors based on how they are classified, there are different kinds of drug administration errors based on when they happen in the process of giving a drug. For example, Seki and Yamazaki (2009) say that an error of omission can happen when a nurse is told to give a patient a drug but doesn't.

When a different drug than what was prescribed is given to a patient, this is called a "wrong patient error." Any shift can also have a drug administration mistake (morning, afternoon, and night shifts). Drug administration errors can also happen with different kinds of drugs, such as antibiotics, intravenous infusions, diuretics, anti-diabetes, anti-hypertension, and painkillers (World Health Organization, 2019).

According to Clifton (2008), nurses and midwives can make significant changes to patient safety and reduce medication errors, as demonstrated by Koppel's research. Medication mistakes will now be reported, distractions will be reduced, double checks will be performed independently prior to medication administration, and a safety culture will be promoted (Handler, et al., 2008). Seemingly, nurses and midwives are not reporting medication errors to higher authorities. On the other hand, reporting errors is vital to decrease the number of medication errors that occur. The frequency of certain types of medication errors may be difficult to gauge because of the lack of formal reporting and documentation by health officials (Garner, 2012).

Statement of the Problem

Recent studies of medication errors have estimated that MAEs may account for as many as 251,000 deaths annually in the United States (US), making medication errors the third leading cause of death (Anderson, 2017). In a study by Zauderer (2022), 30% of adverse effects caused by prescriptions given to patients in hospitals were as a results of medication errors. In Africa, a study by Mekonnen et al, (2018) reported that 2.8% of patients reported of medication errors leading to the patients being admitted at the hospital. In Ghana, a study by Acheampong, (2016) on medication administration errors in

an adult emergency department of a tertiary health care facility in Ghana found that 26.7% cases of patients who reported of medication errors had severe clinical illness and one fatal case was recorded.

Many rules and policies have been made to help stop mistakes from happening when drugs are given. Most nurses know the five rights of giving medicines: the right patient, drug, dose, route, and time (Eisenhauer, Hurley, & Dolan, 2007). By extension, these rights can be put into 10 groups: Right Patient, Right Reason, Right Medicine, Right Route, Right Time, Right Dose, Right Form, Right Action, Right Documentation, and Right Response. These medication rights are meant to keep patients safe and keep them from getting hurt (Elliot & Liu, 2010). Just like there are different kinds of medication errors based on how they are classified, there are different kinds of drug administration errors based on when they happen in the process of giving a drug. For example, Seki and Yamazaki (2009) say that an error of omission can happen when a nurse is told to give a patient a drug but doesn't. When a different drug than what was prescribed is given to a patient, this is called a "wrong patient error." Any shift can also have a drug administration mistake (morning, afternoon, and night shifts). Drug administration errors can also happen with different kinds of drugs, such as antibiotics, intravenous infusions, diuretics, anti-diabetes, anti-hypertension, and painkillers (World Health Organization, 2019).

Clifton-(2008) According to Koppel's research, nurses and midwives can make significant improvements to patient safety and reduce medication errors by modifying their own practices. Medication errors will now be reported, distractions will be reduced, safe double checks will be implemented prior to medication administration, and a safety culture will be promoted (Handler, et

al., 2008). Apparently, medical professionals are not reporting errors in drug administration. On the other hand, reporting errors is crucial to minimizing the occurrence of medical malpractice during drug administration. It can be difficult for health officials to know how often certain types of medication errors occur due to informal reporting and documentation of drug administration mistakes (Garner, 2012).

The primary barriers to nurses' and midwives' reporting of medical errors are culturally based, including "blame culture," management conduct, personal and professional considerations such as fear and accountability, and the availability of organizational reporting tools (Asgarian, et al., 2021). Interestingly, nurses and midwives agree that exposing medication errors to patients and hospital administration is the correct thing to do, but in fact, most nurses rarely report such errors (Peyrovi, Nasrabadi, & Valiee, 2016). Nurses cite their fear of legal culpability, the threat of losing their license to practice, the possibility of upsetting patients, and the loss of privileges and reputation as causes for this gap between theory and practice (You, et al., 2015).

WHO (2009) predicts that the risk of pharmaceutical error-related patient damage may be higher in Ghana due to limited physical facilities, technology advancement, and qualified human resources in hospitals. According to studies conducted by Degley (2016) in tertiary institutions in the Central Region of Ghana, drug administration errors in Ghanaian hospitals are comparable to those found in other countries. Patients with allergic reactions or extended hospital stays are susceptible to hospital-acquired infections, which can lead to problems, disability, or death.

Medication errors take many forms and they have been identified to be very present in most health facilities resulting in various degrees of effects to patients and other clients in the healthcare system. Evidence suggest that most medication errors are basically caused due to the failure of nurses, midwives, and other auxiliary health workers to adhere to the rights of medication administration among others. Reporting medication errors has been cited as one of the basic means of dealing with MAEs. The rate of reporting such errors is very low as compared to the actual number of MAEs taking place in health facilities. For the reporting of MAEs to be effective however, there must be systemic structures available in health facilities to facilitate the reporting of MAEs. However, these systemic structures have been seen to be lacking. There exist barriers to reporting medication errors which represent a huge problem which must be well looked at if medication errors are to be addressed among nurses and midwives as well as other auxiliary health workers.

In the Eastern Region of Ghana, the Holy Family Hospital Nkawkaw recorded 6 adverse drug reactions and 3 blood transfusion reactions in 2019; 4 and 1 in 2018; 3 and 4 in 2017; and 0 and 5 in 2016 (District Health Information Management System, 2020). Some of these reactions to drugs recorded at the facility may have been caused by medication administration problems.

Due to their crucial role in patient care, nurses and midwives are major offenders when it comes to medication errors, as evidenced by the research (Clifton-Koppel, 2008; Pham et al, 2011). Therefore, it is necessary to undertake a study to collect information on MAEs at Holy Family Hospital, Nkawkaw in Ghana's Eastern region and among nurses and midwives. This will provide

answers to inquiries regarding the types of errors made by hospital nurses and midwives and their underlying causes.

Purpose of the Study

The Purpose of this study was to assess medication administration errors among nurses and midwives at Holy Family Hospital, Nkawkaw in the Eastern Region of Ghana.

Research Objectives

This study sought to:

1. determine the prevalence of medication administration errors among nurses and midwives at Holy Family Hospital, Nkawkaw;
2. ascertain the causes of medication administration errors among nurses and midwives in their practice at Holy Family Hospital, Nkawkaw;
3. determine the systemic structures necessary for nurses and midwives to report medication administration errors at Holy Family Hospital, Nkawkaw;
4. determine barriers to reporting medication administration errors among nurses and midwives at Holy Family Hospital, Nkawkaw, and
5. determine the influence of background characteristics of nurses and midwives' willingness to report medication administration errors.

Research Questions

The following research questions were used:

1. What is the prevalence of MAEs among nurses and midwives at the Holy Family Hospital, Nkawkaw?
2. What accounts for medication administration errors among the nurses and midwives in their practice at Holy Family Hospital, Nkawkaw?

3. What systemic structures are necessary for nurses and midwives to report medication administration errors at Holy Family Hospital, Nkawkaw?
4. What are the barriers to reporting medication administration errors among nurses and midwives at Holy Family Hospital, Nkawkaw?
5. What is the influence of nurses' and midwives' background on reporting medication administration errors?

Significance of the Study

Both academic discourse and clinical nursing practice can benefit greatly from the study's findings. Nursing and midwifery staff at Holy Family Hospital, Nkawkaw, and other primary and secondary health care facilities in Ghana will benefit from this study in a few ways. It also helps shape healthcare facility medication error prevention policy for nurses and midwives. Furthermore, the study encourages nurses and midwives to adopt a proactive mindset and enhance their practice to reduce the likelihood of drug administration errors. Finally, the study piques the curiosity of other researchers, who may then go on to add to the existing body of knowledge by conducting their own studies in this area. To top it all off, it offers a hefty empirical study on the topic of medication errors and patient safety in Ghana's Eastern Region.

Delimitations

The study was delimited to profiling the drug administration errors that occur in all the medical, surgical, and emergency wards of Holy Family Hospital, Nkawkaw among nurses and midwives taking into consideration data collected from all nurses and midwives by means of a census. The study also

looked at the perspective of nurses and midwives on possible causes of medication errors in their practice. The necessary structures to nurses and midwives for medication error reporting were also studied as well as the barriers to these reporting systems. This was done quantitatively with the use of a questionnaire after which data collected from respondents were processed and analysed. The study, however, did not focus on the adverse effects of medication administration errors on patients.

Limitations

The limitations to this study include the use of census for data collection which was very tedious and demanding as the researcher had to ensure each nurse and midwife in the facility had been captured. From the responses obtained, it could be detected that individual biases and personal issues of respondents affected their perspectives and data provided which in a way, affected the reliability of the findings. Due to the sensitive nature of the study, some respondents were a bit hesitant to provide valid information to aid in the study.

Definition of terms

- Nurses: All cadre of nurses working in the facility including auxiliary nurses
- Midwives: All midwives working in the facility

Organization of the Study

The research paper has five parts. The first chapter provided context, a statement of the problem, the study's goals, and research questions. It also discussed the study's significance, scope, and limitations. In Chapter 2, we discussed the literature review that laid out the study's theoretical, empirical,

and conceptual foundations. Research methods were outlined in Chapter 3. This entails outlining the scope of the research, the methodology used to collect data, and the conclusions drawn from that data. Information about the study's participants, samples, and sampling methods, as well as the study's instruments and their respective validity and reliability, were all included in this section. The analyzed and discussed data can be found in Chapter 4. The study's findings and conclusions are summarized, and recommendations are offered in Chapter Five.

CHAPTER TWO

LITERATURE REVIEW

This chapter reviewed works from books, Journals, articles, and other publications that are related to the study. Literature review was done using search engines such as google scholar, PubMed, CINAHL, using keywords and Boolean tools. Per the objectives, the literature review was conducted in the following areas: concept of medication administration errors, dimensions of medication errors, causes of medication administration errors, systematic structures necessary for reporting medication administration errors, and barriers to reporting medication administration errors among nursing trainees.

Profile of Medication Errors in Nursing

The medical record contains all information regarding a hospitalized patient's daily treatment, including the date and time, a description of all procedures performed on the patient, and the names of all healthcare providers who provided care (Oselka, 2018). During an average eight-day hospital stay in a general teaching hospital, 75 different personnel interact with a patient's medical record. The completion of medical records in a manner that is comprehensive, accurate, and legible ensures that the information they contain will be adequately recovered for future treatment, research, and teaching purposes (Adebayo, 2019).

According to the findings reported by Lisby et al., the definition of a drug error is contentious (2010). Following an examination of the relevant published material, we were able to come up with a total of 26 distinct terms relating to errors in medication. According to the National Coordinating Council for Medication Error Reporting and Prevention in the United States, a

medication error is defined as an avoidable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of a healthcare professional, the patient, or the consumer. This can occur while the medication is in the possession of any of these parties. Prescriptions, order communication, product labelling, packaging, and nomenclature, compounding, dispensing, distribution, administration, education, monitoring, and use are some examples of professional practices, healthcare items, procedures, and systems that could be linked to such occurrences. Other potential culprits include nomenclature, product labelling, and packaging.

Accidents involving drugs can be classified in several different ways (World Health Organization, 2019). The categorization could be done according to the step in the sequence of the process that is used to make use of the medicine, such as prescribing, transcribing, dispensing, administering, or monitoring. Think about the different kinds of mistakes that can take place, such as giving the wrong drug, dose, frequency, delivery route, or patient. A third method classifies mistakes according to whether they are the result of improper planning (errors that are knowledge-based or rule-based) or mistakes that occur during the execution of activities that have been adequately planned (action-based errors, also known as "slips," or memory-based errors, also known as "lapses"). Errors can also be arranged into hierarchies according to the amount of damage they cause. There is not enough evidence to support the definition or classification of errors that occur in primary care, and these techniques do not compete with one another in any way. The classification's context as well as its primary goal will determine the approach that is taken (WHO, 2016).

As the medical records are the source of information required to establish specific and adequate care for each patient, any inaccuracies or omissions relating to drugs used prior to and during hospitalization may be linked to the occurrence of incidents that cause harm. The inadvertent administration of, for example, penicillin to a patient who has a history of being allergic to penicillin because the patient's medical records contained an error that caused that information to be removed (Poldervaart, van Melle, Willemse, de Wit, & Zwart, 2017).

An investigation into the root causes of nurses' and midwives' medication errors uncovered several distinct types of mistakes. On the job, some nurses and midwives have seen colleagues fail to adhere to patients' prescribed medication schedules. Inaccurate patient identification is another issue with medication safety, according to nurses and midwives. Next, mistakes in pharmaceutical preparation, like incorrect medication labeling, are frequently seen in clinical practice (Musharyanti, Claramita, Haryanti, & Dwiprahasto, 2019). Mistakes can occur at any stage of the healthcare process, from the initial consultation to the final disposal of the patient (Dalmolin & Goldim, 2013).

Causes of Medication Errors

Only a handful of studies have investigated what factors might be responsible for medication mistakes. As part of the Commonwealth Fund International Health Policy survey, patient-reported medication mistakes were investigated in seven different countries. Inadequate care coordination, financial barriers to medical services or medicines, comorbidities, and hospitalization were all found to play a role in the occurrence of medication errors in 11% of patients, according to an analysis of risk factors for medication errors (Lu &

Roughead, 2011). Medication errors are more likely to occur when there are more medications, younger and older patients, and medications targeting a wider range of conditions (including musculoskeletal, oncology, and immunosuppressive, dermatology, ophthalmology, otolaryngologic disorders, infections, and cardiovascular disease) (Guthrie, et al., 2011).

According to the findings of Reid-Searl, Moxham, and Happell (2010), the conditions that contribute to medication errors occur when nurses and midwives do not receive adequate supervision from their colleagues and senior nurses and midwives in the hospital and are not equipped with necessary drug safety training. Additionally, these conditions occur when nurses and midwives do not have access to necessary drug safety equipment. In addition, nurses and midwives require role models who can inspire and motivate them to practice drug safety in an appropriate manner (Vaismoradi et al., 2011). The final line of defense in preventing drug errors are nurses and midwives who are the healthcare professionals who interact with patients the most frequently (Sulosaari et al., 2012). According to the studies that are currently available, a significant number of newly graduated nurses have a low level of self-confidence in their capacity to safely administer medications due to a lack of knowledge of pharmacology, side effects, and other aspects of medication safety (Adhikari, Tocher, Smith, Corcoran, & MacArthur, 2014).

Numerous studies have been conducted on the factors that contribute to pharmaceutical errors in nursing education, the majority of which have been conducted in economically developed countries (Khasanah, 2012). There has only been a limited amount of research conducted on the different kinds of pharmaceutical errors that can be made by nurses and midwives in developing

countries (Mansour, 2013). An investigation conducted in Indonesia found that nursing students made 44.8% of medication errors while participating in clinical rotations, placing them in second place among all medical errors (Association of Indonesian Nurse Education Center, 2015). Because pharmacological knowledge is not directly related to patient safety, it is difficult for nurses to apply drug safety principles, which leaves them open to the possibility of making prescription errors (Vaismoradi et al., 2011).

Several causes of medication errors in clinical practice were identified in a study on why nurses and midwives make medication errors. According to most participants, a lack of knowledge and abilities in drug safety could lead to medication errors. The lack of positive role models was also a factor. In addition to lacking knowledge and practical skills, nurses and midwives reported being perplexed by the discrepancies between the behavior of other nurses and midwives at the hospital and what they had been taught in school. Inadequate supervision was also a major factor in medication errors (Musharyanti, Claramita, Haryanti, & Dwiprahasto, 2019).

Additionally, staffing issues impact the availability of suitable role models for nurses and midwives in clinical practice. Therefore, busy nurses' disregard for medication safety has the potential to be transmitted to other nurses (Gibbs & Kulig, 2017). Moreover, the heavy workload of nurses can impair the quality and quantity of supervision they receive (Ramani & Leinster, 2008). The absence of supervision for nurses, especially those who are new to the profession, makes them susceptible to prescription errors (Reid-Searl, Moxham, Walker, & Happell, 2009). Reid-Searl et al. further assert that this may become one of the reasons why nurses and midwives make medication

errors. Christiansen, Prescott, and Ball (2014) identify the lack of safety knowledge and its implementation in nursing education as one of the most prevalent factors related to medical errors and patient safety. Due to the disparity between theoretical instruction during preclinical education and knowledge application during clinical placement, numerous nurses and midwives struggle to consolidate their clinical abilities in practice (Mariani, Ross, Paparella, & Allen, 2017).

Poor illumination, excessive noise levels, restricted storage space resulting in crowded worktables, a poor layout of medication rooms, a lack of space for preparing and recording prescriptions, and a lack of privacy in medication rooms can all contribute to problems during medication administration. Each of these characteristics is related with an increased likelihood of exhaustion, tension, distraction, and interruptions (Mahmood, Chaudhury, & Valente, 2011). Therefore, environmental factors should be considered while developing measures to reduce pharmaceutical errors (Savvato & Efstratios, 2014).

According to research, the number of hours nurses and midwives work, the duration of their shifts, the severity of their patient's conditions, and their heavy workloads result in weariness (Ulanimo, O'Leary-Kelley, & Connolly, 2017). Due to heavy workloads and the acute nature of patients' diseases, nurses who often engage in competing activities are more likely to face distractions and interruptions, focus poorly on work-related tasks, and potentially make more errors (Hewitt, 2010). Errors are three times more frequent when staff work 12.5 hours or more on a shift (Watkins, 2021), and nurses are 2.5 times

more likely to experience burnout and job dissatisfaction when regularly working shifts of ten hours or longer (Stimpfel, Sloane, & Aiken, 2012).

Higher medication mistake rates relate to increased medication administration interruptions (Westbrook, Woods, & Rob, 2010). One of the most common reasons for mistakes at this stage is interruptions (Ozkan, Kocaman, & Ozturk, 2011). Nurses and midwives often must juggle a few different responsibilities at once due to interruptions, which are defined here as a break in the primary action being performed (medicine administration) to carry out a secondary duty (Petrova, 2010). Noise and other distractions can be ignored or dealt with simultaneously, but they still pose a risk of error and signal the impending arrival of a disruption (McFarlane & Latorella, 2012).

Systemic Structures Necessary for Reporting Medication Errors

The patient is the rightful owner of the information contained in their medical record, and they should always have unrestricted access to this information. The responsibility for this document's upkeep rests with the respective institutions. Those in charge of a patient's medical records must help provide certified copies of the record to the patient or the patient's legal guardian upon request (Conselho Federal de Medicina, 2007). Accurate reporting is crucial for tracing the origins of errors (Hewitt, 2010). Step one in developing strategies to reduce errors is to gain a firm grasp on what constitutes such a blunder (McBride-Henry & Foureur, 2016).

Dalmond and Goldim (2013) notes that the most important ethical implications of medication errors depend on their severity, type, and drugs involved. These include documenting medication errors in patient records, communicating between professionals, disclosing the error to the patient and/or

family, and reporting an error that has caused damage. When people in the healthcare industry are taught to believe they can do no wrong, they may be less likely to report mistakes they make on the job. Activities that train the professional to deal with mistakes are not emphasized during training. Negative emotions like shame, helplessness, and incompetence are the predictable results of mistaking the concept of guilt for the experience of making a mistake (Barreto & Kuramoto, 2006).

Institutional notification initiatives, as proposed by Dalmolin and Goldim (2013), allow healthcare facilities to address the challenges associated with the error in an educational fashion, involving all professionals involved in the medication system. This is especially vital in academic medical centers, where students and professionals from all over the healthcare spectrum come together to learn and practice their craft. To improve communication within healthcare teams, it is essential to combine these institutional notification initiatives with others that foster a mindset of continuous learning. The multidisciplinary team shifts the focus from isolated efforts to collaborative efforts based on shared information (Camargo, Bertoli, Inocenti, & Perufo, 2007).

While drug use begins with a doctor's prescription, Benjamin (2013) argues that other medical staff, including pharmacists, nurses, midwives, and others, must be present and involved to ensure safe and effective treatment. When put together, these responsibilities aid greatly and improve the standard of care given to patients. A hospital's drug error prevention efforts should also be defined and organized by a multidisciplinary committee. Doctors, pharmacists, nurses, midwives, risk managers, and representatives from the

management sector should all be included. As an added note, a hospital's bioethics committee or quality department representative may be invited to sit on this collegiate committee (Otero López, 2013).

To err is human, and it is inevitable that we will err in our efforts. Institutionally, it is crucial to have channels of communication, evaluation, and course correction in place for these sorts of happenings. To ensure effective and ongoing communication, a climate of trust must be established among the involved specialists. The evaluation process, which seeks to locate potential dangers and voids in the healthcare delivery system, must also account for this assurance. Alterations to the system and/or training for caregivers may be necessary to affect a resolution (Dalmolin & Goldim, 2013). Patients are required to be informed of unexpected treatment outcomes per the standards set forth by hospital accrediting bodies. Taking responsibility for mistakes demonstrates honesty and a willingness to put the patient's needs first (Rosner, Berger, Kark, Potash, & Bennett, 2010).

It is important to note that disclosure refers to the conversation between a healthcare provider and a patient, or between a healthcare provider and a patient's family member or legal representative, in which the occurrence of this circumstance is reported. An expert should not only admit a mistake but also elaborate on what happened and how the mistake led to the consequences that were observed. The patient must be able to understand this information in its entirety (Fein, et al., 2007). According to research, when an error has occurred, especially one that has caused harm, patients have four requirements: they must be told what really happened, they must be assured that the health care facility will take responsibility for the mistake, they must be given an apology from the

facility for the harm they have caused, and they must receive an apology from the professional who made the mistake. Nonetheless, it is not uncommon for people to withhold information for fear of legal repercussions, and apologies are uncommon because some professionals see them as an admission of guilt (Weiss & Miranda, 2018).

Experts disagree on whether the professional owes an apology to the client. From a therapeutic vantage point, it is crucial for the professional to demonstrate humility, humanity, fallibility, and remorse. Apologizing sincerely can help the victim heal psychologically and pave the way for forgiveness. The expert may feel less shame and guilt after an apology is made (Weiss & Miranda, 2018).

If a medical professional makes a medication error, they need to report the substance and describe what happened so that appropriate measures can be taken for the patient and similar mistakes can be avoided in the future (Chiericato, Cassiani, & Carvalho, 2011). Medication errors should only be documented in the medical record if a trustworthy account of the relevant facts and circumstances can be provided. The simplest way to do this is to record the date, time, location, substance, dose, route of administration, patient outcomes, and corrective measures taken after the problem was identified. This needs to be presented along with any other data that pertains to the development of patient care. The report needs to be as unbiased as possible, with no assumptions made about who did it. These associations may be investigated further in the future using this dataset as a starting point (Dalmolin & Goldim, 2013).

Standard protocols for doctor-patient communication should be followed when disclosing information about the mistake. The reveal should take

place in a private area away from other patients and their families who aren't involved in the case. This keeps people from worrying about whether they were responsible for similar incidents while in their care, who don't need to know about them. The specialist should be equipped with all relevant information and accompanied by other experts involved in patient care whenever possible. The patient should also be asked if they would like to bring a friend or family member with them to the appointment. In situations where the provider anticipates challenges for the patient or the patient's family, if present, they may consult with a more senior colleague for advice. As you reveal the information to the patient, you should gauge their reaction and adjust your delivery accordingly. The patient should be given straightforward and objective answers to any questions they may have, within the scope of the patient's questioning. The provider must avoid coming across as defensive while listening. After receiving bad news, patients and their loved ones deserve our attention so that we can figure out how best to help them (Francesconi & Goldim, 2015).

Medication errors were reduced in five out of ten randomized controlled trials that included a computerized intervention. By focusing on alerts that are most important for patient care, Computerized Provider Order Entry (CPOE) with decision support hopes to lessen the overall number of notifications that doctors, and nurses must deal with (Lainer, Mann, and Sonnichsen, 2013). There is substantial proof that CPOE can help reduce medication errors in hospitals. According to research, using CPOE to handle an order decreases the likelihood of an error by 48%. (Radley, et al., 2013). However, more research is needed to determine whether a decline in medication errors correlates with less harm to patients.

As has been discussed in the preceding sections of this literature review, training medical professionals is essential to ensuring safe primary care. This is still valid for multi-component therapies aimed at reducing the occurrence of medication errors, including education. Researchers reviewed 47 studies and found that training interventions to enhance antibiotic prescribing and dispensing might influence clinician behavior by increasing adherence to guidelines (Roque, Herdeiro, Soares, Teixeira, & Breitenfeld, 2014). Medication management education tailored to the needs of individual patients is an area that has received surprisingly little research attention despite its importance. Patient self-administration of medication is as safe as, or safer than, standard treatment, according to a review of the literature, provided adequate education and preparation have been provided. Patient-maintained health records were found to have a generally positive effect on health outcomes, according to the same review, but there was some concern that this might have an adverse effect on equity (Pedersen, Brereton, Newbould, & Nolte, 2013).

Barriers to Reporting Medication Errors among Nurses and Midwives

Notification of medication errors may be spotty in large hospitals, happening only in some units or providing scanty, low-quality information. Consolidating data has been shown to improve clarity. All staff members at the institution must be included in the dissemination of this information. Error patterns can then be identified, and the various parts of the medication system that contribute to those errors can be targeted for improvement (Gandhi, Seger, & Bates, 2010).

It is not uncommon for medical professionals to feel conflicted about breaking bad news to patients and their loved ones. A negative development is

any information that causes an immediate and negative shift in outlook. To put it bluntly, medication errors are bad news all around. When a patient associates negative outcomes with the occurrence of an error, they may develop symptoms of anxiety, depression, or trauma. Like how it can have a physical impact, it can also have an emotional impact on the professionals involved, depending on the severity (Weiss & Miranda, 2018).

Patients' views on the right to be informed about harmless errors in medication administration differed from doctors', according to a study comparing the two parties' perspectives on the disclosure of medication errors. While some patients felt it was important to be kept abreast of potential developments, others were concerned about being upset by such knowledge. While some doctors worried that informing patients could damage their relationships with their patients, others saw it as a chance to explain what had happened (Gallagher, Waterman, Ebers, Fraser, & Levinson, 2003).

All healthcare providers will be put in an uncomfortable position if the decision is made not to disclose the error, regardless of the harm that may have resulted from it. Potential sources of distress include both the information withheld and the answers given to the patient's inquiries. It's possible that by leaving out this information, they're intentionally lying or stretching the truth. Problems arise when trying to identify the boundary between two distinct types of circumstances. It was found by O'Connor, Coates, Yardley, and Wu (2010) that the disclosure of a previously undisclosed medical error has a negative effect on the trust between medical staff and patients.

Medication errors have a different impact on the examination of ethical considerations. All potentially harmful mistakes, as seen from the patient's

perspective, should be made public. Disclosures like this can prove the doctor's honesty and earn them more respect (Dalmolin & Goldim, 2013). As such, it may be interpreted as proof that patients are being fully informed about their treatment options. From the doctors' point of view, harmful mistakes should also be made public. However, there are three situations in which clinicians may not disclose an error even if damage has been done: when the damage is minor, when the patient is unconcerned or unable to comprehend that an error occurred, or when the patient does not want to know about the error (Gallagher, et al., 2003).

Damage must be quantified to apply the "insignificant damage" exception for withholding information. According to this theory, negligible damage would be interpreted as no damage at all. This categorization, if deemed appropriate, should also be written into an institution's policy, as doing so would prevent this decision from being made on an individual basis and depending on various factors. The calculation of the loss or gain indicated is the reason behind this exemption. The other deviation is based on arbitrary criteria. Judging that a patient is unconcerned or unable to comprehend that a mistake has occurred is extremely difficult and subject to scrutiny. This could be seen as a professional being overprotective of the patient (Dalmolin & Goldim, 2013).

Most nurses and midwives rely on their colleagues for information rather than consulting authoritative databases (Kosteniuk, D'Arcy, & Stewart, 2006). Some people may be hesitant to use online records that require them to enter search terms because of a variety of factors, including a lack of confidence in their own computer skills or the reliability of the information they may find (Dee & Stanley, 2015).

Nurses cited the error's severity as a reason for not reporting it in a study looking at what factors affect the reporting of nursing errors. One subset of difficulties was preserving a good name. The nurses reported that not reporting errors was due in part to their desire to protect their professional reputation and avoid a scandal. Ineffective communication within the organisation was another hindrance, as flaws were often covered up by nurses fearing retaliation. The nature of the reporting system also played a role in the prevalence of reporting mistakes. They thought that when the system anonymously asked for bug reports, it increased the number of reports. One of the factors that influenced nurses to come forward and admit to mistakes was the nurses' positive past experiences. Nurses were urged to be honest about their shortcomings because of their track records of success (Ajri-Khameslou, Aliyari, Pishgooie, Jafari-Golestan, & Afshar, 2018).

Influence of Nurses' and Midwives' Background Characteristics on Education and Experience (MAEs.)

There is mounting evidence that health care organizations cannot achieve their goals without the contributions of knowledgeable, motivated, and talented health care professionals (WHO, 2012). Experienced RNs and midwives, thanks to their exposure to a wider range of patient conditions and clinical scenarios, are thought to be better equipped to perform nurse surveillance due to the higher quality of care they provide (Stalpers, De Brouwer, Kaljouw, & Schuurmans, 2015). Although numerous studies have shown that improved nurse staffing and more supportive work environments are associated with lower rates of adverse events such as medication errors and mortality, less emphasis has been placed on the potential benefits of a more

highly educated and experienced workforce of registered nurses and midwives. This is even though many of these studies have been conducted (Kendall-Gallagher, Aiken, Sloane, & Cimiotti, 2011). As a direct result of the recommendation made by the Institute of Medicine (IOM) that the number of nurses and midwives who hold a bachelor's degree should increase to 80 percent by the year 2020, there has been a substantial increase in the research interest in latter associations over the past few years. 2011 report from the Institute of Medicine. Despite a campaign to implement the report's recommendations and the preference of chief nursing officers and nursing managers, the recommendation that more nurses and midwives have a bachelor's degree has not been fully implemented, according to the statistics that have been collected from around the world. This is the case even though the recommendation was made by the Institute of Medicine.

In the United States, anywhere from half to two-thirds of nurses and midwives hold a bachelor's degree or higher (National Council of State Boards of Nursing, 2017), and in 12 European countries, on average, 54% of nurses and midwives hold a bachelor's degree or higher (Aiken, Sloane, Bruyneel, Van den Heede, & Sermeus, 2013). The Institute of Medicine has called for nurses and midwives to be educated to the same level as their counterparts abroad, but some experts argue that this cannot be done because there is insufficient evidence to back up the benefits of such an increase in education (Blegen, Goode, Park, Vaughn, & Spetz, 2013). The researchers in this study wanted to get a better idea of how hospital nurses and midwives in the Riyadh Region of Saudi Arabia rate their own performance on the job and to see how those ratings compare to those of their coworkers in similar positions. Though other factors, such as those

related to the nurse's identity and professional experience, played a role, job satisfaction and organizational commitment stood out as the most significant predictors of nurses' performance.

Years of experience, nationality, gender, and marital status are all strong predictors of occupational success; educational attainment, on the other hand, predicts less favorable outcomes (Al-Ahmadi, 2009). The older, single nurses and midwives with the most education and experience also outperformed their younger, married counterparts by a significant margin. These nurses and midwives choose to work at the hospital for longer shifts so that they can acquire more experience and knowledge. Consistent with the findings of (Rabeel, 2014), which found that nurses and midwives gain expertise with experience, our own findings show that senior practitioners tend to have a deeper understanding of their specialty. (Refaat, 2010) found a statistically significant correlation between performance level and nursing qualification, suggesting that nurses and midwives with higher qualifications had, on average, higher total performance scores than nursing school graduates as they transfer their educational knowledge into clinical practice.

Also, this finding is in line with the findings of (Serra, 2018), who found a statistically significant positive correlation between nurses' age and their performance. Further, it was found by (Shehata, 2008) that senior nurses and midwives at Mansoura University Hospital had greater expertise in providing nursing care to deal with challenging tasks. They also felt more assured in their ability to strive for excellence and put quality ahead of quantity.

Theoretical Framework

The study considered 3 frameworks: the Human Factors Approach, the Error Context and Management Approach and the Swiss Cheese Model. These models were considered because they all provided a degree of association with the study objectives however, they were not used as the main framework because they failed to fully communicate the study objectives. However, the conceptual base of the study was developed from the Donabedian Structure-Process-Outcome Health Model which showed a high degree of relationship with the study objectives and well represented the study objectives.

Human factors approach: theoretical background and basic concepts

Since the IOM published "To err is human," there has been a great deal of public and scientific interest in human factors in healthcare and preventable adverse patient outcomes, in particular pharmaceutical errors (Vincent, 2012). Human factor analyses are performed to pinpoint and identify the root causes of system or process failure that can be attributed to human error. Human factors research can be used to create safer systems and procedures by doing things like standardizing and streamlining processes, adding redundancy, enhancing team communications, and rethinking the work environment (Kohn, Corrigan & Donaldson, 2010). To Err is Human: Creating a Safer Health System highlights the significance of human error in patient and drug safety (Kohn et al., 2000). Rasmussen (1983) and Vincent, Taylor-Adams, and Stanhope (1995) have made significant contributions to human factors research in healthcare (1998).

Error context and management: person and system approach

Finding, containing, reducing, and ideally eliminating errors are all facilitated by error management. Human error can be mitigated, and

pharmaceutical safety can be improved using either the person or the system approach (Reason, 1990).

The human element is emphasized in the person method, which pinpoints potentially harmful actions made by individuals as the root cause of mistakes. It chalks up the person's risky actions to factors like forgetfulness, apathy, and a lack of willpower. The 'person' approach ignores conditions or problems inherent to the work environment, systems, and processes that contribute to human errors in favour of modifying human behaviour to reduce errors (to reduce inattention and improve individuals' awareness and recognition of 'error traps') (Reason, 1990).

Errors can be mitigated or eliminated altogether by taking a systemic approach, which analyses the contexts in which people perform their jobs to determine what causes them and what can be done about it (i.e., improved system design, minimizing staff interruptions, and redundant "double checks"). Because of our fallibility, we often accept that "to err is human." The individual, the team, the task, the workplace, and the institution are all potential sources of error, so it is essential that we take a systems-based approach to preventing errors and improving patient safety. Accidents cause breakdowns in defences, barriers, and other safeguards. The "Swiss cheese model" depicts defences that fail to prevent errors and raises the question of how and why this occurred (Reason, 1990).

The “Swiss cheese model” of system accidents

The Swiss cheese model was developed by Reason (1990) to illustrate how analyses of major accidents and catastrophic system failures tend to reveal multiple smaller failures leading up to the actual hazard. Errors, according to

Reason (1990), shouldn't be looked at in a vacuum but rather considering the context in which people make them. Causes further back in the chain of causation could be to blame for errors or accidents. Operators (doctors, nurses, pharmacists, etc.) are put in the driver's seat whenever there is direct patient interaction, such as when a nurse gives the wrong medication to a patient. Reason's (1990) "Swiss cheese model" or "organisational accident model" is one of the most well-known system models in the field of patient safety. The dangers (or "holes") that lead to frontline human errors or accidents close to the patient are arranged in this model, which is depicted in Figure 1. The use of defences, barriers, and safeguards is crucial to the success of this tactic.

There are many safeguards in place within healthcare systems (alarms, physical barriers, etc.) to prevent mistakes and accidents from occurring. The many layers of defence are thin and vulnerable, much like Swiss cheese. Weak holes in anyone's "slice" typically do not have negative consequences. Inadequate barriers or defences (holes) in many layers typically only allow an accident opportunity trajectory and fail to intercept active failures, which is why most adverse events (or patient injuries) are preventable. According to Reason (1990), defence holes can be caused either by active failures (those resulting primarily from system factors, resulting in immediate occurrences, and including operators of complex systems) or by latent circumstances (i.e., factors that are inherent in the system). Nearly every negative event has both aspects, which can be detected through incident analysis (Reason, 1990).

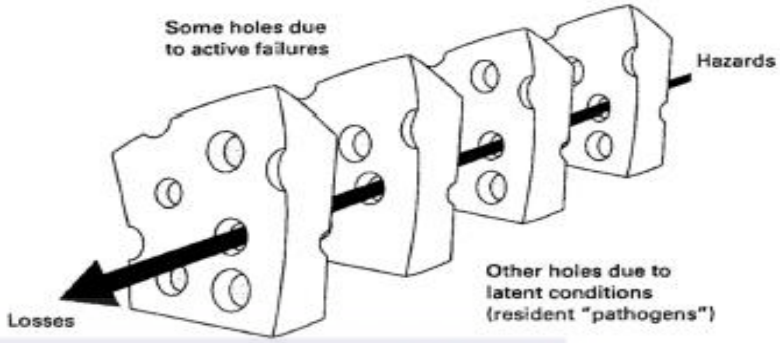


Figure 2: "Swiss cheese model" of system accidents (Reason, 2000)

Figure 1: **'Swiss cheese model' of system accidents.**

Source: Reason (1990)

Conceptual Base of the Study

The framework for this investigation is Donabedian's structure-process-outcome health model (Figure 2). The model consists of three parts: the framework, the process, and the result. Material resources (the building, equipment, and funds), human resources (the number of people employed and their skillsets), and organizational structure are all examples of elements of the environment that make up the structural component (medical staff organisation, peer review, methods of reimbursement). The process dimension is concerned with the actual procedures doctors and nurses use to treat patients. It includes both the patient's efforts to obtain care and the medical professionals' efforts to provide that care. Statistical evidence demonstrates a correlation between the quality of care provided by nurses and the health of their patients (Duffy & Hoskins, 2003). An optimal framework improves the odds of successful execution, which in turn improves the odds of successful results (Donabedian, 1988). According to Donabedian, if you improve the procedure, it will have a knock-on effect on the output. I examined the steps taken in the medical system

that led to medication mistakes and found that nurses and midwives are an integral part of the problem.

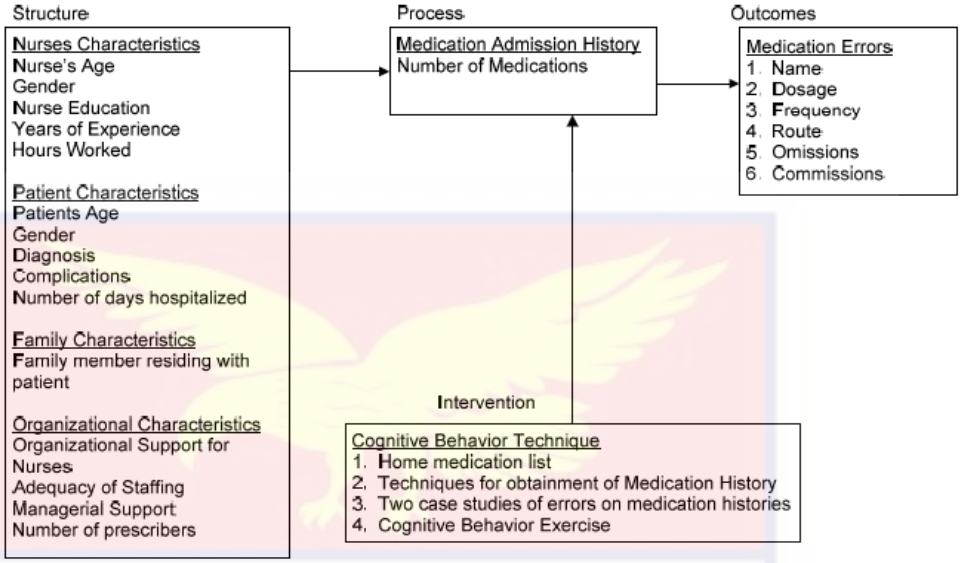


Figure 2: Donabedian's structure-process-outcome health model

Source: Donabedian (1988)

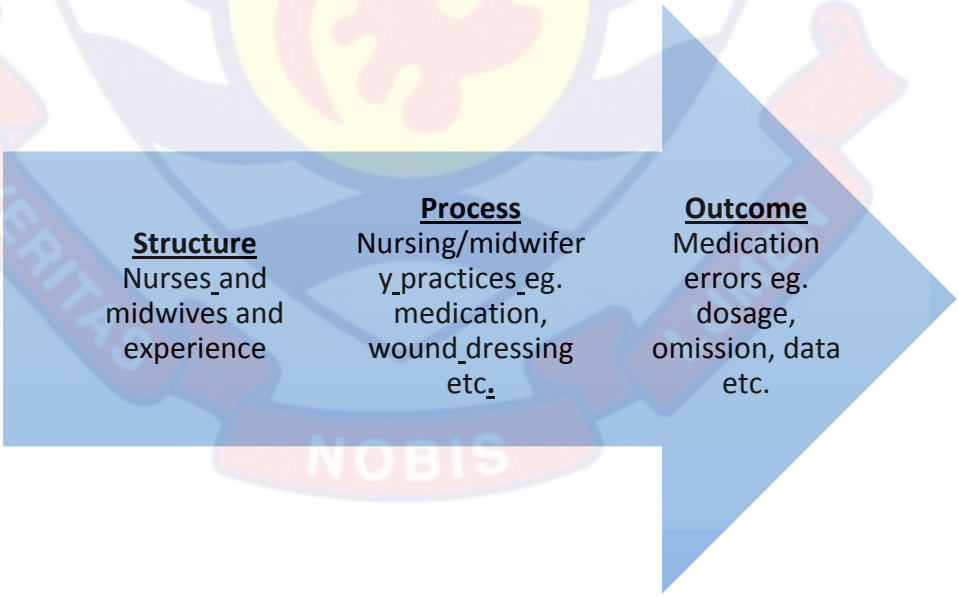


Figure 3: Conceptual framework on medication administration errors among nurses and midwives.

Source: Duffy and Hoskins (2003)

The conceptual framework as shown in Figure 3 is designed in line with the Donabedian structure-process-outcome health model. The framework is seen as a chain process which starts from structure to process and ends at outcome. In this study, structure involves nurses and midwives' characteristics which include nurses' and midwives' age, gender, education, years of experience, working hours etc. The process aspect in the chain involves all activities performed in nursing practice which include administration of medicines, wound dressing, educating patients and documentation of work. The final aspect of the chain, which is outcome, includes improvements in patient health condition or otherwise and in the case of this study medication errors. Using the Donabedian structure-process-outcomes health model, the conceptual framework is derived which allows for the study variables to be defined and identified in a chain process form.

In relating the Donabedian structure-process-outcomes health model to the research objectives, the structure concept can be seen in the profile of medication errors which exist in different contexts and take many forms. The process aspect can be related to the causes of medication errors which represent the process through which medication errors occur. The systemic structures necessary for reporting medication errors and the barriers to reporting medication errors basically describe the intervention aspect of the Donabedian structure-process-outcomes health model which talks about measures to address the causes of medication errors. The outcome aspect is realized in the effect of the intervention measures on the causal factors which may lead to either an increase or decrease in the number of medication administration errors recorded among nurses, midwives and other auxiliary health workers.

Summary of Reviewed Literature

This chapter (Literature Review) was focused on reviewing already existing literature that this present study can be linked to. The literature review covered the prevalence of medication administration errors, causes of medication administration errors, systematic structures necessary for nurses and midwives to report medication administration errors, barriers to reporting medication administration errors, background characteristics of nurses and midwives that influence reporting of medication errors, and the theoretical and conceptual bases of the study. The sources of literature used included journal articles, theses, reports, and materials from websites.

There are different terminologies for describing a medication error (Lisby, et al., 2010). An event that may cause or lead to inappropriate medication use or cause harm to the patient while the medication is in the control of the healthcare professional, or the patient is considered as a medication error. The errors may be classified based on their level of severity (WHO, 2016). Prevalence of medication errors may be related to insufficient information recorded in the files of patients (Poldervaart, et al., 2017).

The reviewed literature points out that causes of medication errors are diverse. Insufficient supervision of works of nurses and midwives by senior officials, incompetence new nurse-midwife graduates regarding the safe administration of drugs due to limited knowledge of pharmacology have been identified to contribute to the causes of medication errors (Vaismoradi, et al., 2011; Adhikari, et al., 2014). Other causes of MAEs are identified as poor nurse-to-patient ratio, working for longer hours (Watkins, 2021), environmental characteristics such as poor lighting systems, high noise levels and cluttered

work surface (Mahmood, et al., 2011; Savvato & Efstratios, 2014). One or a combination of some of these factors, among others, cause medication errors.

Having a clear understanding of what constitutes an error is the first systematic step to reducing errors (McBride-Henry & Foureur, 2016). Putting in place a system of trust among the healthcare professionals to report errors will increase its practice among nurses and midwives (Dalmolin & Goldim, 2013). The barriers to reporting medication errors are preservation of reputation of the professional through whom the error occurred (Ajri-Khameslou, et al., 2018), considering the error to be trivial (Gallagher, et al., 2003), and having internal conflicts whether to report the error incidence or not (Weiss & Miranda, 2018). Finally, the literature suggests that educational qualification level, and the years of service spent by healthcare professionals are demographic characteristics that influence the decision to report medication errors (Institute of Medicine, 2011; Stalpers, et al., 2015). The theoretical framework used in the study encompasses the human factor approach, error context and management approach, and the "Swiss cheese model" of system accidents. The reviewed literature gave some guidelines that helped in planning and choosing the appropriate research methods suitable for the variables in this study.

CHAPTER THREE

RESEARCH METHODS

This chapter is about how the research methods used in assessing medication administration errors among nurses and midwives at the Holy Family Hospital in Nkawkaw made mistakes when giving out medications. It talks about the research design, the study area, the population, the sampling method, the data collection tools, the data collection methods, and how the data is processed and analysed.

Research Design

This study employed the quantitative approach. The research was quantitative in nature because it was more objective, which helped to measure and present data in a comprehensive way in the form of graphical methods through the collection of numerical data. A quantitative cross-sectional descriptive study approach was used to collect data on study variables at a particular point in time. With the use of this design, the nurses and midwives who were involved in this study were contacted on a snapshot basis. The use of the design helped to describe the nature of drug administration errors among nurses and midwives in practice. To describe the occurrence of medication administration errors, cross tabulation, which is a commonly used method for establishing relationships between existing variables was done along with frequencies and percentages of variables.

The advantages of this study design were that it was economical and efficient; provided descriptive, inferential, and explanatory information as well as standardized information. Also, it prevented attrition of participants as the

nurses and midwives were contacted only once. However, its weakness was that it resulted in having a relatively low response rate.

Study Area

When it comes to healthcare in the Kwahu West Municipality, the Holy Family Hospital in Nkawkaw is the place to go. For complex medical, surgical, obstetric, or pediatric cases, residents of the surrounding communities and districts can turn to this facility as a referral center.

Nkawkaw Holy Family Hospital has a staff strength of about 350 comprising Specialists, General Practitioners, House officers, Physician Assistants, Nurses and Midwives, Allied health professionals and other paramedical staff.

The hospital runs a 24-hour service comprising OPD services with about 10 consulting rooms. It has an emergency unit for detention within 24 hours before discharging or admission into any of the medical or surgical wards (both male and female). It has an isolation unit for management of contagious diseases such as tuberculosis and epidemic-prone diseases such as Cholera and Covid-19.

The hospital has a well-resourced maternity unit headed by two gynaecologists with house officers as well as a 68 bed capacity babies unit headed by a paediatrician out of a total 230 bed capacity of the hospital. The maternity unit and the paediatric department of the hospital collaborate strongly due to their interdependence in terms of the cases they attend to. The population of nurses and midwives in the facility at the time of the study was 231.

Data provided by the District Health Information Management System (2020) on adverse drug reactions recorded in Holy Family Hospital which may

be as a results of medication administration errors and considering the large population and services the facility offers provides the basis for selecting Holy Family Hospital as the study area.

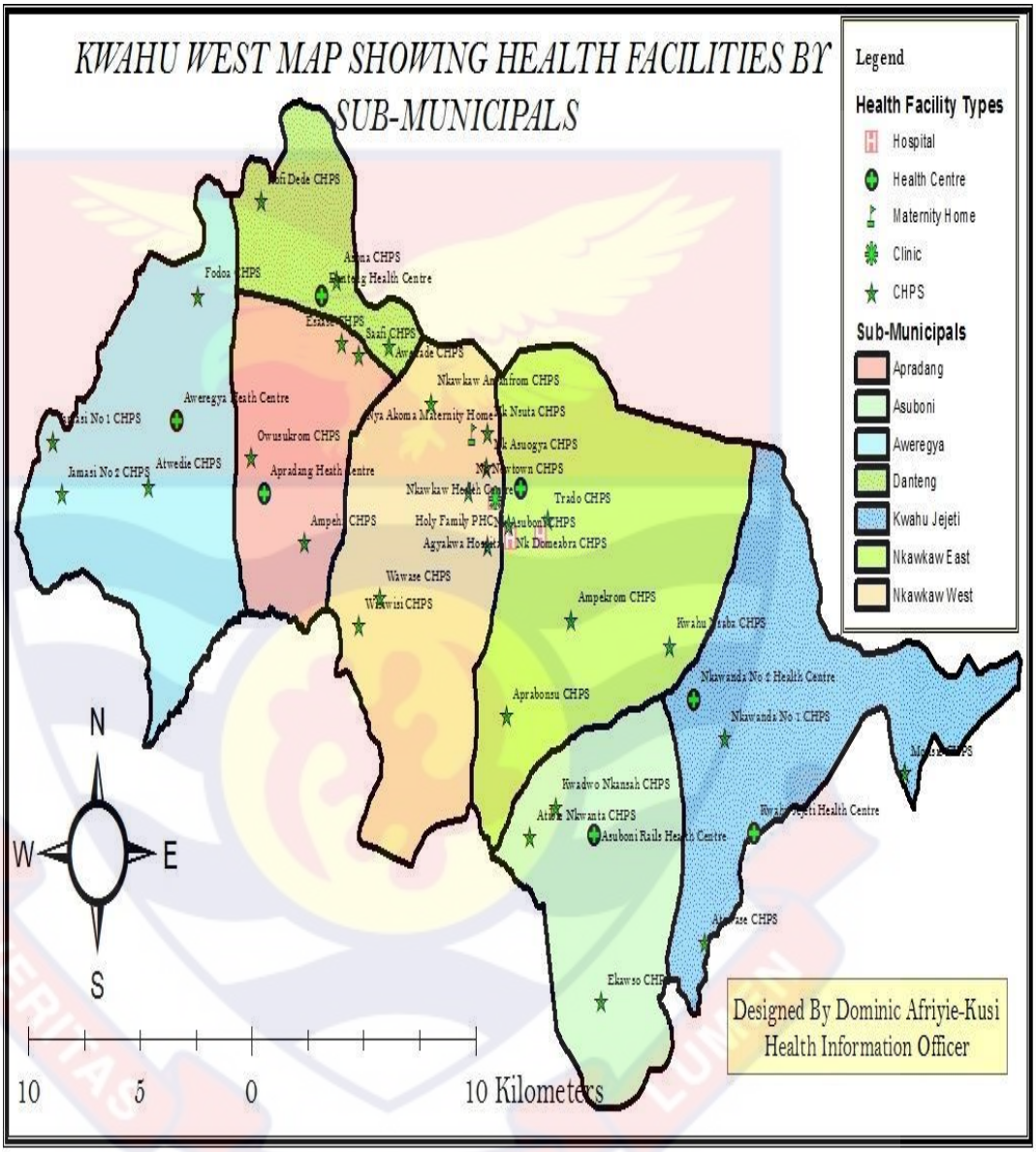


Figure 4: Map of Kwahu West Municipality showing health facilities & Holy Family Hospital.

Population

The study population included all nurses and midwives and other auxiliary health workers employed at Holy Family Hospital. Statistics from the Nursing Manager and the facility indicated that the population of nurses and

midwives and other auxiliary health workers in the various departments of the hospital were 231 at the time of the study. These nurses and midwives and other auxiliary health workers had different demographic characteristics including age, years of experience and level of education. A total number of 231 respondents (made up of midwives, general registered nurses, health assistants and community health nurses) at the Holy Family Hospital who worked in different categories and performed duties specifically assigned to them participated in the study. The breakdown of midwives and nurses and other auxiliary health workers (general registered nurses, health assistants and community health nurses) enrolled in the institution is given in Table 1.

Table 1: Enrolment of Midwives and Nurses in Holy Family Hospital, Nkawkaw

Category	Number of nurses
Midwives	79
General Registered Nurses	75
Health assistants	59
Community health nurses	18
Total	**231**

Source: Field data (Otoo, 2021)

Sampling Procedure

A census was employed in this study as it relies on data collection from all population members to provide the responses to the variables of the study. An advantage of this method is that it provides accurate and complete information since all population members are involved. A disadvantage of this method is that it is time consuming.

Since a census was used in this study, all nurses and midwives and other auxiliary health workers working in Holy Family Hospital were selected for

data collection. Thus 231 nurses and midwives and other auxiliary health workers were used for the study.

Data Collection Instruments

An adapted questionnaire from a study with similar variables to this study was used for data collection from the participants for the study. The questionnaire was adapted by the researcher and was made up of closed-ended, open-ended and Likert scale questions which were structured into 6 sections.

Section A considered the demographic characteristics of participants and had five sub-items. Section B was made up of two items and looked at the concepts or dimensions of medication errors participants might have experienced in their practice. Section C comprised fifteen sub-items and examined the possible causes of nursing medication errors. Section D of the instrument explored the systems and structures nurses, and midwives deem necessary in reporting medication errors and had five sub-items. Section E enquired from the nurses and midwives the barriers associated with reporting nursing medication errors and had six sub-items. The last section, Section F established the influence of background characteristics of respondents on reporting MAEs.

The questionnaire used was adapted from Pournamdar and Zare (2016) on a Survey of Medication Error Factors from Nurses' and midwives' Perspective. This questionnaire was adapted for this study because this study had similar objectives to that of Pournamdar and Zare on medication error factors from nurses' and midwives' perspective and could aid in reaching the research objectives. The strength of the questionnaire was that it covered all the variables being studied but its disadvantage was the associated difficulty in

getting respondents to fully complete the questionnaire due to the questions being a bit lengthy.

Section A of the data collection instrument was modified to only include demographic characteristics relating to the study population. Section B of the data collection instrument was completely designed by the researcher in order to capture data on the prevalence of MAEs which was not included in the adapted questionnaire. Section F of the instrument was also fully developed by the researcher to look at the Influence of Nurses' and Midwives' Background Characteristics on Reporting MAEs. However, the sections on causes of MAEs were completely retained from the adapted instrument as it was fully in line with the research objective.

A pretesting exercise of the data collection instrument was carried out. To be conversant with the data collection instrument and process, the adapted questionnaire was tested among 20 nurses and midwives at KenopCare which makes approximately 10% of the sample size with similar characteristics as the nurses and midwives involved in this study. This helped to address and correct any difficulty in the data collection process which could have affected the outcome of the actual study.

Validity and reliability

In analyzing the pretesting data, the Internal Consistency Coefficient was computed using the Cronbach Alpha measure to indicate the degree to which the items in the data collection tool measure the same trait. The internal consistency coefficient of the overall scale forms the pretesting exercise conducted was 0.82 indicating the instrument was valid and reliable. Therefore,

the instrument was used for the actual data collection exercise for the study since validity and reliability was ensured.

Data Collection Procedures

Five (5) field assistants were recruited by the researcher to assist in the data collection process. The field assistants were responsible for identifying research participants, obtaining consent from participants, proper records taking and keeping, face-to-face interactions with participants, conducting data collection, making sure all participants adhere to the already stated Covid-19 protocols and other duties assigned to them. The field assistants had at least Senior High School level qualification and had to demonstrate a high level of understanding of the data collection process and professionalism. A two-day training program was organised by the researcher for the field assistants to provide a general overview of what was required of them in the data collection process. The field assistants were trained on developing and exhibiting skills of good communication, attention to detail, technical skills, and the ability to maintain quality and safety standards in the data collection process. The field assistants were also trained on issues bothering on ethical issues such as confidentiality, anonymity, and informed consent. They were again tasked to maintain and apply these ethical standards very well. The field assistants were given fair remuneration for their efforts.

A written introductory consent was sought from the nurses and midwives on a template containing the questionnaire. Nurses and midwives in each ward being used for the census were provided with questionnaires to provide their responses to the questions. The field assistants were available to provide help to the nurses and midwives without influencing their decisions.

Data collection was done after approval and clearance had been received from the management of the health facility. Data collection was done before and after the beginning of nurses' and midwives' working shifts so as not to interfere with their work. The data collection process lasted for a period of two weeks to be able to capture all nurses and midwives available. Receiving positive reception and cooperation from nurses and midwives served as a challenge in the data collection process.

Data collection was done in the COVID-19 period and as such certain precautionary and preventive measures were taken. Data collection was face-to-face, where the researcher had direct contact with the respondents. Since data collection was done in the hospital setting and among health workers, there was an adherence to the COVID-19 protocols such as the wearing of nose masks, hand washing and hand sanitizing and observing at least 1-meter distance between the research participants and the researcher among others. I politely always insisted on the adherence to these measures in the data collection process.

Also, I made use of a sampling frame containing the names and contacts of all nurses and midwives at the Holy Family Hospital to help identify participants who were contacted at each point in time. This documentation served as a source of reference when a situation which might require contact tracing occurred. I also made a personal risk assessment of situations and the environment at each point in time to make sure the right safety measures were being followed.

Data Processing and Analysis

The respondents' responses were computed and analyzed using the Statistical Package for the Social Sciences (SPSS) version 22.0 computer software, where data was coded into the software and commands were issued to obtain findings. Data was entered with care, and data was cross-checked to prevent incorrect data entry. The data was analyzed to yield descriptive, inferential, and explanatory information, as well as standardised data. The results were presented in numerical tables with associated explanations. The dependent variable studied was medication administration errors among nurses and midwives. The independent variables were the causes of medication administration errors, the systemic structures necessary for nurses and midwives to report medication administration errors and the barriers to reporting medication administration errors among nurses and midwives.

The study focused on analyzing each research question to meet the study objectives. In analysing the prevalence of medication administration errors among nurses and midwives and the causes of medication administration errors, a descriptive statistic was performed. The study also employed the use of descriptive statistics (frequencies and percentages) to analyse the systemic structures necessary for nurses and midwives to report medication administration and the barriers to reporting medication administration errors among nurses and midwives. Further, binary logistic regression analysis was done to establish the influence of background characteristics of nurses such as educational level and years of experience with reporting medication administration errors. The two independent variables considered for the logistic analysis were the number of years worked and experience gained by nurses and

midwives and the educational qualification level of nurses and midwives. The dependent variable considered was the willingness of reporting MAEs. The results were then properly classified under each of the objectives of the study to aid in discussions, conclusions, and recommendations.

Ethical Consideration

This study involved sensitive issues and as such, clearance was sought from appropriate authorities. Ethical clearance from the University of Cape Coast was sought from the Institutional Review Board (IRB) to undertake the study. An ethical clearance ID of UCCIRB/CHAS/2021/115 was received from the Institutional Review Board (IRB). Approval and guidance were taken from the Department of Adult Health, School of Nursing and Midwifery and the research supervisor, Dr. (Mrs.) Christiana Asiedu in carrying out the survey. The hospital administrator was officially written to for clearance before the start of the study. Respondents were not required to provide personal data which could be used to trace them. Respondents were also given the needed privacy and time to provide their responses.

Also, to ensure a sound participant-researcher relationship in this study, I together with my team endeavoured not to move from the role of the investigator to that of counsellor or therapist and tried to provide minimum assistance to respondents to maintain focus on the topic under investigation. Informed consent was obtained from every participant by assuring participants of anonymity and confidentiality and ensuring that identification features such as names were not recorded on the research tools. The Consent form was attached to the data collection instrument and respondents had to read and give their consent before they proceeded to provide their responses.

In order not to cause psychological stress and displeasure or discomfort to the research participants, I ensured the data collection process took place in a sound, serene, and friendly environment where the participant felt very comfortable and relaxed to communicate. Again, items in the questionnaire were communicated in plain, simple, and friendly language and care was taken to ensure that participants were not put under any pressure. The data collection exercise took place at a time the participant deemed appropriate, and the participants were at liberty to take a break whenever they felt so as to cool off. Again, the participants were periodically reminded of the confidentiality of their responses and were asked not to be afraid of their identity being made known.

Chapter Summary

This chapter explains the procedures used to collect data on variables in the study and describes the quantitative nature of the study. The setting of the study which is the Holy Family Hospital is described and the population being studied is also given. The procedure and method for the selection of respondents is also described, as census was used in collecting data from all nurses and midwives in the Holy Family Hospital. The data collection instrument used in collecting data from respondents is described and the process through which data collected was processed and analysed is also explained in the chapter. The pre-testing exercise and ethical consideration considered in a study of this nature is also spelled out in the chapter. This chapter, thus, provides the methods through which the research went to obtain valid and correct findings. These methods aided in gathering data, analysing them, and presenting the results, which is done in the next chapter (Chapter Four).

CHAPTER FOUR

RESULTS AND DISCUSSIONS

This section of the study presents the findings from the study in tables to aid in conducting further analysis. The data was obtained from the 231 nurses and midwives through census on medication administration errors at Holy Family Hospital. Frequencies and percentages as well as binary logistic regression were used to analyse the data. The results from the data collected are presented in the tables below.

Table 2 shows results on the demographic characteristics of the 231 nurses and midwives used in the study. It was revealed that 21.2% (n = 49) of the nurses and midwives were between the ages of 25 and 29 years, 73.2% (n = 169) were females, 51.9% (n = 120) were diploma holders and 27.7% (n = 39) had worked for 5 years or less. In the unit/department where the nurses and midwives were engaged, 28.6% (n = 66) worked at the maternity unit.

Table 2: Demographic Characteristics of Nurses and Midwives at Holy Family Hospital, Nkawkaw (N = 231)

Demographic Variable	Frequency	Percentage (%)
Age		
24 years and below	46	19.9
25-29 years	59	25.5
30-34 years	65	28.1
35-39 years	23	10.0
40-44 years	25	10.8
55-60 years	13	5.6
Sex		
Female	169	73.2
Male	62	26.8
Qualification		
Enrolled	53	23
Diploma	120	51.9
Degree	46	19.9
Masters	12	5.2
Years of service		
5 years and below	86	37.2
6-10 years	59	25.5
11-15 years	15	6.5
16-20 years	14	6.1
21-25 years	18	7.8
26-30 years	18	7.8
31 years and above	21	9.1
Unit/department of work		
Maternity	66	28.6
Emergency	25	10.8
Theatre	22	9.5
Male ward	18	7.8
Female ward	19	8.2
Paediatric ward	25	10.8
Fever's unit	3	1.3
OPD	14	6.1
Other	39	16.9

Source: Field data (Otoo, 2021)

Prevalence of Medication Administration Errors among Nurses and Midwives at Holy Family Hospital, Nkawkaw

Table 3 shows responses from the 231 nurses and midwives involved in the study on the prevalence of medication administration errors among nurses and midwives at Holy Family Hospital, Nkawkaw.

Table 3: Prevalence of Medication Administration Errors among Nurses and Midwives (N = 231)

Variable	Frequency	Percentage
Have you experienced medication error in your practice as a nurse or a midwife?		
Yes	126	54.5
No	105	45.5
If yes, how many times have you experienced medication error in your practice?		
Once	41	32.5
Twice	52	41.3
Thrice	22	17.5
Five times	2	1.6
Six or more times	9	7.1
Who was the principal cause of the mediation error?		
Nurse/midwife	27	11.7
Doctor	19	8.2
Patient	15	6.5
Other health professional	10	4.3
A combination of factors	38	16.5
No idea	17	7.4

Source: Field data (Otoo, 2021).

From Table 3, 126(54.5%) of the nurses and midwives had experienced medication error in their nursing practice. Among the 126 nurses and midwives who had experienced medication error, 41(32.5%) had experienced it once, 52(41.3%) had experienced it twice, 2(1.6%) had experienced it five times and 9 (7.1%) had experienced it six times or more. From the results obtained, nurses and midwives served as the principal cause in 27(11.7%) of mediation error cases, doctors served as the principal cause in 19(8.2%) of mediation error cases, patients were the principal causes in 15(6.5%) of the cases and in 38(16.5%) of the medication error cases, a combination of factors led to their occurrence. However, 17(7.4%) of the nurses and midwives had no idea of the cause of medication error.

From the study, most respondents claimed to have experienced medication errors in their practice as nurses and midwives. Among the nurses and midwives who had experienced MAE, most of them had experienced MAE twice and a few had experienced MAE about six or more times. It is unknown how often drug administration errors occur in Ghanaian hospitals, despite Degley's (2016) observation that they do. Degley concludes that drug administration errors in Ghanaian hospitals are similar to those found in other regions of the world. That's why this research into the work of MAE nurses and midwives has broad implications. It was discovered that medical professionals such as doctors, nurses, and midwives all play a role in adverse events. The majority of MAEs stemmed from a mix of staff and patient errors. Medical errors (MAEs) are common because doctors, pharmacists, and nurses/midwives aren't communicating effectively with one another, as stated by Salmasi et al. (2015). According to studies by Sulosaari et al., 2012, nurses, midwives, and

other frontline medical professionals are the last line of defense against prescription errors. Thus, they might be the main cause of an MAE. Research conducted in 2003 by the Hospital de Clnicas de Porto Alegre found that in a general teaching hospital, on average, 75 different professionals deal with a patient's medical chart over the course of an eight-day stay, indicating that the involvement of multiple health professionals is likely to contribute to MAEs. According to Oselka (2018), the medical record includes information about the patient's daily progression while in the hospital, including the date and time, a description of all procedures done for the patient, and the identification of all professionals who provided care. This information could be used to determine the most likely causes of MAEs.

Researchers found that the length of time nurses spent in the field was the strongest indicator of whether they had seen prescription errors, followed by respondents' educational attainment. Attree et al. note that there is limited evidence that healthcare educators deliberately include medication safety in professional education (2010). Because of this, nurses and midwives may only receive superficial instruction in error prevention techniques (Page & McKinney, 2011). When nurses and midwives are not adequately supervised by their peers and senior nurses and midwives in the hospital and are not given proper medication safety education, Reid-Searl et al. (2010) find that situations arise that contribute to medication errors. Fewer prescription errors and deaths have been linked to better nurse-midwife staffing and more supportive work conditions, but the potential benefits of a more highly trained and experienced registered nurse and midwife workforce have received less attention (Kendall-Gallagher et al., 2011).

Causes of Medication Administration Errors among Nurses and Midwives in their Practice at Holy Family Hospital, Nkawkaw

The causes of MAEs were classified under nurse-related factors, department-related factors, and nurse management-related factors. Table 4 presents results from the 231 nurses and midwives at the Holy Family Hospital, Nkawkaw on the nurse-related factors that were the causes of medication administration errors. On nurse-related factors, 104(45%) of the nurses and midwives agreed that being despondent and disinterested in the nursing profession is a cause of medication error. Also, 148(64.1%) of the nurses and midwives agreed that being unfamiliar with the drugs is a cause of their MAE. More so, 103(44.6%) of the nurses and midwives agreed that psychological and mental problems could cause a medication error. Again, 110(47.6%) of the nurses and midwives agreed that not having enough time is a cause of medication errors. Furthermore, 111(48.1%) of the nurses and midwives agreed that tiredness resulting from overworking is a cause of medication errors.

Table 4: Nurse-related Factors Causing Medication Administration Errors Among Nurses and Midwives (N = 231)

Variable	Frequency	Percentage
Being despondent and disintegrated in nursing profession		
Completely agree	21	9.1
Agree	104	45.0
No idea	4	1.7
Disagree	56	24.2
Completely disagree	46	19.9
Nurses/midwives being unfamiliar with the drugs		

Completely agree	7	3.0
Agree	148	64.1
No idea	17	7.4
Disagree	43	18.6
Completely disagree	16	6.9
Nurses'/midwives' psychological and mental problems		
Completely agree	2	.9
Agree	103	44.6
No idea	35	15.2
Disagree	52	22.5
Completely disagree	39	16.9
Not having enough time		
Completely agree	17	7.4
Agree	110	47.6
No idea	4	1.7
Disagree	83	35.9
Completely disagree	17	7.4
Tiredness resulting from overworking		
Completely agree	54	23.4
Agree	111	48.1
No idea	6	2.6
disagree	43	18.6
Completely disagree	17	7.4

Source: Field data (Otoo, 2021)

On department-related factors as causes of MAEs, Table 5 shows that 94(40.7%) disagreed with department environment noise being a cause of medication error, whereas 48(20.8%) had no idea whether department environment noise can cause medication error. Most of the nurses and midwives, 97(42%), agreed that drugs chamber office space (light, physical space) can be a cause of medication error. Again, 75(32.5%) of the nurses and

midwives agreed that high volume of work is a cause of medication error. Also, 101(43.7%) of the nurses and midwives agreed that the way drugs are arranged on the shelves can be a cause of medication error. Furthermore, 102(44.2%) of the nurses and midwives agreed that department medication and drug protocols is a cause of medication errors.

Table 5: Department-related Factors Causing Medication Administration Errors among Nurses and Midwives (N = 231)

Variable	Frequency	Percentage
Department environment noise		
Completely agree	30	13.0
Agree	25	10.8
No idea	48	20.8
Disagree	94	40.7
Completely disagree	34	14.7
Drugs chamber office space (light, physical space)		
Completely agree	29	12.6
Agree	97	42.0
No idea	37	16.0
Disagree	40	17.3
Completely disagree	28	12.1
High volume of work		
Completely agree	58	25.1
Agree	75	32.5
No idea	63	27.3
Disagree	22	9.5
Completely disagree	13	5.6
The way drugs are arranged on the shelves		
Completely agree	45	20.0
Agree	101	43.7
No idea	30	13.0
Disagree	43	18.6
Completely disagree	13	5.6
Department medication and drug protocols		
Completely agree	15	6.5
Agree	102	44.2
No idea	23	10.0
Disagree	78	33.8
Completely disagree	13	5.6

Source: Field data (Otoo, 2021)

On nurse management-related factors as causes of MAEs, Table 6 shows that 100(43.3%) of the nurses and midwives agreed that the insufficient number of nurses and midwives in relation to the patients is a cause of medication error. The majority, 148(64.1%) of the nurses and midwives agreed that department style of supervision and control is a cause of medication error. Moreover, 94(40.7%) of the nurses and midwives completely agreed that a cause of medication error is physicians' illegible handwriting in patients' files. In addition, 101(43.7%) of the nurses and midwives agreed that the drug prescription method is a cause of medication. Further, it was agreed by 118(51.1%) of the nurses and midwives that medication errors occur mostly during shifts.

Table 6: Nursing Management-related Factors Causing Medication Administration Errors among Nurses and Midwives (N = 231)

Variable	Frequency	Percentage
Insufficient number of nurses and midwives in relation to the patients		
Completely agree	72	31.2
Agree	100	43.3
No idea	3	1.3
Disagree	43	18.6
Completely disagree	13	5.6
Department style of supervision and control		
Completely agree	13	5.6
Agree	148	64.1
No idea	22	9.5
Disagree	26	11.3
Completely disagree	22	9.5

Physician's illegible handwriting in patients' files		
Completely agree	40	17.3
Agree	94	40.7
No idea	37	16.0
Disagree	34	14.7
Completely disagree	26	11.3
Drug prescription method		
Completely agree	37	16.0
Agree	101	43.7
No idea	34	14.7
Disagree	46	19.9
Completely disagree	13	5.6
Errors occurring mostly during shifts		
Completely agree	3	1.3
Agree	118	51.1
No idea	25	10.8
Disagree	45	19.5
Completely disagree	40	17.3

Source: Field data (Otoo, 2021).

According to the study on nursing-related variables generating MAEs among nurses, most nurses and midwives believe being dejected and disinterested in the nursing or midwifery profession is a cause of MAE. MAE can also be caused by nurses and midwives who are unfamiliar with medications. Most nurses and midwives are familiar with the five rights of medicine administration: the right patient, drug, dose, route, and time (Eisenhauer, Hurley, & Dolan, 2007). These regulations and standards were designed to assist reduce drug administration errors. Elliot and Liu's "Ten Rights of Medicine Administration" include "Right Patient," "Right Reason," "Right Medicine," "Right Route," "Right Time," "Right Dose," "Right Form,"

"Right Action," "Right Documentation," and "Right Response" (2010). The purpose of these drug permissions is to lessen the likelihood of patient damage. Nurses and midwives are to blame for the medication errors observed in the study because they failed to adhere to or implement at least one of the medication administration rights outlined in the study. The nurses and midwives who took part in this study say that not understanding enough about medicines can cause problems with giving the Right Medicine at the Right Time. Nurses and midwives are among those in the healthcare industry that point the finger at a lack of time as the root cause of prescription errors. Not adhering to the Right Dose at the Right Time concept might lead to medication mistakes. According to the current body of research, many new nurses and midwives worry that they don't know enough about pharmacology, side effects, and other essential topics to safely administer medications to their patients (Adhikari et al., 2014). When nurses and midwives try to follow drug safety rules based on data that has no bearing on patient care, medication errors are more likely to occur (Vaismoradi et al., 2011).

The study also discovered that fatigue caused by overworking and having limited time to deal with are the leading causes of MAEs. This result is supported by study from Ulanimo et al. (2017), who found that the number of hours nurses work, the duration of shifts, patient acuity, and high workloads all contribute to nursing exhaustion. According to Watkins (2021), the likelihood of errors is three times higher when staff work 12.5 or more hours in a shift, and Stimpfel et al. (2012) discovered that nurses are two and a half times more likely to suffer burnout and job dissatisfaction when working shifts of ten hours or

longer on a regular basis. This requires more attention because it contributes significantly to MAEs.

The study's findings on department-related factors contributing to MAEs suggest that a noisy working environment is a source of MAE. As McFarlane and Latorella (2012) identify distractions, such as noise, that can be disregarded or processed concurrently with the core activity, this may induce a lack of concentration on the work and contribute to errors as a precursor to an interruption. MAEs are also thought to be caused by a bad lighting system and a lack of space in the medicines chamber office. This may have an impact on the administration of the Right Medicine. According to Mahmood, Chaudhury, and Valente (2011), environmental factors that can cause problems during medication administration include poor lighting, limited storage space (resulting in cluttered work surfaces), a poor layout of medication rooms, a lack of space for preparing and charting medications, and a lack of privacy in medication and drug chamber rooms. A high volume of work and workload, according to the nurses and midwives, is also a possible cause of MAEs. The application of Right Documentation and Right Time in medicine delivery may be hampered by a high volume of work. Ramini and Leinster (2008) discovered that nurses' high workload can have an impact on the quality and quantity of supervision they get. In addition, Hewitt (2010) argues that nurses and midwives whose work is constantly interrupted by the urgent needs of their patients are more likely to be distracted from their tasks, perform them poorly, and make mistakes as a result. The majority of nurses and midwives agree that current department medicine and drug guidelines can result in medication delivery errors. The departmental medication and drug protocols may also have an

impact on the Right Reason, Right Route, Right Form, Right Documentation, and Right Response in medication administration. Complicated protocols may discourage nurses and midwives from reporting MAEs; thus, they must be succinct in order to encourage nurses and midwives to report MAEs.

The study also looked at nursing management aspects that could lead to medication delivery errors. The survey found that a large percentage of nurses and midwives believed that the department's monitoring and control style contributes to medication delivery errors. Several studies have also identified the contribution of departmental supervision to MAEs: Reid-Searl et al. (2010) discovered that conditions that contribute to medication errors arise when nurses and midwives do not receive adequate supervision from their colleagues and senior personnel in the hospital; Musharyanti, Claramita, Haryanti, and Dwiprahasto (2019) acknowledge that lack of proper supervision is a major cause of medication error; additionally, acco Nurses and midwives who lack supervision, particularly those who are new to the profession, are subject to prescription errors (Reid-Searl et al. 2009).

Nurses and midwives were also surveyed, and their responses showed that they believe medication delivery errors are more likely to occur during shifts. Stimpfel, Sloan, and Aiken (2012) found that nurses who regularly worked shifts of 10 hours or longer were 2.5 times more likely to experience burnout and job dissatisfaction. Issues with dosing or administering medications are possible in these settings. Medication errors are more common in nursing care, and many nurses and midwives attribute this to staffing shortages. Medication errors may be exacerbated by a shortage of nurses and midwives relative to the number of patients. This could affect the ability to implement the

Right Time and the Right Action. According to Gibbs and Kulig (2017), the lack of sufficient nurse and midwife role models in clinical practice is a direct result of staffing issues. The World Health Organization (2009) reports that a lack of trained medical personnel in Ghana raises the possibility that patients will be harmed as a result of pharmaceutical errors. The current study's results backed up the WHO estimate, and it's clear that managers in the healthcare sector need to do more to increase the number of properly trained staff members in hospitals and clinics to lower the risk of MAEs.

Systematic Structures Necessary for Nurses and Midwives to Report Medication Administration Errors at Holy Family Hospital, Nkawkaw

The 231 nurses and midwives at Holy Family Hospital, Nkawkaw, were surveyed about the structures they needed to report medication administration errors, and their responses are summarized in Table 7. Table 7 shows that 124 (53.7%) nurses and midwives agreed that a clear definition of what constitutes an error is essential for nurses and midwives to report medication administration errors. In addition, 129 (55.8%) of the nurses and midwives agreed that thorough documentation of medication administration errors is required. Another 152 (or 65.8%) of the nurses and midwives agreed that it is important for nurses and midwives to share information about medication administration errors with other health professionals. In addition, 59 (25.5%) of the nurses and midwives agreed that it is essential for nurses and midwives to inform patients and their families when they make a medication administration error. Finally, 128 (55.4%) nurses and midwives agreed that creating a culture that encourages the reporting of medication administration errors is essential.

Table 7: Systemic Structures Necessary for Nurses and Midwives to Report Medication Administration Errors (N = 231)

Protocols	Frequency	Percentage (%)
Understanding what constitutes an error		
Strongly Agree	49	21.2
Agree	124	53.7
Neutral	25	10.8
Disagree	20	8.7
Strongly Disagree	13	5.6
Recording of errors with necessary details		
Strongly Agree	49	21.2
Agree	129	55.8
Neutral	13	5.6
Disagree	27	11.7
Strongly Disagree	13	5.6
Communicating errors among health professionals		
Strongly Agree	41	17.7
Agree	152	65.8
Neutral	3	1.3
Disagree	22	9.5
Strongly Disagree	13	5.6
Disclosing errors to patients and their relatives		
Strongly Agree	53	22.9
Agree	59	25.5
Neutral	41	17.7
Disagree	36	15.6
Strongly Disagree	42	18.2
Establishment of an environment to aid reporting		
Strongly Agree	41	17.7
Agree	128	55.4
Neutral	24	10.4
Disagree	21	9.1
Strongly Disagree	17	7.4

Source: Field data (Otoo, 2021)

According to the findings of the survey, the majority of nurses and midwives believe they understand what constitutes a medicine administration error. Understanding what defines a medicine administration error is critical since McBride-Henry and Foureur (2016) believe that obtaining a clear understanding of what makes an error is the first step in creating methods to eliminate errors. Again, the majority of nurses and midwives felt that recording medication errors with important details was required for reporting drug delivery errors. In this regard, Dalmond and Goldim (2013) emphasize the importance of recording medication errors in patients' records. Similarly, Chiericato, Cassiani, and According to Carvalho (2011), after a medication error has occurred, the healthcare provider should report the drug involved in order to prevent similar errors from happening again. According to Poldervaart et al. (2017), medical records are the source of information needed to establish specific and adequate care for each patient, so any insufficient documentation or lack of information in these records may be related to the occurrence of incidents that cause damage.

Again, many nurses and midwives thought that discussing mistakes with colleagues would improve the reporting of medication delivery issues. Dalmond and Goldim (2013) talk about how a lack of open dialogue between professionals and the culture of infallibility common in healthcare education can lead to mistakes going unreported on the job. Health care providers, including physicians, pharmacists, midwives, and nurses, often contribute to patients experiencing MAEs by failing to effectively communicate with one another, as stated by Salmasi et al. (2015). Furthermore, the majority of nurses and midwives agree that establishing an atmosphere to aid reporting is a

framework required for MAEs to be reported. According to the literature, Dalmolin and Goldin (2013) discovered that it is critical to create a trusting environment among the experts engaged in order for communication to occur successfully and continually. This environment should also be linked to the evaluation process, which aims to detect hazards and deficiencies in the medicine system. Similarly, examining human factors, according to Kohn, Corrigan, and Donaldson (2000), can contribute to the design of safer systems and processes, such as simplifying and standardizing processes, incorporating redundancy, increasing communications within teams, or rethinking the work environment.

Barriers to Reporting Medication Administration Errors among Nurses and Midwives at Holy Family Hospital, Nkawkaw

Table 8 shows results from the 231 nurses and midwives studied on barriers to reporting medication administration errors among nurses and midwives at Holy Family Hospital, Nkawkaw. The results showed that 107(46.3%) of the nurses and midwives agreed that avoiding punishment from the health facility was a barrier to reporting medication administration errors. In addition, 89(38.5%) of the nurses and midwives agreed that the largeness of the facility was a barrier to reporting medication administration errors. Again, 110(47.6%) of the nurses and midwives agreed that unfavourable institutional protocols to reporting errors serves as a barrier to reporting medication administration errors. Furthermore, 86(37.2%) of the nurses and midwives agreed that health professionals' internal conflict about revealing errors was a barrier to reporting medication administration errors. Also, 92(39.8%) of respondents agreed that a barrier to reporting medication administration errors

was when errors were considered trivial. Finally, 124(53.7%) of respondents agreed that preserving the reputation of the health professional was a barrier to reporting medication administration errors.

Table 8: Barriers to Reporting Medication Administration Errors among Nurses and Midwives (N = 231)

Protocols	Frequency	Percentage (%)
To avoid punishment from the health facility		
Strongly Agree	11	4.8
Agree	107	46.3
Neutral	79	34.2
Disagree	21	9.1
Strongly Disagree	13	5.6
The largeness of the facility		
Strongly Agree	12	5.2
Agree	89	38.5
Neutral	67	29.0
Disagree	50	21.6
Strongly Disagree	13	5.6
Unfavourable institutional protocols to reporting errors		
Strongly Agree	5	2.2
Agree	110	47.6
Neutral	50	21.6
Disagree	39	16.9
Strongly Disagree	27	11.7
Health professionals' internal conflict about revealing errors		
Strongly Agree	11	4.8
Agree	86	37.2
Neutral	33	14.3

Disagree	72	31.2
Strongly Disagree	29	12.6
When errors are considered trivial		
Strongly Agree	3	1.3
Agree	92	39.8
Neutral	45	19.5
Disagree	64	27.7
Strongly Disagree	27	11.7
To preserve reputation of the health professional		
Strongly Agree	15	6.5
Agree	124	53.7
Neutral	25	10.8
Disagree	54	23.4
Strongly Disagree	13	5.6

Source: Field data (Otoo, 2021)

The findings from the study revealed that there are multiple factors creating barriers to reporting medication administration errors. Most nurses and midwives failed to report MAEs to avoid punishment from the health facility. A barrier leading to nurses and midwives refraining from reporting errors is a negative organisational structure with a ruling and punishable atmosphere (Ajri-Khameslou, 2018). Healthcare professionals will hesitate to report any medication errors if they know or feel that they will be punished for the errors committed. As a result, they will avoid punishment by not reporting the errors. Meanwhile, the consequences of the errors may be dire and could be minimised if they are reported for alternative care to be given. It is, therefore, imperative that managers of health facilities be considerate in giving out punitive measures to nurses and midwives when issues of medication errors are reported. This will, in the long run, encourage most nurses and midwives to develop the habit of

reporting MAEs. The largeness of the facility also serves as a barrier to reporting medication errors. In large hospitals, medication error notification can be haphazard, occurring only in certain units or containing little information (Gandhi et al., 2010). In very large facilities, the duties of supervisors become increasingly tedious. As such, it is difficult to monitor the performances of nurses and midwives to ensure that MAEs are minimised. This creates a room for some nurses and midwives to go unidentified should any errors occur. An unfavourable institutional protocol to reporting errors is another barrier to reporting medication errors. Not only is this found in this current study but somewhere else. For instance, this study makes a finding like one made by Ajri-Khameslou et al. (2018) that the type of reporting system in an institution affects the reportage of errors. Healthcare professionals believe that the frequency of error reports will increase when the system requests that errors are reported anonymously. Hence, systems should be created in such a way that nurses and midwives who encounter medication errors will not be exposed to the larger healthcare community when they report those errors. Anonymity in reporting errors takes off the fear of punishment or shame from the individuals who committed those errors. Such systems of reporting must be created to improve the reportage of MAEs.

Again, most of the nurses and midwives were of the view that health professionals' internal conflict about revealing errors was a barrier to reporting medication errors. However, almost an equal number of the nurses and midwives shared a contrary view. This means that the nurses and midwives have mixed reactions when it comes to internal conflict in reporting MAEs. According to Weiss and Miranda (2008), medical professionals frequently

struggle with whether to break bad news to patients and their loved ones. It's clear that medication errors are bad news for Weiss and Miranda, no matter how big or small they are. Patient anxiety, depression, and trauma can result when damage is linked to the occurrence of an error. The professionals who were involved in the mistake may also suffer psychologically, depending on its magnitude. Most nurses and midwives in the study also believed that the desire to protect their professional reputation prevented them from reporting medication errors. Reputational concerns are a subcategory of the larger issue of not reporting medication errors, as stated by Ajri-Khameslou et al. (2018). Study participants reported that not reporting errors was due, in part, to a desire to avoid professional scandal.

Another finding of the study was that when medication errors were seen as minor, people were less likely to report them. It was found by Gallager et al. (2013) that nurses and midwives may face situations where the damage has been done but no disclosure is made because the damage is minor. Also, when the patient doesn't care, doesn't understand, or doesn't want to hear about the error. According to Dalmolin and Goldim (2013), however, there is an exception to the rule of disclosure when the damage is minor, and this requires a categorization of the severity of the damage. From this vantage point, minor damage will be considered to be completely harmless. This means that such mistakes might go unreported.

Research question 4: Influence of Background Characteristics of Nurses and Midwives on Reporting Medication Administration Errors.

This research question intended to establish the level of influence of the demographic characteristics of participants on their willingness to report

medication errors. A binary logistic regression analysis was conducted. However, a preliminary bivariate analysis was conducted to understand the relationship between the demographic characteristics of participants and their willingness to report medication errors.

Table 9 (Appendix I) presents the chi-analysis for the association between participants' willingness to report medication errors. The results show that sex of participants was significantly associated with the willingness to report medication errors (χ^2=14.77, p=0.000). Also, age of participants was significantly associated with participants' willingness to report medication errors **(**χ^2=15.56, p=0.001, p=0.000). Again, the number of years of services and the type of unit or department a participant work was significantly associated with the wiliness to report medication errors respectively **(**χ^2=26.67, p=0.000, p=0.000) and **(**χ^2=39.08, p=0.000) (see table 10). A further multivariate analysis was conducted to determine the level of influence of background characteristics of participants and their likelihood of reporting medication errors.

Table 10 presents binary logistic results on the level of influence of background characteristics of participants and their likelihood of reporting medication errors. The independent variables used in the model were sex, age of participants, qualification level years of service, and unit/department of work. The dependent variable on the other hand was their willingness to report medication error or not. The dependent variable was measured on two levels; that is whether participants were willing to report medication or not. A “yes” response means the participants were willing to report medication error while “no” meant participants were not willing to report medication errors. The results show that males were 0.349 times less likely to report medication errors

compared with females (AOR=.349, 95%CI=.141-.862). Also, participants who had worked for 6-10 years were 24.0 times more likely to report medication errors than those who had worked for less than six years at a health facility (AOR=24.003, 95%CI=5.217-110.435). Further, the likelihood of reporting medication errors was high among those who work at the theatre (AOR=7.519, 95%CI=1.260-44.862), female ward (AOR=19.721, 95%CI=3.908-99.507) and those who work at the maternity ward (AOR=15.930, 95%CI=2.770-91.611) compared with those who work at the emergency ward (see table 10).

Table 9: Regression analysis on background characteristics as predictors of nurses' willingness to report medication errors.

Variables	Category	B	p-value	Adjusted Odds ratio	95% confidence interval for odds ratio Lower	Upper
Sex	Female	Ref	Ref	Ref	Ref	Ref
	Male	-1.053	.022	.349*	.141	.862
Age of participants	<30	Ref	Ref	Ref	Ref	Ref
	30-39	.402	.405	1.495	.580	3.855
	40-49	1.400	.159	4.054	.579	28.386
	50+	-.926	.294	.396	.070	2.232
Qualification level of respondents	Certificate	Ref	Ref	Ref	Ref	Ref
	Diploma	-1.018	.069	.361	.121	1.081
	Degree	-1.119	.229	.327	.053	2.024
	Masters	-2.461	.081	.085	.005	1.358
Years of service	Below 6 years	Ref	Ref	Ref	Ref	Ref
	6-10	3.178	.000	24.003***	5.217	110.435
	11-15	2.013	.038	7.489*	1.116	50.276
	16-20	.757	.334	2.132	.459	9.907
	21-25	.697	.312	2.008	.520	7.749
	26-30	-.246	.710	.782	.214	2.858
	31 years or above	.426	.537	1.531	.396	5.923
Unit/department of work	Emergency	Ref	Ref	Ref	Ref	Ref
	Theatre	2.017	.027	7.519*	1.260	44.862
	Male ward	1.363	.089	3.906	.811	18.817
	Female ward	2.982	.000	19.721***	3.908	99.507
	Paediatric ward	1.466	.082	4.331	.828	22.645
	Maternity ward	2.768	.002	15.930**	2.770	91.611
	OPD	.289	.727	1.336	.263	6.787

Note. $*p < 0.05$, $**p < 0.01$, $***p<0.001$. Nagelkerke R^2= .469. Hosmer and Lemeshow test (goodness of fit): χ^2=14.58 (8), p=1.020.

The current study found that the likelihood of reporting medication errors was low among males compared with females. This means that males are less willing to report medication errors when they occur than females. The possible reason for this finding may be partially linked to the traditional gender roles and cultural norms associated with the male gender. Men may feel societal pressure to appear competent and in control, which can deter them from admitting mistakes, including medication errors (Berdahl, Cooper, Glick, Livingston, & Williams, 2018). In Ghanaian society, there is a prevailing expectation that men are expected to display higher levels of competence and strength in their roles, including those in healthcare (Böhmig, 2010). Consequently, when a male nurse commits a medication error, it may be perceived as a sign of incompetence and vulnerability. This societal pressure to conform to traditional gender roles can create a reluctance among males to report errors, as it may be seen as a deviation from expected norms and an admission of fallibility. The consequence of this finding is that unreported errors may go unaddressed, potentially harming patients. Moreover, there could be an increase in patient mortalities and disabilities at the various health facilities, especially now that more males are moving into the nursing profession. The disabilities associated with unreported medication errors may further hinder the attainment of Sustainable Development Goal (SDG) three which seeks to ensure good health among all people. Also, when male nurses are less willing to report errors, it can hinder efforts to identify system issues, analyse root causes, and implement changes to prevent future errors. This can impede the overall quality of care provided. Besides, patients who become aware of underreporting errors

may lose confidence in the quality of care they receive which can negatively affect their health-seeking behaviour.

In line with the current findings, a study in Ethiopia found the likelihood of reporting medication errors to be higher among females than males (Bifftu, Dachew, Tiruneh, & Beshah, 2016). However, an Ethiopian study contrasts the current finding where it was reported that females had a lower likelihood of reporting medication errors compared with males (Jember, Hailu, Messele, Demeke, & Hassen, 2018). The reason for the difference in the findings could be explained by the fact that their study was conducted in only one facility and also included more male nurses than female nurses contrary to the current study. Perhaps, the predominance of females in the current study might have contributed to the observation of males being less likely to report medication errors. Also, the possible differences in factors such as the organisational culture, leadership, peer dynamics, and policies related to error reporting may explain the variation in the findings. Notwithstanding, the current finding underscores the importance of robust education and training regarding error reporting and patient safety, with attention to the male gender.

Also, the current study found that the likelihood of reporting medication errors was higher among nurses and midwives who had 6-10 years and 11-15 years of working experience than those who had less than six years of working experience. Nurses with more experience may have learned from past errors and understood that reporting them can lead to valuable lessons and improvements in patient care. They may view error reporting to prevent similar incidents from recurring. Moreover, nurses with 6-10 years and 11-15 years of experience may be in roles that involve more responsibility, including supervisory positions.

These roles often entail a heightened awareness of the importance of error reporting and the need to set an example for others (Mlambo, Silén, & McGrath, 2021). Besides, over time, nurses may become more aware of the importance of error reporting in improving patient safety and healthcare quality. They might recognise that error reporting is an essential component of safety culture and be more proactive in this regard. Similarly, a study in Ethiopia (Bifftu et al., 2016) and Qatar (Stewart et al., 2018) found the likelihood of medication error reporting to be higher among nurses with 15 years or more working experience. The reason for the similarity in the findings is that, universally, experienced nurses may have likely encountered and learned from past errors, hence, they may view error reporting as an opportunity for learning and improvement.

The implication of the current finding is that healthcare professionals with more experience are actively involved in identifying and addressing errors promptly, which can lead to early intervention and better patient safety. This can contribute to a reduction in patient harm caused by medication errors. Also, the findings highlight that healthcare professionals with 6-10 years and 11-15 years of experience are more actively engaged in quality improvement efforts. Their willingness to report errors can contribute to the identification and correction of system-level issues, which is essential for continuous quality improvement in healthcare. The willingness of experienced nurses reporting medication errors could help achieve the SDG target 3.2 that aims to end preventable deaths of newborns and children under 5 years of age. Therefore, healthcare organisations may need to allocate resources for training and supporting healthcare providers, particularly those with less experience, in error reporting and patient safety practices.

Further, the likelihood of reporting medication errors was higher among nurses who work at the theater, female ward, and maternity ward than those who work at the emergency ward. The current findings mean that medication errors that occur at the theater, female ward and maternity ward are more likely to be reported. Nurses in the emergency ward often face high levels of stress, a fast-paced work environment and urgency of care which affect their likelihood of reporting medication errors. Nurses in other units may have a different workload and less time pressure, making it easier to report errors. Moreover, the current finding suggests that nurses in the emergency ward are facing challenges when it comes to reporting medication errors. Identifying these barriers and addressing them could increase the likelihood of reporting medication errors in the emergency ward. Also, the current finding may imply that nurses in the theater, female ward, and maternity ward are more proactive in ensuring patient safety by reporting errors and highlighting the need to improve patient safety in the emergency ward. In agreement with the current finding, Stewart et al. (2018) also found the higher likelihood of reporting medication errors at the female ward and maternity ward than those who were at the emergency ward. The similarities in the findings could be attributed to the universal urgency of care required at the emergency wards and the time constraints in handling emergency cases and at the same time documenting medication errors. These findings call for special policies and interventions on medication error reporting among nurses with special attention given to those who work at the emergency wards.

The implications of the lower likelihood of medication error reporting among nurses at the emergency ward is that it can erode patient trust in the healthcare system and discourage patients from seeking care, particularly in the

emergency ward (Bifftu et al., 2016). Besides, lower reporting rates at the emergency ward can harm patients by worsening their health condition, increasing disability and mortality, prolonging hospital stays, and increasing healthcare costs for patients. Moreover, the findings have implications for SDG three by potentially hindering progress toward ensuring healthy lives and well-being for all. The findings necessitate a comprehensive assessment of the organizational culture within the emergency ward.

Summary

This chapter entails the results obtained from the study and the discussions of the results. The results and their discussions were presented for each research question, starting from the first to the last research question. On the prevalence of MAEs, it was discovered in this study that 54.5% of nurses and midwives at the Holy Family Hospital in Nkawkaw had encountered MAEs prior to conducting this study. Among the nurses and midwives who had ever encountered MAEs, most of them (41.3%) had encountered it twice. The principal cause of most of the MAEs were a combination of factors from nurses and midwives, doctors, patients, and other health professionals.

We classified the causes of MAEs into three groups: those associated with nurses, those associated with departments, and those associated with nursing administration. Negativity and disintegration in the nursing and midwifery profession, drug ignorance, mental health issues, a lack of time, and exhaustion from overwork were identified as nurse-related factors. Some of the causes of MAEs were found to be department-specific, such as inadequate space in the drug chamber office, an excessive amount of work, the disorganized placement of drugs on shelves, and inadequate departmental protocols for

medications and drugs. Factors related to nursing management were identified as the following: the department's style of supervision and control; many nurses and midwives caring for a small number of patients; the physician's illegible handwriting in patient files; and errors occurring during specific shifts.

Regarding the systematic structures necessary for reporting medication errors, the nurses and midwives asserted that understanding what constitutes an error, recording errors with necessary details, communicating errors among health professionals, and establishment of an environment to aid reporting were some necessary arrangements to put in place. The barriers to reporting errors were discovered to be the avoidance of punishment from the health facility, largeness of the facility, unfavourable institutional protocols to reporting errors, considering errors to be trivial, and preservation of the reputation of the health professional.

Finally, it was discovered that the likelihood of reporting medication errors was lower (AOR=.349) among males than females. Also, participants who had worked for 6-10 years were 24.0 times more likely to report medication errors than those who had worked for less than six years at a health facility. Further, the likelihood of reporting medication errors was high among those who work at the theatre (AOR=7.519), female ward (AOR=19.721) and those who work at the maternity ward (AOR=15.930) compared with those who work at the emergency ward.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter provides a comprehensive summary of the study, draws the necessary conclusions on the study variables and necessary recommendations are given for consideration on medication administration errors among nurses and midwives at Holy Family Hospital, Nkawkaw. The conclusions and recommendations were based on the research outcomes that helped to achieve the research objectives.

Summary of the Study

The purpose of the study was to examine medicine administration errors among nurses and midwives at Holy Family Hospital in Nkawkaw. This was important because nurses and midwives are the closest professionals to patients and the final link in medicine administration. As a result, by making significant modifications to their particular practice, they can reduce drug administration errors and increase patient safety. To fulfill the study's goal, five research questions were developed to lead the investigation. To answer the study questions, a cross-sectional descriptive research design of the quantitative technique was employed to collect data. The research was carried out in the Holy Family Hospital in Nkawkaw, Kwahu West Municipality, using a census approach to recruit 231 nurses and midwives. The research tool in this study was a questionnaire derived from another study with similar variables as this one. The research instrument's data was analyzed using frequency distributions and direct regression statistical methods.

Summary of Key Findings

a. On the prevalence of medication administration errors among the nurses and midwives at the Holy Family Hospital, it was found out that 54.6% of the 231 nurses and midwives had ever encountered medication errors. Most of those who had encountered medication errors experienced it at least twice. It was also discovered that a combination of factors which included, nurse/midwife, doctor, other health professionals, and patients accounted for most of the medication errors.

b. Three contributors were recognized as the root of the problem when it comes to incorrectly dispensing medications. There were aspects concerning individual nurses, the nursing department, and the nursing administration. Negativity and indifference in nursing or midwifery, drug ignorance, emotional and mental health issues, a lack of time to devote to a patient, and exhaustion from overwork were all nurse-related reasons. Space, workload, shelving configuration, and drug and medicine protocols across departments were all taken into account when designing the drugs chamber. Nursing management issues included a shortage of nurses and midwives relative to patients, insufficient oversight and control from departments, doctors' illegible handwriting in patient files, inefficient medicine prescription methods, and shift-related mistakes.

c. With regards to the systematic structures necessary for reporting of medication errors, it was found that nurses and midwives need to first understand what constitutes a medication error, errors need to be recorded with necessary details, errors must be communicated among

health professionals, errors must be disclosed to patients and their relatives, and an enabling environment need to be established to aid reporting of medication errors.

d. The barriers to reporting medication administration errors among the nurses and midwives at the Holy Family Hospital were identified to be the avoidance of punishment from the health facility, the largeness of the facility, unfavourable institutional protocols to reporting errors, health professionals' internal conflict about revealing errors, considering errors to be trivial, and preservation of the reputation of the health professionals.

    a. With respect to the background characteristics of the nurses and midwives that influence reporting of medication errors, it was found that the likelihood of reporting medication errors was lower (AOR=.349) among males than females. Also, participants who had worked for 6-10 years were 24.0 times more likely to report medication errors than those who had worked for less than six years at a health facility. Further, the likelihood of reporting medication errors was high among those who work at the theatre (AOR=7.519), female ward (AOR=19.721) and those who work at the maternity ward (AOR=15.930) compared with those who work at the emergency ward.

Conclusions

The entire study process and findings provide the necessary basis for a few conclusions drawn on assessing medication administration errors among nurses and midwives.

On the prevalence of medication administration errors among nurses and midwives, a greater proportion of nurses and midwives have experienced medication errors in their professional practice. Comparatively, a relatively lower proportion of nurses and midwives have not encountered any medication administration error in their professional practice. Most of the nurses and midwives have experienced a medication error at least twice with just a smaller percentage experiencing a medication error six or more times. In most cases, the occurrence of a medication error was due to a combination of factors. Nurses and midwives' contribution to medication errors was more than that of other health professionals including doctors and pharmacists. Patients were also seen as causes of medication errors and in some cases, the principal cause of medication errors could not be established.

On the causes of medication administration errors among nurses and midwives, nurses and midwives believe that showing less interest in the nursing or midwifery profession is a cause of medication errors. Unfamiliarity with drugs coupled with working with limited time and tiredness resulting from overworking also contribute to primary causes of medication errors. Another cause of medication error can be related to poor lighting system and the lack of space in the drugs chamber office as well as inappropriate department medication and drug protocols. However, nurses and midwives do not believe that a noisy working environment is a primary cause of medication error which

is contrary to what mainly exists in the literature (Mahmood et al., 2011). The departmental style of supervision and control is also identified as a contributing factor to medication administration errors. It has also been established that medication errors are more likely to occur during particular working shifts but the particular shift was not specified. The poor ratio of number of nurses and midwives to patients is also marked as a cause of medication errors in nursing practice.

On the systemic structures necessary for nurses and midwives to report medication administration errors, nurses and midwives need to first understand what a medication error is (McBride-Henry & Foureur, 2016), and the study establishes that most nurses and midwives do understand. A system that ensures that recording of medication errors with its necessary details and one which allows for the communication of errors among health professionals is necessary for reporting medication administration errors. Again, to promote the reporting of medication errors, the existing structures must involve the establishment of an enabling environment that accepts and promotes reporting medication errors among nurses and midwives.

On the barriers to reporting medication administration errors among nurses and midwives, the study concludes that nurses and midwives fail to report medication errors to avoid punishment from the health facility and to preserve their reputations as competent nurses and midwives. There also exists an internal conflict among nurses and midwives about revealing medication errors. This may sometimes be in cases when a medication error is considered trivial. The size of the health facility may also represent a barrier to reporting medication errors. Thus, the larger the size of the health facility, the less likely

a medication error will be reported. This is mostly linked to the existence of an unfavourable institutional protocol to reporting medication errors which may lead to bureaucratic protocols and systems in larger health facilities. Such systems may serve as a disincentive for nurses and midwives to report medication errors.

In relation to the influence of background characteristics of nurses and midwives on reporting medication administration errors, it can be concluded that, male nurses are less willing to report medication errors at the various wards than female nurses and midwives. Also, the number of years worked, and the experience gained informs nurses and midwives' decision to report a medication administration error. Medication errors that occur at the theatre, female ward and the maternity ward are usually reported whereas medication errors that occur at the emergency ward may go unreported.

Recommendations

From the findings of this study, the following recommendations are made for health policy and practice:

1. Health facilities should ensure that education on medication errors should be done among all health professionals since errors may not be limited to only nurses and midwives.
2. Health facilities should arrange for longer serving nurses and midwives to mostly oversee medication administration.
3. All nurses and midwives should strictly adhere to the rights of medication administration in their practice.
4. Nurses and midwives should exhibit a high level of interest and professionalism in their nursing practice.

5. Unit in-charges should ensure that the drugs chamber office at the wards/units should be well set-up in addition to appropriate department medication and drug protocols.
6. Nurses and midwives should be given ample time by unit in-charges to work to avoid tiredness and work overload when administering medication.
7. Adequate supervision must be provided by ward in-charges and senior staff to other nurses and midwives in the administration of medicines.
8. Institutional protocols should be developed by health faculties to ensure that all medication errors are recorded with the necessary details and communicated among health professionals.
9. A welcoming and less strict environment must be created by leadrship in health facilities to encourage the reporting of medication errors among nurses and midwives.
10. Nurses and midwives must be encouraged to report all medication errors irrespective of how trivial they may seem.
11. Institutional protocols on reporting medication errors in large health facilities should be reviewed by leadership in health facilities to be less bureaucratic.
12. Hospital administrators and the Ghana Health Service should implement medication error prevention intervention at the various health facilities particularly paying attention to nurses and midwives who work at the emergency ward.

Suggestions for Further Research

Considering how important reporting of medication administration errors is, it is suggested that a similar study should be conducted to cover a greater number of health facilities as this current study was limited to the holy family hospital in Nkawkaw. Further research could be conducted on the practicing of the rights of medication errors among nurses and midwives. Again, future researchers could use observatory methods instead of a survey to monitor the errors occurring in a health facility and if those errors would be reported.

REFERENCES

Acheampong, F. (2016). Medication administration errors in an adult emergency department of a tertiary health care facility in Ghana. *National Library of Medicine.*

Adebayo, T. T. (2019). The role of health information officers in the prevention and management of HIV/AIDS in three tertiary health institutions in Southwestern Nigeria. *Library Philosophy and Practice* (E-JOURNAL).

Adhikari, R., Tocher, J., Smith, P., Corcoran, J., & MacArthur, J. (2014). A multi-disciplinary approach to medication safety and the implication for nursing education and practice. *Nurse Education Today*, 185-190.

Aiken, L. H., Sloane, D. M., Bruyneel, L., Van den Heede, K., & Sermeus, W. (2013). Nurses' reports of working conditions and hospital quality of care in 12 countries in Europe. *International Journal of Nursing Studies, 2*(50), 143–153.

Ajri-Khameslou, M., Abbaszadeh, A., & Borhani, F. (2017). Emergency nurses as second victims of error: a qualitative study. *Advanced Emergency Nursing Journal*, 68-76.

Ajri-Khameslou, M., Aliyari, S., Pishgooie, A. H., Jafari-Golestan, N., & Afshar, P. F. (2018). Factors affecting reporting of nursing errors: a qualitative content analysis study. *Annals of Medical and Health Sciences Research.*

Al-Ahmadi. (2009). "Factors affecting performance of hospital nurses in Riyadh Region, Saudi Arabia". *International Journal of Health Care Quality Assurance, 22*(1), 40 – 54.

Alanazi, M., Ali, A. A., Alanazi, A., & Hussein, M. A. (2017). Barriers to reporting medication errors as perceived by healthcare professional in a tertiary hospital in Riyadh: a cross-sectional study. *King Abdullah Medical City.*

Alblowi, F., Alaidi, H., Dakhilallah, H., & Alamrani, A. (2021). Nurses' perspectives on causes and barriers to reporting medication administration errors. *Health Science Journal*, *15*(9), 1-7.

Al-Shara. (2011). Factors contributing to medication errors in Jordan: a nursing perspective. *Iranian Journal of Nursing and Midwifery Research*, 158-161.

Anderson, J. G., & Abrahamson, K. (2017). Your health care may kill you: Medical errors. *Information Technology and Communications in Health*, *234*, 13-17.

Asgarian, A., Mahjour, P., Heidari, H., Khademi, N., Ghassami, K., & Mohammadbeigi, A. (2021). Barriers and facilities in reporting medical errors: A systematic review study. *Advances in Human Biology*, *11*(1), 17-25.

Association of Indonesian Nurse Education Center. (2015). *The core curriculum of nurse's education.*

Attree, M., Cooke, H., & Wakefield, A. (2010). Patient safety in an English pre-registration nursing curriculum. *Nurse Education in Practice, 8*(4), 239–248.

Barreto, M. N., & Kuramoto, J. B. (2006). *A Bioética e o erro humano. In: Harada MJCS, Pedreira MLG, Pereira SR, Peterlini MAS, organizadores. O erro humano e a segurança do paciente.* São Paulo: Atheneu.

Benjamin, D. M. (2013). Reducing medication errors and increasing patient safety: case studies in clinical pharmacology. *Journal of Clinical Pharmacology*, 768-783.

Berdahl, J. L., Cooper, M., Glick, P., Livingston, R. W., & Williams, J. C. (2018). Work as a masculinity contest. *Journal of Social Issues*, *74*(3), 422-448.

Bifftu, B. B., Dachew, B. A., Tiruneh, B. T., & Beshah, D. T. (2016). Medication administration error reporting and associated factors among nurses working at the University of Gondar referral hospital, Northwest Ethiopia, 2015. *BMC Nursing*, 15, 1-7.

Blegen, M. A., Goode, C. J., Park, S. H., Vaughn, T., & Spetz, j. (2013). Baccalaureate education in nursing and patient outcomes. *Journal of Nursing Administration*, *2*(43), 89–94.

Böhmig, C. (2010). *Ghanaian nurses at a crossroads: managing expectations on a medical ward*.

Camargo, S. A., Bertoli, C. S., Inocenti, M. A., & Perufo, O. S. (2007). Problemas na comunicação: uma possível causa de erros de medicação. *Acta Paul Enferm*, 272-276.

Carpenter, K., Duevel, M. A., Lee, P. W., Wu, A., Bates, D., Runciman, W., . . Weeks, W. (2010.). Measures of patient safety in developing and emerging countries: a review of the literature. *Quality & Safety in Health Care 19*, 48–54.

Chenot, T. M., & Daniel, L. G. (2010). Frameworks for patient safety in the nursing curriculum. *Journal of Nursing Educatiion*, 559-568.

Chiericato, C., Cassiani, S. H., & Carvalho, V. T. (2011). Instrumento de registro dos erros nas medicaçöes segundo a revisão da literatura. *Acta Paul Enferm*, 79-90.

Christiansen, A., Prescott, T., & Ball, J. (2014). Learning in action: developing safety improvement capabilities through action learning. *Nurse Education Today*, 243-247.

Clifton-Koeppel, R. (2008). Newborn and Infant. *Nursing Reviews*, 72-82.

Conselho Federal de Medicina. (2007). *Resolução n. 1821 de 23 de novembro de 2007.*

Covell, C. L., & Ritchie, J. A. (2011). Nurses' responses to medication errors: Suggestions for the development of organizational strategies to improve reporting. *Journal for Nursing Care Qual, 24*, 287-297.

Cvent, G. (2019). *Advantages and Disadvantages of Census Surveys.* Cvent.

Dalmolin, G. R., & Goldim, J. R. (2013). Medication errors in hospitals: Bioethical issues. Erros de medicação em hospitais: considerações a partir da Bioética. *Revista da Associação Médica Brasileira*, 95-99.

Dee, C., & Stanley, E. E. (2015). Information-seeking behavior of nursing students and clinical nurses' implications for health sciences librarians. *Journal of the Medical Library Association*, 213-222.

Degley, A. T. (2016). Nurses View on Drug administration error and patient safety in health facilities in the Central Region of Ghana. *University of Cape Coast, Ghana Library*.

Donabedian, A. (1988). The Quality of Care. How can it be Assessed? *Journal of the American Medical Association*, 1743-1748.

Duffy, J., & Hoskins, L. (2003). The quality caring model blending dual paradigms. *Advances in Nursing Science*, 77-88.

Eisenhauer, L., Hurley, A., & Dolan, N. (2007). Nurses' reported thinking during medication administration. *Journal of Nursing Scholarship*, 82-87.

Fein, S. P., Hilborne, L. H., Spiritus, E. M., Seymann, G. B., Keenan, C. R., & Shojania, K. G. (2017). The many faces of error disclosure: a common set of elements and a definition. *Journal of General International Medicine*, 755-761.

Feleke, Y. &. (2010). Medication administration errors involving paediatric in-patients in a hospital in Ethiopia. *Tropical Journal of Pharmaceutical Research*, *9*(4), 401-407.

Francesconi, C. F., & Goldim, J. R. (2015). *Bioética clínica. In: Clotet J, Feijó AGS, Oliveira MG, coordenadores. Bioética: uma visão panorâmica.* Porto Alegre: Editora Universitaria da Pontificia Universidade Catolica do Rio Grande do Sul.

Gallagher, T. H., Waterman, A. D., Ebers, A. G., Fraser, V. J., & Levinson, W. (2013). Patients' and physicians' attitudes regarding the disclosure of medical errors. *JAMA*, 1001-1007.

Gandhi, T. K., Seger, D. L., & Bates, D. W. (2010). Identifying drug safety issues: from research to practice. *International Journal of Quality Health Care*, 69-79.

Garner, S. (2012). Medicines administration: Avoiding the pitfalls. 26-30.

Ghana Statistical Service (GSS), G. H. (2015). Demographic data. *Ghana Statistical Service, Ghana Health Service, and International Classification of Functioning, Disability and Health.*

Gibbs, S. S., & Kulig, J. C. (2017). "We definitely are role models": exploring how clinical instructors' influence nursing students' attitudes towards older adults. *Nurse Educational Practice*, 74-81.

Guthrie, B., McCowan, C., Davey, P., Simpson, C. R., Dreischulte, T., & Barnett, K. (2011). High risk prescribing in primary care patients particularly vulnerable to adverse drug events: cross sectional population database analysis in Scottish general practice. *British Medical Journal.*

Handler, S., Perera, S., Olshansky, E., Studenski, S., Nace, D., Fridsma, D., & Hanlon, J. (2008). Identifying Modifiable Barriers to Medication Error Reporting in the Nursing Home Setting. *Journal of America Medical Dir Association*, 568–574.

Hewitt, P. (2010). Nurses' perceptions of the causes of medication errors an integrative literature review. *MEDSURG Nursing*, 159-167.

Institute of Medicine. (2011). *The Future of Nursing: Leading Change, Advancing Health.* Washington, DC: The National Academy Press.

International Confederation of Midwives. (2005).

International Council of Nurses. (2002).

Jember, A., Hailu, M., Messele, A., Demeke, T., & Hassen, M. (2018). The proportion of medication error reporting and associated factors among nurses: a cross-sectional study. *BioMed Central Nursing, 17*(1), 1-8.

Kachalia, A., & Bates, D. W. (2014). Disclosing medical errors: The view from the United State of America. *Surgeon*, 64-67.

Kendall-Gallagher, D., Aiken, L. H., Sloane, D. M., & Cimiotti, J. P. (2011). Nurse specialty certification, inpatient mortality, and failure to rescue. *Journal of Nursing Scholarship, 2*(43), 188–194.

Kerari, A., & Adnan, I. (2021, June 22). The Influence of Nurses' Characteristics on Medication Administration Errors: An Integrative Review. *SAGE Open Nursing*.

Khasanah, U. (2012). Nursing procedural error: types and causing factor in nursing students of clinical rotation in Nursing Study Program UIN Syarif Hidayatullah. *Journal of Unair*, 186-195.

Kiersma, M. E., Plake, K. S., & Darbishire, P. L. (2011). Patient safety instruction in US health professions education. *American Journal of Pharmaceutical Education*.

Kohn, L. T., Corrigan, J. M., & Donaldson, M. S. (2010). *To err is human: building a safer health system.* National Academies Press.

Kosteniuk, J. G., D'Arcy, C., & Stewart, N. (2006). Central and peripheral information source use among rural and remote registered nurses. *Journal of Advanced Nursing*, 100-114.

Lainer, M., Mann, E., & Sönnichsen, A. (2013). Information technology interventions to improve medication safety in primary care: a systematic review. *International Journal of Quality Health Care*, 590-598.

Lisby, M., Nielsen, L. P., Brock, B., & Mainz, J. (2010). How are medication errors defined? A systematic literature review of definitions and characteristics. *International Journal of Quality Health Care*, 507-518.

Lu, C. Y., & Roughead, E. (2011). Determinants of patient-reported medication errors: a comparison among seven countries. *International Journal of Clinical Practice*, 733-740.

Mahmood, A., Chaudhury, H., & Valente, M. (2011). Nurses' perceptions of how physical environment affects medication errors in acute care settings. *Applied Nursing Research*, 229-237.

Malcolm, E., & Yisi, L. (2010). The nine rights of medication administration. *British Journal of Nursing*, 300-304.

Mansour, M. (2013). Examining patient safety education in preregistration nursing curriculum: qualitative study. *Journal of Nursing Education Practice*, 157-167.

Mariani, B., Ross, J. G., Paparella, S., & Allen, L. R. (2017). Medication safety simulation to assess student knowledge and competence. *Clinical Simulation of Nursing*, 210-216.

McBride-Henry, K., & Foureur, M. (2016). Medication administration errors: understanding the issues. *Australian Journal of Advanced Nursing*, 33-41.

McFarlane, D. C., & Latorella, K. A. (2012). The scope and importance of human interruption in human–computer interaction design. *Human-Computer Interaction*, 1-61.

Medication Error Reporting and Prevention. (2015). National Coordinating Council for Medication Error Reporting and Prevention (NCCMERP). About Medication Errors.

Metsala, E., & Vaherkoski, A. (2014). Medication Errors in Elderly Acute Care - A systematic Review. *Research Gate*.

Mojtaba, V. A., Sue, A. J., Turunen, B. H., & Bondas, B. T. (2014). Nursing students' perspectives of the cause of medication errors. *Nurse Education Today*, 434-440.

Musharyanti, L., Claramita, M., Haryanti, F., & Dwiprahasto, I. (2019). Why do nursing students make medication errors? A qualitative study in Indonesia. *Journal of Taibah University Medical Sciences*.

National Coordinating Council for Medication Error, a. (2015). *What is a medication error?* New York: National Coordinating Council for Medication Error Reporting and Prevention.

National Council of State Boards of Nursing. (2017). *The 2015 National Nursing Workforce Survey. National Council of State Boards of Nursing*. Retrieved 12 27, 2020, from https://www.ncsbn. org/workforce.htm.

National Family Health. (2014). Available from: http://www.nfhsindia.org 13Survey,

NCCMERP. (2021, About Medication Errors). *About Medication Errors*. Retrieved from National Coordination Council for Medication Error Reporting and Prevention: https://www.nccmerp.org/about-medication-errors.

O'Connor, E., Coates, H. M., Yardley, I. E., & Wu, A. W. (2010). Disclosure of patient safety incidents: a comprehensive review. *International Journal of Quality Health Care*, 371-379.

O'Grady, D. (2018). *'Ten rights' of safe medication administration.* Crumlin: Our Lady's Children's Hospital.

Oselka, G. (2018). *Considerações sobre prontuário médico. In: Bioética clínica: reflexões e discussões sobre casos relacionados.* São Paulo: Conselho Regional de Medicina do Estado de São Paulo, Centro de Bioética.

Otero López, M. J. (2013). Errores de medicación y gestión de riesgos. *Rev Esp Salud Publica*, 527-540.

Ozkan, S., Kocaman, G., & Ozturk, C. (2011). Frequency of pediatric medication administration errors and contributing factors. *Journal of Nursing Care Quality*, 136-143.

Page, K., & McKinney, A. (2011). Addressing medication errors — the role of undergraduate nurse education. *Nurse Education Today, 27* (3), 219–224.

Pedersen, J. S., Brereton, L., Newbould, J., & Nolte, E. (2013). *The puzzle of changing relationships. Does changing relationships between healthcare service users and providers improve the quality of care.* London: The Health Foundation.

Petrova, E. (2010). Nurses' perceptions of medication errors in Malta. *Nursing Standard*, 41-48.

Peyrovi, H., Nasrabadi, A. N., & Valiee, S. (2016). Exploration of the barriers for reporting nursing errors in intensive care units: A qualitative study. *J Intensive Care*, 215-221.

Pham, J., Story, J., Hicks, R., Shore, D., Morlock, L., Cheung, D., Pronovost, P. (2011). National study on the frequency, types, causes, and consequences of voluntarily reported emergency department medication errors. *Journal of Emergency Medicine*. *40*(5), 485–492. Retrieved from Doi: http://dx.doi.org/10.1016/j.jemermed.2008.02.059

Poldervaart, J. M., van Melle, M. A., Willemse, S., de Wit, N. J., & Zwart, D. L. (2017). In-hospital prescription changes and documentation in the medical records of the primary care provider: Results from a medical record review study. *BioMed Central Health Services Research, 17*(1), 1-10.

Rabeel, A. (2014). *Developing a tool for assessing nurse professional identity, Unpublished Doctorate Thesis* (98 ed.). Cairo: Faculty of nursing.

Radley, D. C., Wasserman, M. R., Olsho, L. E., Shoemaker, S. J., Spranca, M. D., & Bradshaw, B. (2013). Reduction in medication errors in hospitals due to adoption of computerized provider order entry systems. *Journal of the American Medical Informatics Association*, 470-476.

Ramani, S., & Leinster, S. A. (2008). AMEE Guide no. 34: teaching in the clinical environment. *Medical Teaching*, 347-364.

Rasmussen, J. (1983). Skills, rules, and knowledge; signals, signs, and symbols, and other distinctions in human performance models. *Institute of Electrical and Electronics Engineering transactions on systems, man, and cybernetics*, 257-266.

Reason, J. (1990). *Human error.* Cambridge: Cambridge university press.

Refaat, A. (2010). *Developing and validating a model for nurses' professional identity and quality of nursing care* (130-132 ed.). Faculty of nursing, Ain Shams University.

Reid-Searl, K., Moxham, L., & Happell, B. (2010). Enhancing patient safety: the importance of direct supervision for avoiding medication errors and near misses by undergraduate nursing students. *International Journal of Nursing Practice*, 225-232.

Reid-Searl, K., Moxham, L., Walker, S., & Happell, B. (2009). Internal conflict: undergraduate nursing students' response to inadequate supervision during the administration of medication. *Collegian*, 71-77.

Roque, F., Herdeiro, M. T., Soares, S., Teixeira, R. A., & Breitenfeld, L. (2014). Educational interventions to improve prescription and dispensing of antibiotics: a systematic review. *BioMed Central Public Health*.

Rosner, F., Berger, J. T., Kark, P., Potash, J., & Bennett, A. J. (2010). Disclosure and prevention of medical errors. *Archives of International Medicine*, 2089-2092.

Rutledge, D., Retrosi, T., & Ostrowski, G. (2018). Barriers to medication error reporting among hospital nurses. *Journal of Clinical Nursing*, 1941-1949.

Saldelowski, M. (2000). Whatever happened to qualitative description? *Research on Nursing Health*, 334-340.

Salmasi, S., Khan, T. M., Hong, Y. H., Ming, L. C., & Wong, T. W. (2015). Medication errors in Southeast Asian countries: a systematic review. *Public Library of Science One*.

Samsiah, A., Othman, N., Hamshed, S., & Hassali, M. (2016). Perceptions and attitudes toward medication error reporting in primary care clinics: A qualitative study in Malaysia.

Sandelowski, M. (2010). What's in a name? Qualitative description revisited. *Research in Nursing and Health, 33*(1), 77-84.

Savvato, K., & Efstratios, A. (2014). An inside look into the factors contributing to medication errors in the clinical nursing practice. *Health Science Journal*, 32-44.

Seki, Y., & Yamazaki, Y. (2009). Effects of working conditions on intravenous medication errors in a Japanese hospital. *Journal of Nursing Management*, 128–139.

Serra, M. (2018). Learning to be a nurse: Professional identity in nursing students. *Journal of Educational Science, 3*(5), 65-76.

Shehata, R. (2008). *Organizational culture versus occupational stress among staff nurses at Mansoura University Hospital.* Faculty of Nursing, Mansoura University.

Stalpers, D., De Brouwer, B. J., Kaljouw, M. J., & Schuurmans, M. J. (2015). Associations between characteristics of the nurse work environment and five nurse-sensitive patient outcomes in hospitals: a systematic review of literature. *International Journal of Nursing Studies, 2*(52), 817–835.

Stewart, D., Thomas, B., MacLure, K., Wilbur, K., Wilby, K., Pallivalapila, A., ... & Al Hail, M. (2018). Exploring facilitators and barriers to medication error reporting among healthcare professionals in Qatar using the theoretical domains framework: A mixed-methods approach. *Public Library of Science One, 13*(10), e0204987.

Stimpfel, A. W., Sloane, D. M., & Aiken, L. H. (2012). The longer the shifts for hospital nurses, the higher the levels of burnout and patient dissatisfaction. *Health Affairs*, 2501-2509.

Sulosaari, Kajander, S., Hupli, M., Huupponen, R., & Leino-Kilpi, H. (2012). Nursestudents' medication competence — an integrative review of the associated factors. *Nurse Education Today, 32* (4), 399–405.

Sulosaari, V., Kajander, S., Hupli, M., Huupponen, R., & Leino-Kilpi, H. (2012). Nurse students' medication competence - an integrative review of the associated factors. *Nurse Education Today*, 399-405.

Ulanimo, V. M., O'Leary-Kelley, C., & Connolly, P. M. (2017). Nurses' perceptions of causes of medication errors and barriers to reporting. *Journal of Nursing Care Quality*, 28-33.

Vaismoradi, M., Salsali, M., & Marck, P. (2011). Patient safety: nursing students' perspectives and the role of nursing education to provide safe care. *International Nursing Review, 58*(4), 434–442.

Vaismoradi, M., Salsali, M., & Marck, P. (2011). Patient safety: nursing students' perspectives and the role of nursing education to provide safe care. *International Nursing Review*, 434-442.

Vaismoradi, S. M. (2011). Patient safety: nursing students' perspectives and the role of nursing education to provide safe care. *International Nursing Review*, *58*(4), 434–442.

Valdez, L. d.-C. (2012.). A structural equation modelling of the factors affecting student nurses' medication errors. *Nurse Education Today.* Retrieved from http://dx.doi.org/10.1016/j.nedt.2012.01.001.

Vincent, C. (2012). *The essentials of patient safety. Download disponible all'indirizzo*. Retrieved from www1. imperial. ac. uk/medicine/about/ institutes/patientsafetyservicequality

Vincent, C., Taylor-Adams, S., & Stanhope, N. (1998). Framework for analysing risk and safety in clinical medicine. *British Medical Journal: British Medical Journal*, 1154-1157.

Watkins, K. (2021). 12-hour shift: Beneficial or harmful. *Journal of Nursing Care*, *10*(2). Retrieved from https://www.researchgate.net/publication /281006717_12_hour_shifts_and_error_among_nurses_ A_sytematic_review_poster.

Weiss, P. M., & Miranda, F. (2018). Transparency, apology, and disclosure of adverse outcomes. *Obstetric Gynecological Clinic of North America*, 53-62.

Westbrook, J. I., Woods, A., & Rob, M. I. (2010). Association of interruptions with an increased risk and severity of medication administration errors. *Archives of Internal Medicine*, 683-690.

WH O. (2016). Consultative meeting planning for the global patient safety challenge. *World Health Organization*.

WHO. (2012).

WHO. (2016). *Medication Errors: Technical series on safer primary care.* Geneva: World Health Organization.

World Health Organisation. (2011). *Patient safety curriculum guide report.* Geneva: WHO.

World Health Organization. (2011). *WHO patient safety curriculum guide multiprofessional.*

World Health Organization. (2019). Medication Errors. *Technical series on safer primary care*.

You, M. A., Choe, M. H., Park, G. O., Kim, S. H., & Son, Y. J. (2015). Perceptions regarding medication administration errors among hospital staff nurses of South Korea. *Int J Qual Health Care:*, 276-283.

Zahra, P., & Sadegh, Z. (2016). Survey of Medication Error Factors from Nurses' Perspective. *Biology and Medicine*.

Zauderer, S. (2022). Medication Errors Statistics and Facts. *Cross River Therapy*.

APPENDIX A- QUESTIONNAIRE

UNIVERSITY OF CAPE COAST

COLLEGE OF HEALTH AND ALLIED SCIENCES

SCHOOL OF NURSING AND MIDWIFERY

QUESTIONNAIRE FOR FIELD STUDY

Dear Respondent,

I am a student at the University of Cape Coast offering a Master of Science degree in Nursing. I am conducting research to assess medication administration errors among nurses and midwives at Holy Family Hospital, Nkawkaw in the Kwahu West municipality in the Eastern Region of Ghana. Kindly provide answers to this questionnaire relating to the subject. Participation is voluntary, and you are assured of anonymity and confidentiality of any information you provide. Kindly note that the intent is for academic purposes only. Please provide your answers in the spaces provided. This survey will require between 10 to 15 minutes of your time.

A. Demographic Characteristics of respondents

1. Age

   a. 24 years and below [ ] b. 25-29 years [ ]

   c. 30-34 years [ ] d. 35-39 years [ ]

   e. 40-44 years [ ] f. 45-49 years [ ]

   g. 50-54 years [ ] h 55-60 years [ ]

2. Sex

   a. [ ] Female b. [ ] Male

3. Qualification

a.[ ] Enrolled b.[ ] Diploma

c.[ ] Degree d.[ ] Masters

Other (Specify) ……

4. Years of service

a.[ ] 5 years and below b.[ ] 6 -10 years

c.[ ] 11 – 15 years d.[ ] 16-20 years

e.[ ] 21 – 25 years f.[ ] 26-30 years

g.[ ] 31 years and above

5. Unit/Department of work

a.[ ] Emergency b.[ ] Theatre

c.[ ] Male ward d.[ ] Female ward

e.[ ] Paediatric ward f.[ ] Maternity

g.[ ] Fever's Unit h.[ ] OPD

Other (Specify) ……

B. Prevalence of medication administration Errors among nurses and midwives

6. Have you experienced medication error in your practice as a nurse

a.[ ] Yes b.[ ] No

7. If yes to question 6, how many times have you experienced medication error in your practice?

a. 1 [ ] b. 2 [ ]

c. 3 [ ] d. 4 [ ]

e. 5 [ ] f. 6 or more [ ]

8. Who was the principal cause of the mediation error

a.[ ] Nurse b.[ ] Doctor

c.[ ] Patient d.[ ] Other health professional

e.[ ] A combination of factors f.[ ] No idea

g.[ ] Self

Other (specify) ……

C. Causes of Medication Administration Errors among the Nurses and Midwives in their Practice

Nurse-related factors

Indicate your perspective on the causes of medication errors.

Cause	Completely Agree	Agree	No idea	Disagree	Completely Disagree
9. Being despondent and disinterested in nursing profession					
10. Nurses and midwives being unfamiliar with the drugs					
11. Nurses and midwives' psychological and mental problems					
12. Not having enough time					
13. Tiredness resulting from overworking					

Department related factors

Cause	Completely Agree	Agree	No idea	Disagree	Completely Disagree
14. Department environment noise					
15. Drugs chamber office space (light, physical space)					
16. High volume of work					
17. The way drugs are arranged on the shelves					
18. Department medication and drug protocols					

Nursing management-related factors

Cause	Completely Agree	Agree	No idea	Disagree	Completely Disagree
19. The insufficient number of nurses and midwives in relation to the patients					
20. Department style of supervision and control					
21. Physicians' illegible handwriting in patients' files					
22. Drug prescription method					
23. The errors occurring mostly during particular shifts					

D. Systematic structures necessary for nurses and midwives to report medication administration errors

Indicate your level of agreement on how necessary you deem these protocols for reporting medication errors

Protocols	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
24. Understanding what constitutes an error					
25. Recording of errors with necessary details					
26. Communicating errors among health professionals					
27. Disclosing errors to patients and their relatives					
28. Establishment of an environment to aid reporting					

E. Barriers to reporting medication administration errors among nurses and midwives.

Indicate your level of agreement to these existing barriers to reporting medication errors

Barriers	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
29. To avoid punishment from the health facility					
30. The largeness of the facility					

31. Unfavourable institutional protocols to reporting errors					
32. Health professionals' internal conflict about revealing errors					
33. When errors are considered to be trivial					
34. To preserve reputation of the health professional					

F. Influence of Nurses' and Midwives' Background Characteristics on Reporting MAEs

35. Will your years worked and experience gained inform your decision to report a medication administration error?

[ ] Yes [ ] No

36. Are you willing to report medication administration error?

[ ] Yes [ ] No

THANK YOU FOR PARTICIPATING

APPENDIX B:

BIVARIATE ANALYSIS ON ASSOCIATION BETWEEN NURSES WILLINESS TO REPORT MEDICATION

Table 10: Bivariate analysis on the association between demographic variables and willingness to report medication errors.

Variables		Willingness to report medication errors (N=2666)			
		No	Yes		
Demographic				χ^2	**Phi**
Sex	Female	24(10.4%)	111(48.1%)	14.7	-.253
	Male	39(16.9%)	57(24.7%)	7***	
Age	<30	37(16.0%)	69(29.9%)	15.5	.260
	30-39	17(7.4%)	67(29.9%)	6**	
	40-49	2(0.9%)	26(11.3%)		
	50+	7(3.0%)	6(2.6%)		
Qualification level	Enrolled nurse	11(4.8%)	29(12.6%)	3.20	.118
	Diploma	45(19.5%)	108(46.8%)	7	
	Degree	5(2.2%)	28(12.1%)		
	Masters	2(0.9%)	3(1.3%)		
Years of service	5 years or below	34(14.7%)	52(22.5%)	26.6	.340
	6-10	3(1.3%)	56(24.2%)	7**	
	11-15	2(0.9%)	13(5.6%)		
	16-20	4(1.7%)	10(4.3%)		
	21-25	7(3.0%)	11(4.8%)		
	26-30	8(3.5%)	10(4.3%)		
	31 years or above	5(2.2%)	16(6.9%)		
Unit/department of work	Emergency	10(4.3%)	16(6.9%)	39.0	.411
	Theatre	4(1.7%)	22(9.5%)	81**	
	Male ward	8(3.5%)	20(8.7%)	*	
	Female Ward	5(2.2%)	38(16.5%)		
	Paediatric ward	6(2.6%)	20(8.7%)		
	Maternity	5(2.2%)	37(16.0%)		
	OPD	25(10.8%)	15(6.5%)		

Note. ∗p < 0.05, ∗∗p < 0.01, ∗∗∗p<0.001

APPENDIX C- IRB Ethical Clearance Letter

UNIVERSITY OF CAPE COAST
INSTITUTIONAL REVIEW BOARD SECRETARIAT
TEL: 0558093143 / 0508878309
E-MAIL: irb@ucc.edu.gh
OUR REF: UCC/IRB/A/2016/1187
YOUR REF:
OMB NO: 0990-0279
IORG #: IORG0009096

21ST DECEMBER, 2021

Ms. Vera Love Otoo
Department of Adult Health Nursing
University of Cape Coast

Dear Ms. Otoo,

ETHICAL CLEARANCE – ID (UCCIRB/CHAS/2021/115)

The University of Cape Coast Institutional Review Board (UCCIRB) has granted Provisional Approval for the implementation of your research titled ***Assessment of Medication Administration Errors among Nurses and Midwives at Holy Family Hospital, Nkawkaw-Ghana.*** This approval is valid from 21st December, 2021 to 20th December, 2022. You may apply for a renewal subject to submission of all the required documents that will be prescribed by the UCCIRB.

Please note that any modification to the project must be submitted to the UCCIRB for review and approval before its implementation. You are required to submit periodic review of the protocol to the Board and a final full review to the UCCIRB on completion of the research. The UCCIRB may observe or cause to be observed procedures and records of the research during and after implementation.

You are also required to report all serious adverse events related to this study to the UCCIRB within seven days verbally and fourteen days in writing.

Always quote the protocol identification number in all future correspondence with us in relation to this protocol.

Yours faithfully,

Samuel Asiedu Owusu, PhD
UCCIRB Administrator

ADMINISTRATOR
INSTITUTIONAL REVIEW BOARD
UNIVERSITY OF CAPE COAST

APPENDIX D

Form
SGS F.12 - TDSF

UNIVERSITY OF CAPE COAST
SCHOOL OF GRADUATE STUDIES

THESIS/DISSERTATION SUBMISSION FORM

Name of Student: VERA LOVE ATOO

Registration Number: SN/MNS/19/0011

College/Faculty/School: SCHOOL OF NURSING

Department: ADULT HEALTH NURSING

Telephone No. 0243640525

Title of Thesis/Dissertation: ASSESSMENT OF MEDICATION ADMINISTRATION ERRORS AMONG NURSES AND MIDWIVES AT HOLY FAMILY HOSPITAL, NKAWKAW - GHANA

Date of Submission of Thesis/Dissertation: 14-03-2023

Fee Payment. *Please attach copies of receipts for fees paid from year of registration.*

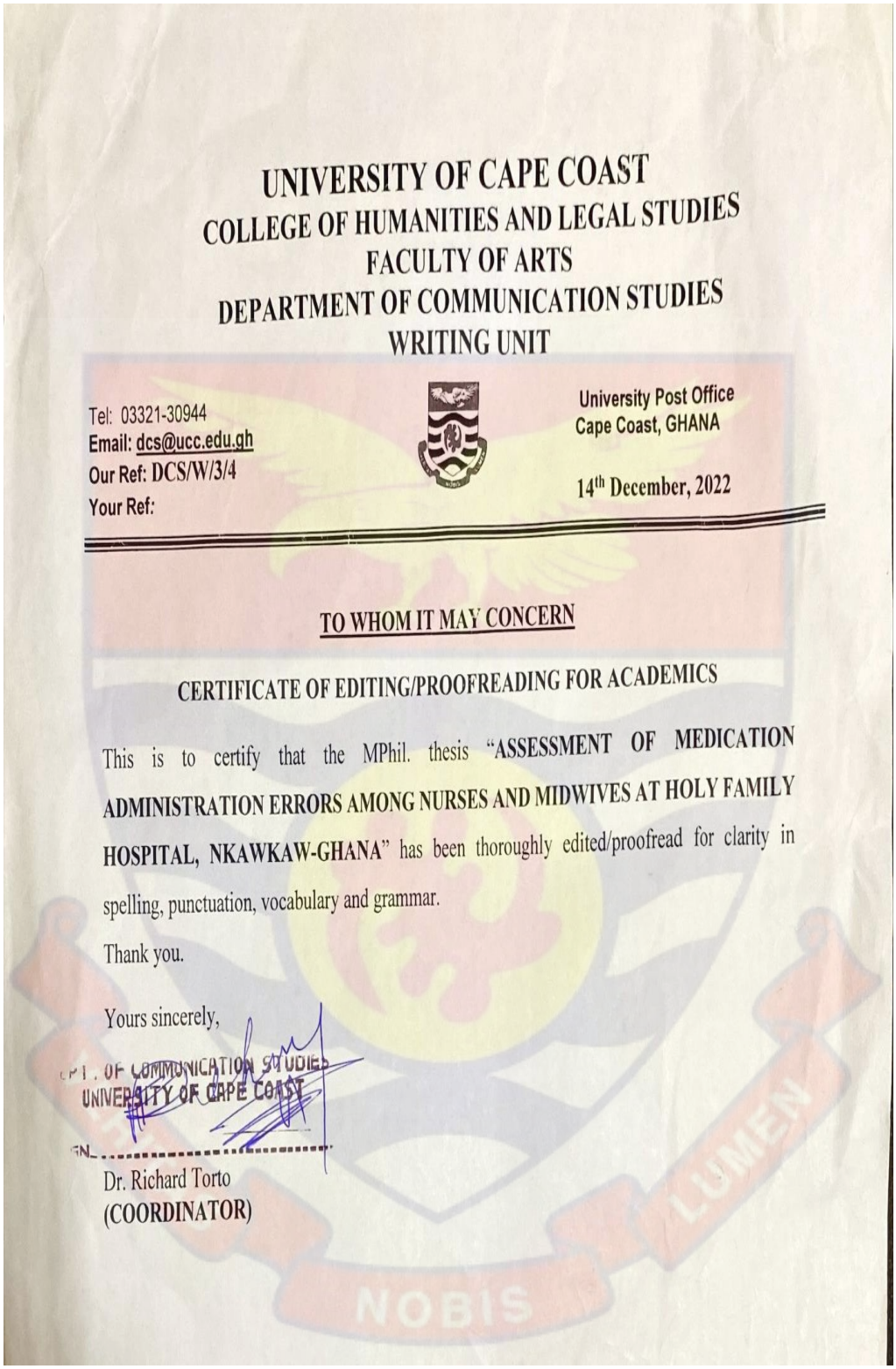
For Official use (SGS)

We confirm that the student named above has submitted his/her thesis/dissertation and that he/she has satisfied all conditions for submission of the thesis/dissertation.

Paul Akwasi Mensah
Name of SGS Official

Signature

Date: 14/03/23



UNIVERSITY OF CAPE COAST
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FACULTY OF ARTS
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Thank you.

Yours sincerely,

DEPT. OF COMMUNICATION STUDIES
UNIVERSITY OF CAPE COAST

Dr. Richard Torto
(COORDINATOR)

UNIVERSITY OF CAPE COAST
COLLEGE OF HUMANITIES AND LEGAL STUDIES
FACULTY OF ARTS
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Yours sincerely,

DEPT. OF COMMUNICATION STUDIES
UNIVERSITY OF CAPE COAST

Dr. Richard Torto
(COORDINATOR)

UNIVERSITY OF CAPE COAST

INSTITUTIONAL REVIEW BOARD SECRETARIAT

TEL: 0558093143 / 0508878309
E-MAIL: irb@ucc.edu.gh
OUR REF: UCC/IRB/A/2016/1187
YOUR REF:
OMB NO: 0990-0279
IORG #: IORG0009096

21ST DECEMBER, 2021

Ms. Vera Love Otoo
Department of Adult Health Nursing
University of Cape Coast

Dear Ms. Otoo,

ETHICAL CLEARANCE – ID (UCCIRB/CHAS/2021/115)

The University of Cape Coast Institutional Review Board (UCCIRB) has granted Provisional Approval for the implementation of your research titled ***Assessment of Medication Administration Errors among Nurses and Midwives at Holy Family Hospital, Nkawkaw-Ghana.*** This approval is valid from 21st December, 2021 to 20th December, 2022. You may apply for a renewal subject to submission of all the required documents that will be prescribed by the UCCIRB.

Please note that any modification to the project must be submitted to the UCCIRB for review and approval before its implementation. You are required to submit periodic review of the protocol to the Board and a final full review to the UCCIRB on completion of the research. The UCCIRB may observe or cause to be observed procedures and records of the research during and after implementation.

You are also required to report all serious adverse events related to this study to the UCCIRB within seven days verbally and fourteen days in writing.

Always quote the protocol identification number in all future correspondence with us in relation to this protocol.

Yours faithfully,

Samuel Asiedu Owusu, PhD
UCCIRB Administrator

ADMINISTRATOR
INSTITUTIONAL REVIEW BOARD
UNIVERSITY OF CAPE COAST