Exploring the Factors Contributing to Medication Errors in The Intensive Care Unit of Governmental Jordanian Hospitals: perspective from Nurses

Prepared By:

Abeer Barhomeh

Supervised by

Dr. Abdullah Algunmeeyn

Co-supervised by

Dr. Hamzeh Abu-Nab

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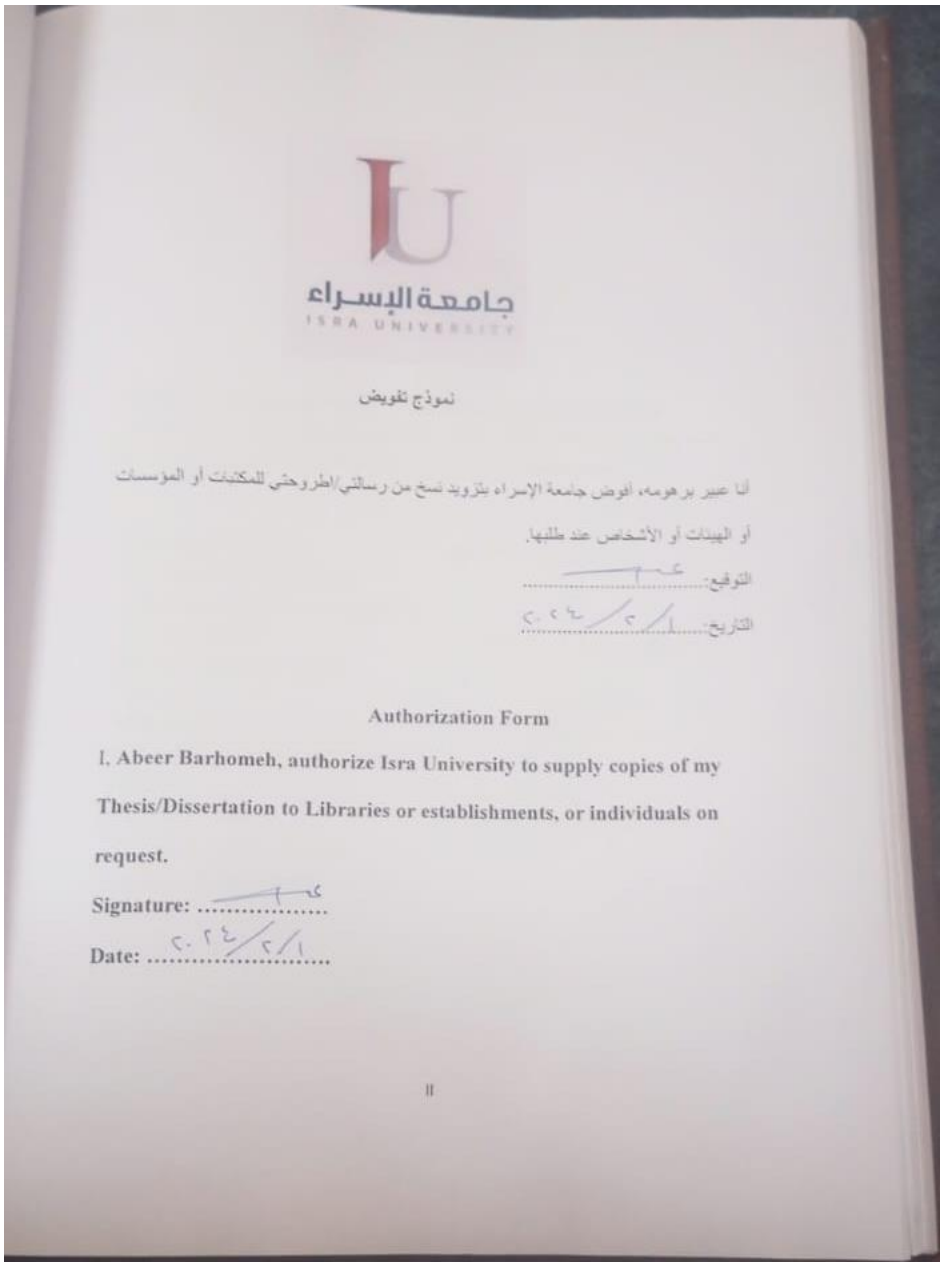

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II

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Committee Decision

This Thesis (Exploring the Factors Contributing to Medication Errors in The Intensive Care Unit of Governmental Jordanian Hospitals: perspective from Nurses) was successfully defended and approved on January 2024

Examination Committee	Signature
Dr. Abdallah Ahmad Abdallah Alghnimeen, Supervisor and Chairman. Assistant Professor	.....
Dr. Hamza Abunab, Associate supervisor Assistant Professor	.....
Dr. Hassan Kamal Al-emran, Internal member Assistant Professor	.....
Professor Dr. Suhair Hosni Al-Ghobeish, External member Professor	.....

III

DEDICATION

I would like to dedicate my work to my family, my backbone, whose endless support, and encouragement were with me in every step of the road. Without their help and support, this work would have never been accomplished.

To my colleagues and friends whose love, encouragement, and prayers made me stronger and able to continue every time.

To my beloved one, my Mum, who left us and could not be here with us, yet she is connected to us by heartstrings into infinity.

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First of all, I express my deep thanks to Allah, the mighty, for giving me the strength and the ability to accomplish this study.

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I would like to thank the examination committee for their helpful and insightful comments and feedback.

Finally, I wish to thank my family and friends for their support and help.

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Abstract:

Background:

Medication is used to treat infectious diseases, stop effects from chronic diseases, and ease pain. But drugs can also hurt you if you don't use them the right way. Mistakes can happen at home, in the hospital, at the doctor's office, or in the drugstore. Medication Administration Errors (MAEs) are a common type of error. (Adam et al, 2020)

Aim: This study aims to examine, from the nurses' perspective, the factors that contribute to medication errors in the Intensive Care Units of Jordanian government hospitals.

Method:

Employing a narrative qualitative approach, this study utilized a specific methodology and was conducted in two government hospitals in Jordan. Three distinct data collection methods were employed: face-to-face semi-structured interviews, document review, and observation. The primary data collection tool involved face-to-face semi-structured interviews with a sample of 24 participants, specifically nurses, across the two hospitals. The data gathered from the case studies underwent thematic analysis, employing a framework analysis technique and guided by established principles.

Finding:

This study demonstrate the prevalence of prescribing medication errors and may identify the most significant factors contributing to error which is classified as active failure, impact of errors, error-producing condition, and medication safety strategy.

Conclusion:

The investigation utilized a qualitative research methodology, 24 nurses from government hospitals were interviewed, focusing on medication errors. Semi-structured interviews were conducted, and data were analyzed using NVivo software. Nurses perceive medication errors as complex challenges with multifaceted origins, emphasizing the need for risk mitigation strategies. Factors contributing to errors encompass facility conditions, substance properties, personnel actions, and patient factors. Addressing medication errors requires heightened situational awareness and diverse data collection and analysis methods. This study delves into nurses' perspectives on prescription error management.

Keywords: Error, Medication, Governmental, Intensive Care Units, Jordanian Hospitals

, Nurses

CHAPTER ONE

INTRODUCTION

This chapter discusses the scientific background of the study and elucidates its core problem. By doing so, the researcher aims to formulate precise study questions. Addressing these questions enabled the achievement of the study's objectives, subsequently highlighting its significance.

Medication Error Conceptualy Defined according to the National Coordinating Council for Medication Error Reporting and Prevention (NCCMERP), "any preventable event that may lead to inappropriate medication use or harm to a patient while the medication is under the control of healthcare professionals, patients, or consumers. Such incidents can be associated with various aspects of healthcare practice and products, including prescribing, order communication, product labeling, packaging, formulation, distribution, administration, education, monitoring, and use." (Thomas B et al., 2019)

Medication errors (MEs) represent a significant challenge for healthcare systems globally (Aseeri et al., 2020). Notably, severe medication errors are estimated to result in the deaths of 7,000 patients, injure at least 1.5 million others, and incur costs amounting to $3.5 billion annually in U.S. hospitals (Aseeri et al., 2020).

The repercussions of these errors, such as deteriorating patient health and extended hospital stays, impose considerable psychological and financial burdens on patients' families and healthcare systems alike.

The National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP) defines a medication error (ME) as: “any preventable event that may cause or lead to inappropriate medication use or harm to a patient while the medication is under health care control, be it professional, patient, or consumer-driven. Such events encompass various facets of healthcare practices and products, spanning prescribing, communication during ordering, product labeling, packaging, formulation, distribution, administration, education, monitoring, and use” (Thomas B et al., 2019).

A study was published by Kumar and colleagues negotiating MPE in the ICU, reporting 10.7% medication errors (95% confidence interval, CI 10.3–11.1). When assessed for severity, 1,757 (7.15%) had mild MPE, with no adverse effects observed in any patient. However, 867 cases (3.52%) of severe MPEs required intervention and/or affected patients. Seventy percent of severe MPEs occurred in the antibiotic group, accounting for 2.8% of all errors, whereas the drug classes most frequently involved in ME in the mild error group were control (multivitamin) and nutritional supplement for the general population (5.6) . %), followed by sepsis (0.4%), myocardial infarction (0.3%) and stroke (0.2%). (Kumar and Sahni, 2021) can conclude that MPE associated with antibiotics is more harmful to patients than MPE associated with other drugs. Interestingly, 129 (92.8%) of the 138 ICU patients included in this study developed one or more MPEs during their stay in the ICU. This may explain the high prevalence of ME in ICU patients.

1. 1. Research Background

Medication administration errors (MAEs) remain prevalent in hospital wards, despite ongoing efforts to mitigate them, putting patients at potential risk (Giannetta et al., 2020). Prior research indicates that MAEs, excluding prescribing and administration errors, occur in 5% of non-intravenous and 35% of intravenous doses, accounting for up to 40% of all administered doses (Härkänen et al., 2019).

Clinical nurses devote a considerable portion of their time to administering medications to hospitalized patients (Michel et al., 2021). On average, nurses allocate approximately 27% of their time to medication-related tasks, a figure influenced by the specific healthcare facility and the health information system in place (Moore et al., 2020). The medication administration process in hospitals is multifaceted, involving various healthcare professionals. Factors such as individual (staff) attributes (e.g., knowledge, experience), patient characteristics (e.g., treatment setting), and system-related issues (e.g., workload, communication breakdowns) can influence this process (Härkänen, Luokkamäki et al., 2020). Consequently, dosing errors can stem from multiple sources, making the medication administration process inherently error-prone (Giannetta et al., 2020). Given the pivotal role of nurses in this process, understanding their perspectives on MAEs is essential for devising targeted interventions to minimize medication errors and enhance patient safety (Härkänen, Luokkamäki et al., 2020).

Various definitions of MAEs have been proposed in the literature. For instance, the Nurse Intervention category defines medication administration as "the preparation, administration, and assessment of the effectiveness of both prescription and non-prescription medications" (Butcher et al., 2018). Another perspective characterizes MAEs as errors occurring during the medication administration process (Baraki et al., 2018). Such errors typically signify deviations from the established "five rights" of medication administration or lapses in documenting medication usage (Moore et al., 2020).

Beyond medication errors during administration, procedural oversights, including omissions and deviations from safe medication practices, also contribute to medication errors (Savva et al., 2022). Notably, skipped procedural steps account for a significant proportion of identified errors within the treatment process (Henderson et al., 2021).

Numerous interventions have been proposed to curtail medication errors, encompassing technological solutions, staff training initiatives, enhanced access to pharmacy services, and refinement of clinical protocols (European Medicines Agency, 2013; Manias et al., 2020). Despite these efforts, medication errors persistently occur in healthcare settings, with hospitals being particularly susceptible (Härkänen et al., 2019). Indeed, MAEs have been reported in 20% of all administered doses, though the prevalence varies based on location and the criteria employed for definition (Härkänen et al., 2019)

Several factors contribute to the safe administration and use of medications. While some argue that registered nurses (RNs) may lack the necessary knowledge and skills for effective medication monitoring, others emphasize environmental and systemic challenges. These include the inherent risks associated with certain behaviors, frequent interruptions, technological design flaws, time constraints, and communication barriers. Furthermore, the absence of strong leadership and outdated policies and guidelines can also impact medication safety." (Odberg et al., 2019).

1.2 Statement of problem:

Safety considerations are paramount in healthcare delivery. The occurrence of medication errors in routine practices holds significant implications for healthcare analytics. Notably, specific data on medication errors, particularly those committed by nurses, often remain distinct from broader datasets. Furthermore, there is a dearth of published information concerning medication errors in Jordanian nursing practices.

Medication errors can manifest at various stages of the administration process. Such errors arise when vulnerabilities in medication systems, coupled with human factors like fatigue, adverse environmental conditions, or staffing shortages, compromise prescribing, dispensing, and management practices. These errors can culminate in severe outcomes, including injuries, disabilities, or even fatalities (Abdelhamed, 2020).

The prevalence of medication errors is notably higher in high-intensity care settings such as emergency rooms and Intensive Care Units (ICUs). This heightened risk can be attributed to the sheer volume of patients and the predominant use of intravenous medications, necessitating precise infusion rate calculations. Moreover, many ICU patients are in critical conditions, rendering them unable to monitor or report adverse drug

reactions. Consequently, these settings may witness a higher incidence of medication-related errors with potentially grave repercussions (Kaboodmehri et al., 2019). Alarmingly, medication errors contribute to extended hospital stays and escalate disability and mortality rates in approximately 6.5% of admissions (Abukhader & Abukhader, 2020).

Ensuring patient safety and minimizing errors hinge on precise and timely patient assessments. This includes evaluating the risk factors predisposing patients to complications, some of which may be inevitable. However, the process of risk assessment and evaluation is frequently complicated by the susceptibility of patients with chronic or acute conditions, exacerbated by the high-stress environment of intensive care settings. (Shalaby et al., 2018).

1.3 Purpose of the Study:

The purpose of this study is to investigate the factors that contribute to medication errors in the Intensive Care Units of Governmental Jordanian Hospitals from the perspective of nurses

1.4 Research Question:

What are the factors contributing to medication errors in the intensive care unit in Jordanian government hospitals from the nurse's perspective?

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1.5 Significant of the study:

Medication errors pose a significant challenge in numerous regions worldwide. Countries like Jordan, in particular, lack even the most rudimentary medication error management systems, often remaining oblivious to the associated risks. The findings of this study aim to enlighten patients, nurses, and hospital boards about the frequency of medication errors among nurses in the study area. Additionally, the research sheds light on the challenges these professionals encounter in their efforts to prevent such errors. It is hoped that the study's outcomes will catalyze changes within the healthcare system, facilitating better monitoring of medication errors and removing existing barriers that hinder patients from reporting them.

1.6 Summary:

This study plan aimed to identify the factors leading to medication errors in the intensive care units of Jordanian government hospitals, as perceived by nurses. After delineating the study's problem, which served as the primary impetus for the researcher's chosen title, the study's objectives were revisited. Recognizing the significance of the study and aiming to fulfill its objectives, specific research questions were formulated. Answering these questions is crucial to achieving the study's intended goals.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter delves into the literature pertaining to the study's research topic: Medication Error in Intensive Care Units of Governmental Jordanian Hospitals. his chapter reviewed the studies and scholarly works, offering a synthesis of knowledge and insights that contextualize the multifaceted nature of medication errors within the domain of healthcare delivery.

2.2 Background

Maintaining patient safety is a crucial goal of nursing care. Patients' safety is been given lots of attention in the healthcare setting. The safety of patient is an important indicator of quality health care delivery system. One of the major challenges to patient safety is medication errors. Patient safety should be ensured when handling medication. When drugs are prescribed for a patient, added that the intent is to improve the patient's quality of life by curing a disease, reducing or eliminating the symptoms of a disease, arresting or slowing a disease process, or preventing a disease or its symptoms from appearing in the first place. (Oluebubechukwu, 2018). Most people in the world will take medication at some point in their lives to prevent or treat disease. However, sometimes when used incorrectly, drugs can cause serious side effects, disability, and even death (Adam et al., 2020). Medication errors are a major cause of avoidable patient harm in healthcare systems worldwide. Medication errors are a common health problem in the African healthcare context (McLachlan AJ et al., 2018) Medication errors (MAE) are the most common type of medication error and spell disaster for patients, healthcare providers and healthcare Providers of sexual consequences (Kaltenthaler E et al. 2018). Medication administration is primarily the responsibility of nurses, who spend 40% of their time on medication administration (Adam et al., 2020). The nurse represents the final safety check in the drug delivery system chain of events and is the ultimate guarantee of patient well-being (Kaltenthaler E, et al., 2018)

2.3 Search Strategy

Various databases were utilized throughout the study, including Google Scholar, EBSCO, CINAHL, PubMed, and Cochrane. The search was conducted using specific keywords such as "Error," "Medication," "Jordan," "nurses," "Intensive Care Units," and "Governmental Jordanian Hospitals," focusing on the relationship between the study variables, namely "Factors Contributing to Medication Errors." It is important to note that the study specifically concentrated on the "Intensive Care Units of Governmental Hospitals." The study population and sample were limited to the perspectives of nurses. The search results were refined by applying restrictions based on the date range (2017–2023), full-text accessibility, and the English language. A total of 105 studies were identified, of which 27 were excluded due to only having abstracts available in English, 19 were inaccessible in full text, and 31 were excluded because their titles, abstracts, and objectives were unrelated to the study topic. Ultimately, only 25 articles were considered relevant for inclusion.

1.4.1 Medication Errors among Nurses in General:

To mitigate or potentially prevent the looming surge in nursing cases, the nursing profession must take immediate action on a global scale (Olans et al. 2020). It is alarming that medication resistance accounts for only 1% of publications in health literature, especially considering that nurses constitute the largest group of healthcare workers interacting with the population (Abuhammad & Ababneh, 2023) Investing in nurses has yielded significant benefits across the clinical, socio-economic, and political domains of healthcare systems worldwide (Williams et al. 2013).

Nurses must meet professional requirements, leveraging their expertise and sense of duty (Abuhammad et al. 2022). They undertake diverse and comprehensive responsibilities, encompassing all facets related to the preparation and administration of antibiotics, as well as monitoring their effects (Rout et al. 2021). Nurses play a pivotal role in disease prevention and control (Alrabadi N, Haddad R, Haddad R, et al. 2020). Their work also entails collaborating with patients and their families in clinical settings, engaging in clinical research and development, educating both fellow nurses and the public, and advocating for policy and practice changes (Abuhammad, 2020).

1.4.2 Medication errors among nurses in Jordan:

Jordan, like many developing countries, faces challenges stemming from a shortage of resources. This shortage may be exacerbated by the emigration of nurses due to inadequate facilities and salaries within the country (Alrabadia, 2020). Conversely, a deficit in nursing professionals can intensify their workload, limit their opportunities for continuing education, and elevate the risk of medication errors (MEs) (Sulaiman ZH et al. 2019). Controlling MEs is crucial not only for enhancing health services but also for reducing healthcare costs. However, research on this topic within Jordan remains sparse (Tariq and Sherbak, 2019). There is an overarching need to enhance the quality of reporting systems in Jordan and to adopt a standardized methodology for assessing the prevalence, severity, outcomes, and contributing factors of infectious diseases (Thomas B et al. 2019).

While doctors prescribe medications and pharmacists handle their dispensation and storage, nurses are entrusted with the critical task of administering these medications. Consequently, errors in medication administration can occur at any stage, with nurses serving as the final checkpoint in this process (Harkanen et al. 2019).

1.4.3 Global incidence of medication errors:

Studies on medication errors date back to as early as 1962, revealing an incidence of 16 errors per 100 medications (Barker and Mc, 1962; Cohen, 2007). By the 1970s, the frequency of medication errors had decreased by 5% compared to the previous decade (Thornton and Koller, 1994; Scott, 2002).

In Jordan, the magnitude of medication errors is substantial, escalating, and demands increased attention across all types of hospitals (Mrayyan and Al-Atiyyat, 2011). Limited research has been conducted in recent years regarding reported medication errors in the country (Mrayyan et al., 2007; Mrayyan and AlAtiyyat, 2011; Al-Shara, 2011; Mrayyan, 2012).

Various studies have compared the prevalence or incidence of ME in different hospitals.The literature also contains many studies that addressed the issue of medical errors specifically in the intensive care unit (Irajpour, 2017). Here, it must be taken into account that most intravenous medications are given to patients in intensive care units, taking into account that this forces nurses to deal with needles most of the time, and therefore the necessary assessment of the characteristics of this needle must be made. Especially since patients in the intensive care unit often suffer from cognitive impairment, which makes it impossible to monitor and report

harmful effects of medications through them. Which leads to increased complications and consequences of ME (Suclupe, 2020). Moreover, other factors affect the work of nurses, such as working conditions (Gianetta, 2021), organizational environment, physical aspects of the workplace (lighting, negative aspects of temperature and noise), and number of patients (Gianetta, 2021), so it is necessary to determine and clarify all available strategies to improve patient safety taking into account these factors (Kaboodmehri, 2019).

2.4.4 Medication administration errors

According to the first study of medication administration errors in a European Intensive Care Unit (ICU), dose errors were the most frequent errors (31%) followed by wrong rate (22%) (Sulaiman, 2014). However omission errors (40.3%) were the most common administration errors reported in an Indian ICU, followed by wrong timing (18%) (Kadam et al., 2009). The most common medication administration errors reported in elderly patients were omission (27.1%) and unauthorized extra doses (30.1%) (Haw et al., 2007). While in pediatrics patients who are more vulnerable to medication administration errors, the most common types of errors detected were wrong time (28.8%), wrong drug preparation (26%), and omission (16.3%) (O'Hare et al., 1995, Chua et al., 2010); therefore based on the reported data, the frequency of medication administration errors is relatively high (Abbasinazari et al., 2013) and administrators need to take the initiative of developing systems that guarantee safe medication administration (Fahimi et al., 2008).

2.4.5 Nursing shortage:

According to a Jordanian study, nursing shortage is identified as an important factor influencing medication errors because nurses must work with a large number of patients who have different health conditions and disease severity. Therefore, nurses are more likely to make medication errors in such stressful situations (Mrayyan et al., 2007). Other researchers have reported that better staffing is associated with fewer medication errors (Sulaiman, 2014). Bailey and colleagues found that the causes of medication errors vary across different types of errors; such as staff shortages and workload (Bailey et al., 2011).

2.4.6 Workload:

One of the primary factors contributing to medication errors is the elevated nursing workload (Tang et al., 2007; Fry and Dacey, 2007a; Fry and Dacey, 2007b). Workload is typically defined by the patient-to-nurse ratio; a higher workload correlates with an increased risk of errors (Sulaiman, 2014). Madegowda et al. (2007) observed that medication error rates were elevated during winter, likely due to the heightened patient census in those months. Various workload-related factors, including consecutive hours worked, rotating shifts, staff composition, and patient-to-staff ratios, can lead to distractions and interruptions among healthcare personnel. Clinical nurses spend a significant portion of their time administering medication to hospitalized patients (Michel et al., 2021). In fact, nurses spend approximately 27% of their time on medication-related tasks depending on the type of facility and the health information system used (Moore et al., 2020). Administering medications to hospitalized patients is a complex process, involving

a variety of healthcare professionals. Individual (staff)-related factors (i.e., knowledge, experience), patient characteristics (i.e., treatment environment) and system-related factors (i.e., workload, communication failure) may influence treatment age process (Härkänen, Luokkamäki et al., 2020). Thus, dosing errors can be attributed to a variety of factors. Nurses, are, therefore, involved in an error-prone process (Giannetta et al., 2020). Given that nurses play a key role in this process, it is critical to explore their perceptions of factors associated with MAE, in order to develop targeted programs to reduce medication errors and patient safety will be improved (Härkänen, Luokkamäki et al., 2020).

2.5 Summary:

Evaluating the medication errors from nurses perspective shows that, the shortage of nursing professionals can lead to an increase of medical errors , at the same time it is anticipated that controlling MEs can improve health care and can reduce healthcare costs. Administration errors were classified into ten categories, these included omission errors, unauthorized administration errors, administration errors, wrong route, extra dose , incorrect method of administration of drugs, wrong rate, incorrect dosage, incorrect timing and incorrect preparation. Nevertheless, increased workload and level of nursing education and experience have been reported as major factors contributing to medication errors.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

The commencement of this chapter involves an exploration of the methods chosen for the study setting, encompassing considerations such as the target population and eligibility criteria, sampling and sample size, recruitment procedures, data collection, ethical considerations, and data analysis. Following this, an overview is provided concerning the rigor and trustworthiness of the study, including discussions on ethical approval and concluding remarks.

3.2 Methodology

The study employed a narrative qualitative research methodology, considered most appropriate for achieving the study's goals and objectives. This approach enabled a comprehensive exploration of nurses' perspectives and the various factors contributing to medication errors in the Intensive Care Units of government hospitals in Jordan. Qualitative research is often employed when addressing questions related to 'How?' or 'What?'

Using a qualitative case study as the method of inquiry allows for an in-depth examination of a specific phenomenon within its contextual framework, drawing on multiple data sources. This ensures that the subject is not explored from a singular viewpoint but rather from various perspectives, facilitating a more nuanced understanding of the phenomena.

The research design selected for this study is a qualitative case study, a method extensively discussed by two notable scholars: Yin (2015), who approached case studies from a post-positivist perspective, and Stake (2013), who viewed them through a social constructivist lens. Various definitions of the case study exist in the literature. Robson (2002, p.178) defines it as a research approach involving empirical inquiry into a particular contemporary phenomenon within its genuine contextual setting, utilizing a range of data sources.

3.3 Site and Settings

The study was conducted at Jameel Al-Totangi Hospital and Al-Bashir Hospital, two key healthcare institutions that significantly shape the medical landscape of the region. Strategically situated in the eastern sector of Amman, the capital city, Jameel Al-Totangi Hospital is a prominent government-operated facility that offers round-the-clock medical services. Serving as a crucial healthcare hub, it provides a broad range of medical services to the local community.

Established in the 1950s, Al-Bashir Hospital is not only the oldest hospital in Jordan but also the largest government-operated hospital. Located in Amman, it comprises 49 buildings housing 80 departments. With a bed capacity of 1,850, including 85 intensive care beds across nine departments, the hospital handles an impressive volume of patients—receiving around twelve thousand patients daily, conducting over a hundred surgical operations daily, and issuing 9,000 prescriptions daily.

Al-Tutanji Hospital, established in 2001 in Amman, is the second institution included in this study. The hospital offers a comprehensive range of specialized departments to address specific healthcare needs. Employing a staff of 650, including 57 specialist doctors, 17 emergency doctors, and 225 nurses, the hospital has a clinical capacity of 151 beds.

Notably, the hospital recorded 34,880 specialty clinic visits and performed 1,452 surgical operations within the first six months of 2023.

3.4 study sample

The participants in this qualitative study were nurses, specifically nurses employed at two hospitals in Jordan, both of which were government-funded. A total of 24 participants were selected for interviews from these two distinct hospitals. The researcher conducted interviews exclusively with nursing professionals from a government hospital. Of the participants, sixteen were female, and the remaining participants were male, representing various roles within their workplaces. No participants declined to partake in the study, as the researcher assured all participants of privacy and confidentiality. To protect their identities, the individuals interviewed are referred to using a coded designation, 'N,' followed by a number ranging from 1 to 24, such as 'Interviewee N1' or 'Interviewee N24.'

The selection of participants for the interviews employed a combination of convenience and purposive sampling techniques to fit the nature of the study, resulting in a sample size of 24 hospital nurses. The primary objective of the sampling procedure was to identify and select informants with a comprehensive understanding of the topics under investigation. Furthermore, the aim was to recruit these informants in a way that enhances the credibility of the study findings and facilitates potential confirmation to other contexts or to a broader group of the study population.

3.5 Sample Size.

The selection of participants for this study prioritized their relevance to the study's scope, expected data quality, and alignment with the study's design and objectives, rather than

aiming for a representative sample of the broader population (Ritchie et al., 2013). The researcher adopted a non-restrictive methodology for participant selection, avoiding the imposition of a predetermined number within a specified timeframe. In qualitative research, the determination of sample size often hinges on factors such as available time, resources, and research objectives. In this study, the focus was squarely on data quality rather than participant quantity or data volume.

Achieving an appropriate sample size is crucial for effectively addressing the research question. Instead of adhering to fixed sample sizes, this study adopted an approach consistent with Creswell's (2013) recommendations, wherein sample size determination was guided by the concept of data saturation. This approach was deemed most suitable given the study's objectives, qualitative methodology, and the goal of generating comprehensive and insightful data. The primary aim was to conduct interviews with a sufficient number of participants to glean essential information. The focus remained on thorough exploration rather than rigid adherence to a predetermined sample size.

3.6 Inclusion and Exclusion Criteria

This study was conducted at two government hospitals in Jordan: Al-Bashir Hospital and Al-Tutanji Hospital. The inclusion criteria for participants in this study were as follows: all nurses employed in the intensive care units that hold a bachelor’s degree in nursing and have at least one year of experience, specifically within the same hospital. Additionally, participants were required to express acceptance, interest, and willingness to participate in interviews.

Conversely, the exclusion criteria for this study included individuals in leadership roles, such as department heads, as well as those with professional experience exceeding one year

overall but less than one year specifically within the intensive care unit of a government hospital setting.

3.7 Research Tool

The researcher employed semi-structured interviews conducted face-to-face as the primary method for data collection. These interviews were specifically tailored for nurses, focusing on their professional background, expertise, and insights into the factors contributing to medication errors within the Intensive Care Units of government hospitals in Jordan. The questions also centered on the hospitals' potential successes in addressing drug errors in these units. Ethical approval for this research study was obtained from relevant committees at both governmental and hospital levels. Specifically, the ethics committees at Israa University and two Jordanian hospitals provided consent for the study's execution. Consent forms and information sheets were provided to individuals who expressed a willingness to participate in the study.

The inclusion of a setting within a literary work is a critical element that significantly contributes to the overall narrative and characterization.

3.8 Ethical Approval

Obtaining ethical approval is a pivotal step in research, especially within academic and scientific domains. For this study, ethical approval was secured from the appropriate committees at both academic and governmental levels. The committees overseeing this research included the Isra University Ethics Committee, as well as the Ethics Committees of Hospitals, so the researcher sought approval to conduct interviews with Jordanian

government hospitals, but only obtained approval from Al-Bashir Hospital and Al-Tutanji Hospital, and the other hospitals apologized due to administrative circumstances.

To ensure confidentiality, participants' identities and their respective healthcare departments were encoded rather than using actual names. Participants were informed that all data, including recorded interviews, would be securely stored both in audio-tape format and on the researcher's personal computer, accessible only via a password. Transcribed interviews would be available exclusively to the researcher and principal research supervisors throughout the study. Following anonymization, all data would be securely archived in a locked filing cabinet accordingly. Participants were explicitly informed of their right to withdraw from the study at any time.

3.9 The Pilot Study:

Prior to commencing the primary investigation, the researcher in question conducted a preliminary interview with intensive care unit nurses. The researcher subsequently carried out 10 pilot interviews, with five interviews done in each hospital, representing distinct participant groups. The interviews were captured via a digital voice recording device. The duration of the interviews exhibited modest variations in length, ranging from a minimum of 40 minutes to a maximum of 45 minutes. Furthermore, pilot interviews were conducted to ascertain the clarity and quick comprehensibility of the questions outlined in the interview guidelines.

Following the completion of the pilot interviews, the researcher dedicated several days to thoroughly examining the collected replies in order to evaluate the credibility and appropriateness of the questions in effectively obtaining the needed information. The

primary analysis of the responses involved frequent reference to the research aim and objectives to ensure that sufficient information would be obtained from the interviews. Nevertheless, the data acquired from this preliminary interview was excluded from the subsequent analysis of the qualitative case study due to the interviewee's failure to meet the predetermined selection criteria.

3.10 Data collection

This study was conducted between June and September 2023, employing qualitative analysis to explore and identify factors contributing to medical errors made by nurses in intensive care units.

Data collection primarily involved face-to-face interviews conducted at the two participating hospitals. Prior to initiating interviews, the study received ethical approved from the ethics committees of the two Jordanian hospitals involved. Individuals expressing interest in participating were emailed an electronic consent form, enabling them to confirm their willingness to partake and facilitating the scheduling of interview sessions. This correspondence also included an information sheet detailing the study's purpose, methodologies, and data usage intentions.

Upon arrival for the interview, participants were asked to provide formal, informed consent by signing a designated document. The researcher emphasized that participants' well-being and needs were paramount, superseding the study's objectives. Consent was also sought to audio-record the interviews and utilize the transcripts for future research purposes. Each interview was digitally recorded, with the researcher also taking contemporaneous notes.

The interview process began with a friendly introduction, during which participants reviewed the provided information sheet and signed the consent form. Subsequent discussions covered the collection of demographic and background information, followed by the exploration of predetermined interview questions and prompts.

The duration of the interviews exhibited modest variation, ranging from a minimum of 40 minutes to a maximum of 45 minutes. During each interview, the investigator allocated around five minutes to provide an overview of the research background, introduce the study issue, elucidate the research gap, underscore the rationale for conducting the investigation, and articulate the study's aim and objectives.

To augment the validity and reliability of classification and interpretation, the initial and secondary authors autonomously categorized the themes related to error sources, mechanisms, and enabling factors. Additionally, both authors assessed the severity of medication errors using the adapted NCCMERP classification system [NCCMERP]. Analysis of each report was thoroughly discussed until a consensus was reached. Subsequently, the analysis of causal factors was presented to the researcher , and further discussions ensued until an agreement was reached on the definitive categories, as detailed in the findings.

3.11 Data Analysis:

The data from the 24 interviews were analyzed using the NVivo qualitative data analysis software. The interviews, recorded in audio format, were transcribed verbatim and underwent a comprehensive review prior to data analysis. The transcribed data were then imported into the NVivo software to aid in identifying connections between the concepts

present in the data. Thematic analysis was selected as the method for analyzing the data, given its appropriateness for this study.

Braun and Clarke (2006), thematic analysis is a widely used and well-established technique in qualitative research. The six processes of thematic analysis are listed in Table (Braun and Clarke, 2006). The six steps of thematic analysis, adopted from Braun and Clarke (2006).

The data analysis process consisted of several phases:

1. Familiarization with the data: This involved transcribing the data, reading and re-reading it, and jotting down initial ideas.

2. Generating initial codes: Interesting features of the data were systematically coded across the entire data set, and data relevant to each code was collated.

3. Searching for themes: Codes were collated into potential themes, and all data relevant to each potential theme was generated.

4. Reviewing themes: The themes were checked against the coded extracts and the entire data set, and a thematic 'map' of the analysis was generated.

5. Defining and naming themes: An ongoing analysis was conducted to refine the specifics of each theme, and clear definitions and names were assigned to each theme.

6. Producing a report: Vivid and compelling extract examples were selected, and final analysis of these extracts was conducted. The analysis was then related back to the research question and literature, and a scholarly report of the analysis was produced.

.3.12 Summary

Chapter Three delineates the methodology employed in this study that focuses on medication errors within the intensive care units of Jordanian hospitals. The study utilizes qualitative methods, specifically adopting a narrative qualitative approach, and involves 24 nurses from Jameel Al-Totangi Hospital and Al-Bashir Hospital. Data collection was conducted through face-to-face interviews, with a strong emphasis on obtaining ethical approval and ensuring confidentiality. Pilot interviews were conducted to refine the questions, while the primary data collection took place between June and September 2023. The NVivo software facilitated data analysis, with the goal of comprehending nurses' perspectives on medication errors. This chapter highlights ethical considerations, the rationale behind the chosen methodology, site selection criteria, participant eligibility criteria, data collection techniques, and the rigorous process of data analysis.

CHAPTER FOUR

RESEARCH FINDINGS

4.1 Introduction

This chapter unfolds the study data and delves into the themes arising from the analysis. Commencing with an overview of the hospitals featured in this thesis, the chapter proceeds to explore the backgrounds of the participants and the methodology employed for data collection, utilizing semi-structured interviews. Subsequently, the findings are articulated, incorporating the respondents' perspectives in their own words.

4.2 The Participants' Backgrounds

Those selected for the face-to-face interviews were employed in a Jordanian hospital, bringing with them considerable experience in the field of nursing. A succinct summary of each interviewee is provided in Table 1, highlighting their professional expertise in relation to their roles within the workplace.

The finding showed that the number of female nurses, according to the interviews conducted, was 16 nurses, with a percentage of 67%, while the number of male nurses was 8 nurses, with a percentage of 33%.

The results also showed that the number of nurses within the age group (22-27 years) reached nine nurses, with a percentage of 38%, while the number of nurses within the age group (28-32 years) reached 11 nurses, with a percentage of 46%. Age group (over thirty three years): 4 nurses, with a percentage of 17%.

Table 4.1 : Participant profiles

No	Position of interviewee	Gender	Years of experience	Marital status	Educational level
1	ICU nurses 1	Female	3	Single	Bachelor's
2	ICU nurses 2	Female	7	Married	Bachelor's
3	ICU nurses 3	Female	4	Single	Bachelor's
4	ICU nurses 4	Male	12	Married	Bachelor's
5	ICU nurses5	Female	9	Married	Bachelor's
6	ICU nurses 6	Male	1	Single	Bachelor's
7	ICU nurses 7	Male	7	Married	Bachelor's
8	ICU nurses 8	Female	15	Married	Bachelor's
9	ICU nurses 9	Female	6	Married	Bachelor's
10	ICU nurses 10	Male	8	Married	Bachelor's
11	ICU nurses 11	Male	5	Single	Bachelor's
12	ICU nurses 12	Female	9	Married	Bachelor's
13	ICU nurses 13	Female	14	Married	Bachelor's
14	ICU nurses14	Male	10	Married	Bachelor's
15	ICU nurses 15	Female	7	Married	Bachelor's
16	ICU nurses 16	Female	5	Married	Bachelor's
17	ICU nurses 17	Male	8	Married	Bachelor's
18	ICU nurses 18	Female	9	Married	Bachelor's
19	ICU nurses19	Male	4	Single	Bachelor's
20	ICU nurses 20	Female	2	Single	Bachelor's
21	ICU nurses 21	Female	5	Single	Bachelor's
22	ICU nurses 22	Female	6	Married	Bachelor's
23	ICU nurses23	Female	16	Married	Bachelor's
24	ICU nurses 24	Female	1	Single	Bachelor's

4.3 Interview findings

Factors of Medication error in Jordanian Hospital

During the face-to-face interviews, participants were prompted to share their perspectives on the factors contributing to medication errors in the Intensive Care Units of Jordanian government hospitals. Four distinct themes emerged from this discussion: 'active failure. ‘impact of errors,' 'error-producing conditions, and 'medication safety strategies.

1. Active Failure:

The first theme, 'active failure,' emerged as participants discussed patient engagement as a key factor contributing to medication errors in Jordanian hospitals. The majority of participants 23 out of 24 affirmed that active failure played a significant role in the increase of medication errors. They emphasized the impact of patient engagement on medication safety.

These themes and insights were derived from the responses of the participants, reflecting their diverse perspectives on the multifaceted factors influencing medication errors in Jordanian hospital environments. The following quotations from the nurses interviewed.

> *“Omitting the results of an important test due to the negligence of a doctor or nurse who is caring for a critically ill patient”(N15)*
>
> *’ In my ICU when I make med’s error I keep it silent in most time unless it didn’t harm patient and the patient is stable because for sure I’ll get bad evaluation bad reputation and a hard punishment if I admitted my mistake my team is not that cooperative staff’(N12)*

" Hospital should provide medication preparation room with cassette for each patient including all oral drugs and drawers in the fridge includes all IV drugs or oral liquid drugs. As nurses we can provide suggestions for place and storage conditions".(N19)

The researcher posits that fear plays a significant role as an active failure category, representing an unsafe act practiced by nurses in intensive care units. The fear of repercussions for making mistakes often deters nurses from reporting errors, as they aim to avoid blame and potential retribution. This apprehension stems from concerns about being perceived as incompetent and facing negative consequences, leading nurses to refrain from reporting errors.

The researcher contends that fostering a culture of reporting and acknowledging differences can mitigate medical issues. However, the prevalent fear among nurses hinders adherence to this policy. Such fear may arise from the anticipation of professional consequences, a perceived lack of appreciation, or feelings of inadequacy. These findings are echoed by the sentiments expressed by the following participants:

"Underreporting of medication errors in the ICU can result from fear of retribution, lack of time, or inadequate reporting systems. To overcome these barriers, healthcare professionals need assurance of non-punitive reporting"(N3)

"Fear of retribution and blame can lead to underreporting implement anonymous reporting systems, Promote the perception that reporting errors is a valuable opportunity for improvement rather than a sign of incompetence"(N14)

2. Impact of Errors:

The second theme, 'impact of errors,' surfaced as 12 out of the 24 interviewees emphasized its significance. Participants viewed the impact of errors as an initial contributing factor to medication errors in Jordanian ICU settings. They perceived it as a crucial element affecting patient outcomes and recovery times.

After identifying the main results factors of active failure, which consisted of fearing, slips and lapses, violations and medication preparing room, the researcher examined the impact of these elements as unsafe actions carried out by nurses in ICU. The impact of these actions was determined by four elements that represent the impact of errors, which consisted of Severity of outcome, frequency errors, delayed diagnosis and wrong medication.

The researcher concluded that active failure with all its elements had major repercussions on the medical errors committed, whether in terms of wrong doses, delaying diagnosis, repeating errors and it may have serious consequences, and this is what was expressed in the semi-structured interviews that were conducted.

The participant highlighted, as the following:

> *" Medication errors impact patient's outcome for sure , it can make recovery time longer it can confuses doctor's management while giving the wrong dose, or even the wrong medication that goes on with the right diagnosis, from the other side these wrongs or errors could be fatal to the patient. For example giving a medication contains ampicillin ingredient to a patient who is already allergic to that drugs".(N5)*

"In fact, I do not deny the existence of medical errors. The speedy diagnosis of the patient and knowing the correct treatment in some cases, such as a heart attack and the delay In medical intervention, leads to disastrous results, Failure to properly diagnose a patient is a medical error that sometimes leads to his death"(N6).

"Medication errors can have significant impacts on patient outcomes, ranging from mild discomfort to severe harm or even death. For instance, administering the wrong medication or the incorrect dose can lead to adverse reactions or therapeutic failures"(N17).

"Medication errors in the ICU can have severe consequences on patient outcomes. Administering the wrong medication, incorrect dosage, or at the wrong time can lead to adverse reactions, delayed recovery, or even patient harm"(N13).

"Medical errors can significantly affect patient outcomes through delayed diagnosis, wrong medication, or incorrect medical procedures."(N21)

"Examples of medical errors:

Giving people the wrong medicine, the wrong dose, or a medicine to which they are allergic

Giving medications to the wrong person

Performing a surgical procedure on the wrong side of the body

Omitting the results of an important test due to the negligence of a doctor or nurse who is caring for a critically ill patient"(N9)

3. Error-Producing Conditions:

The third theme, 'error-producing conditions,' was identified in discussions with 8 out of the 24 interviewees. The study revealed that nurses often justified their medical errors—whether due to violations or lapses—that resulted in significant patient harm. Such errors were predominantly attributed to work-related pressures, indicating situational errors specific to the nurse rather than violations of established rules and protocols.

The researcher posits that the unsafe acts committed by nurses, manifested as slips and lapses, constitute a category of active failure leading to patient harm. These acts are primarily attributed to situational factors like work pressures. Conversely, violations committed by nurses, also categorized as active failures, stem from situational errors linked to a lack of knowledge and unfamiliarity with safety culture. The researcher contends that work-related pressures cannot justify violations of rules and protocols, which are more indicative of knowledge gaps and a failure to prioritize safety culture.

Semi-structured interviews further revealed that a lack of knowledge and ineffective communication were the primary causes of violations by ICU nurses. Many nurses expressed a need for training programs, improved communication protocols, and enhanced safety training to mitigate violations.

The researcher concluded that fear, as another category of active failure among ICU nurses, is attributable to several factors. Chief among these are information gaps, poor inter-departmental coordination, and a pervasive lack of understanding that deters nurses from reporting incidents. Participants also highlighted the potential of technology in reducing errors, as evidenced by insights shared during the interviews:

"High patient acuity and workload can contribute to errors. Adequate staffing and workload management are essential "(N1)

"We are short in staffing and we need to prepare for many patients in public" (N8)

"Implement a medication safety committee within the institution to review, improve processes, encourage nurses to actively participate in safety rounds, provide input on potential safety hazards, conduct regular education and training sessions on high-alert medications and best practices for administration".(N1)

"Technology has made it easier for us to save and document information for the patient, so that all procedures, reports, laboratory results, doctors' orders, and nursing notes have become documented" (N20)

"Interdisciplinary team should hold meetings and discuss why medication errors occur" (N7

4. Medication Safety Strategies:

The fourth theme, 'medication safety strategies,' emerged as a cornerstone in the implementation of Total Quality Management (TQM) within Jordanian hospitals. Of the 24 interviewees, 20 underscored the critical role of medication safety strategies in mitigating medication errors. After identifying the active failure elements across four dimensions that contribute to medical errors and recognizing their impacts and underlying causes, the researcher delved into studying and analyzing strategies and policies aimed at preventing errors in the ICU by nurses. Participants emphasized the pivotal role of these strategies in ensuring the quality of medication practice.

"Implement a medication safety committee within the institution to review, improve processes, encourage nurses to actively participate in safety rounds, provide input on potential safety hazards, conduct regular education and training sessions on high-alert medications and best practices for administration".(N17)

Effective communication among healthcare professionals is paramount for medication safety. Interdisciplinary collaboration minimizes the risk of errors by allowing for cross-checks and clarifications. Regular interdisciplinary rounds, structured handoffs, and clear communication protocols ensure accurate medication administration and prevent misunderstandings". (N4)

"Institutional Strategies for Medication Safety in the ICU:

At the institutional level, enhancing medication safety requires a multi-faceted approach. This includes standardized protocols for medication administration, clearly defined roles and responsibilities among healthcare professionals, regular education and training sessions, and creating a reporting system for near misses and errors. Nurses can actively participate by adhering to protocols, reporting discrepancies, and engaging in interdisciplinary discussions to improve processes. I've observed successful initiatives where ICU nurses collaborate in multidisciplinary rounds to ensure accurate medication administration and share insights on potential safety enhancements" (N22).

"Effective communication among healthcare professionals is paramount for medication safety. Interdisciplinary collaboration minimizes the risk of errors by allowing for cross-checks and clarifications" (N10)

4.4 Summary

Chapter Four delves into the findings derived from face-to-face interviews with 24 nurses from Jordanian hospitals, focusing on the factors that contribute to medication errors in ICU settings. The study identifies four primary themes: 'active failure,' which highlights patient engagement and nurses' fear of error reporting; 'impact of errors,' which showcases the repercussions of errors on patient outcomes and recovery; 'error-producing conditions,' which links errors to situational pressures and safety protocol violations; and 'medication safety strategies,' which emphasizes the importance of interdisciplinary collaboration and institutional protocols in bolstering medication safety. Participants' insights underscored the critical roles of fear, workload, technology, communication, and standardized protocols in mitigating medication errors, emphasizing the imperative for proactive interventions and enhanced safety practices within hospital environments.

CHAPTER FIVE

DISCUSSION

5.1 Introduction

This last chapter presents the main findings of the current study. In addition, it discusses findings regarding identifying and explaining the factors contributing to medication errors in the ICU of governmental hospitals. This chapter discusses the importance of these findings. In addition, this chapter addresses the limitations of the study, and a conclusion statement is also given. Which the researcher analyzed the collected data from the transcripts of the 24 semi- structured interviews.

5.2 Discussion

The analysis of this study progresses through several stages. Initially, the objective is to identify instances of unsafe acts—referred to as cases of active failure—committed by nurses in direct contact with intensive care patients. Subsequently, the researcher evaluates the impact of these medical errors and discerns their underlying nature. The study then delves into the root causes of these unsafe acts, a stage termed 'error-producing conditions.' Lastly, the researcher analyzes strategies to mitigate these unsafe acts, which could have severe repercussions for patients, including fatalities. This stage is termed 'medication safety strategies.'

The study reveals that 'active failure' constitutes a prevalent unsafe practice among nurses in Jordanian ICU settings. Specifically, administering incorrect doses or medications at

inappropriate times emerged as common slips and lapses. Such errors, categorized as clinical oversights due to nurses' omissions, align with previous research by Soliman (2014), which similarly classified errors resulting from slips and lapses rather than protocol violations.

Furthermore, the study underscores the significance of 'violations' as another category of unsafe acts among ICU nurses. Common violations included neglecting double-check procedures, overlooking medication administration records, and failing to consult with duty nurses during medication preparation. These violations are considered situational, stemming from nurses' non-adherence to established rules and protocols, particularly concerning verification procedures.

Interestingly, the study finds that factors related to the medication preparation room ranked least significant among unsafe actions by ICU nurses, despite its potential role in error reduction.

Semi-structured interviews revealed that knowledge gaps and communication deficiencies primarily contribute to violations among ICU nurses. Many nurses expressed a need for training programs, improved communication protocols, and enhanced safety awareness to minimize violations. These findings align with previous research indicating that reduced work pressure correlates with fewer medical errors (Soliman, 2014).

Moreover, the study highlights the role of technology, such as smart infusion pumps and Computerized Pharmacy Order Entry (CPOE) systems, in reducing medication errors. These technological solutions facilitate better coordination and care transitions, thereby minimizing errors.

Conversely, factors related to pharmacist rounds and error analysis were deemed less significant as medication safety strategies within the ICU setting, a finding inconsistent with Nguyen et al. (2018).

Lastly, the study emphasizes the importance of developing training programs and fostering communication and collaboration as integral components of medication safety strategies. The significance of effective communication is underscored by a report from Harvard University, which attributed 52,000 incidents of medical errors in India in 2013 to communication deficiencies among healthcare specialists (Sokol DK et al., 2014).

In the interviews conducted with nurses working in the intensive care unit, great emphasis was placed on the element of encouraging a non-punitive reporting culture. This element is of great importance, as the fear of blame, revenge, and punishments, in addition to the feeling of incompetence, drives nurses not to report the errors that occur. . Therefore, the researcher believes it is necessary to encourage a culture of non-punitive reporting, and this is what most of the interviews that were conducted stressed, and this leads to analyzing mistakes in addition to avoiding committing them in the future, but in parallel with this, work must be done to adopt similar strategies to prevent and reduce cases of active failure. These results are consistent with the findings of (Aseeri, et al, 2020) on Saudi hospital which concluded that the hospital drug safety reporting system is an effective tool to identify system based issues in the drug management process The researcher determined based on the interviews some strategies were implemented in order to reduce the number of errors occurring in addition to reaching the optimal strategy for medication safety management in the ICU, because focusing only on encouraging a non-punitive reporting

culture may push nurses to neglect and commit violations due to justifying committing the error by encouraging a reporting culture exaggeratedly, in addition to neglecting other factors such as the expansion of the use of technology, the factor of communication and cooperation, and training and development programs.

The researcher determined based on the interviews the following strategies were implemented in order to reduce the number of errors occurring in addition to reaching the optimal strategy for drug safety management in the intensive care department.

5.3 Conclusion

This study found that the elements of active failure practiced by nurses in intensive care units in Jordanian hospitals, according to the interviews conducted, as unsafe behavior, were represented by four elements: (violations, slips and lapses, fear, and the medication preparation room).These elements are committed by nurses in intensive care units in Jordanian hospitals, according to interviews, which were considered clinical errors due to oversights, slips, and lapses on the part of nurses.These errors committed by nurses are also considered situational violations due to nurses not adhering to the basic rules and violating the protocol, especially with regard to verification procedures. These unsafe behaviors caused many medical errors in the intensive care unit, and the impact of these errors included delayed diagnosis, taking the wrong medications, and the seriousness of the outcome that could lead to death. The study found that the factors (employee workload, lack of use of technology, poor communication, lack of knowledge) are the elements that most lead to committing these errors. According to the interviews conducted, the technology element was emphasized as one of the important elements in

reducing medical errors. It was also emphasized to encourage a non-punitive reporting culture in parallel with focusing on other elements such as enhancing cooperation, contracting, training and development programs, and the use of technology, as only encouraging a non-punitive reporting culture may push nurses to commit. Crimes and violations due to the justification for their occurrence.

5.4 Implications of the Study

The implications of this study on medical practice include how the results can be used to improve in various aspects.

Education

One of the implications of this study on education that the research findings become instrumental in shaping educational curricula for nursing and healthcare programs in Jordan. Integrating this knowledge into training materials and coursework ensures that future nurses are well-equipped to identify, prevent, and address medication errors in ICU settings. Case studies and real-life examples derived from this research can enrich classroom discussions, fostering a culture of awareness, critical thinking, and proactive measures among students, and encouraging a culture of non-punitive reporting, in addition to clearly defining strategies for preventing errors, as analyzing the error and learning from it is considered an effective strategy for communicating those errors and preventing them from occurring in the future.

Practice

One of the primary implications of this study pertains to the prevention of future medical errors by nurses in intensive care departments. By comprehensively understanding the causes and patterns of medication errors through research, targeted interventions can be implemented within medical practice. The insights gleaned from this study can pave the way for the development of robust protocols, enhanced prescription systems, and improved communication among healthcare providers—all of which contribute to minimizing medication errors. Furthermore, the research findings suggest the potential integration of technologies or decision-support systems to bolster medication safety in clinical settings. Adopting these advanced practices enables nurses and healthcare providers to proactively prevent errors and prioritize patient safety within ICU environments.

Research

One significant implication of this study is its potential utility as a foundational database for subsequent research endeavors. The data and insights derived from this study can serve as a valuable reference point for future investigations in various hospitals, both within and outside Jordan. Furthermore, while this study primarily focused on the government sector in Jordan's capital, Amman, its findings could inform research in other healthcare sectors, including university-affiliated, private, and military hospitals. Comparing and analyzing the outcomes across these diverse settings could offer comprehensive insights into medication errors. To further enrich our understanding, future research could expand its scope by incorporating the researcher's objective observations, in addition to the insights

gathered from semi-structured interviews. Extending the duration of the research could also provide a more nuanced evaluation of medication errors and the underlying factors contributing to their occurrence.

5.5 Strength and Limitation of the study

Limitation:

1. Reluctance to Participate: A notable challenge encountered was the reluctance of many nurses to partake in personal interviews, often due to constraints in time allocation.
2. Limited Scope of Interviews:The study was constrained by its focus on a singular location, omitting potential insights from a broader range of hospitals across Jordan, including private and university-affiliated institutions.
3. Exclusive Focus on Nurses: The study primarily centered on nurses' perspectives. While valuable, incorporating viewpoints from other healthcare providers could have offered a more comprehensive understanding of medication errors in intensive care units.

Strengths:

1. Contribution to the Field: This research enriches the existing literature on medication errors in ICU environments, specifically within Jordanian governmental hospitals. It not only deepens our understanding of the issue within this context but also offers insights that could resonate with similar challenges globally.

2. Policy and Practice Implications: The study's findings hold potential significance for shaping hospital protocols, refining nurse training curricula, and informing broader healthcare strategies aimed at mitigating medication errors in Jordanian ICUs.

3. By leveraging a qualitative approach, this study has the capacity to capture nuanced details, diverse viewpoints, and intricate experiences that might be overlooked in quantitative studies. Such an approach facilitates a richer and more holistic comprehension of the underlying issues.

5.6 Recommendations

Recommendations for Enhancing Medication Safety in ICU:

1. Leveraging Technology: Advocate for the integration and advancement of technology within Jordanian hospitals, specifically targeting the ICU's medication management system. A robust technological framework can mitigate error-inducing factors, notably workload, consequently minimizing instances of active failures, such as slips and lapses.

2. Prioritizing Training and Skill Enhancement: Initiate and reinforce training and development programs tailored for ICU personnel. Enhancing the skills and knowledge base of healthcare workers can elevate efficiency levels and curtail active failures, particularly those stemming from violations.

3. Promoting a Transparent Reporting Culture: Foster a culture within ICU settings where reporting errors is encouraged and seen as a constructive step towards improvement. This involves bolstering inter-departmental communication, establishing unequivocal medication management guidelines, and cultivating leadership that prioritizes a supportive environment. By reframing errors as learning opportunities rather than punitive issues, healthcare providers can collaboratively work towards elevating patient safety standards.

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Appendix

ملحق (1)

جامعة الإسراء

عمادة البحث العلمي والدراسات العليا

الموافقة المبنية على المعرفة

عنوان البحث:

استكشاف العوامل المساهمه في الاخطاء الدوائيه في وحده العنايه المركزه في المستشفيات الحكوميه الاردنيه من وجهة نظر الكادر التمريضي

أنا الموقع أدناه أقر بما يلي:

مشاركتي في هذه الدراسة تطوعية ولست بحاجة إلى كتابة اسمي في الاستبيان

يمكنني الانسحاب من الدراسة في أي وقت ولن يؤخذ هذا ضدي ولن اتعرض للمسائلة القانونية

إذا تم تقديم نتائج الدراسة للنشر أو العرض، فلن يتم الكشف عن هويتي

أنا على استعداد للمشاركة في الدراسة

توقيع المشارك:

.....

ملحق (2)

Research Question

Interview Questions for Research on Exploring the Factors Contributing to Medication Errors in the Intensive Care Unit of Governmental Jordanian Hospitals: Perspective from Nurses

1. How do medication errors impact patient outcomes, and what specific measures can be implemented to minimize their impact on patients? Can you provide examples from your own experience?

2. What strategies do you believe can be implemented at the institutional level to enhance medication safety in the ICU? How can nurses actively participate in these initiatives to ensure effective implementation?

3. As a nurse, how do you stay updated with the latest medication information and guidelines? What specific resources do you rely on to enhance your practice and maintain patient safety?

4. Based on your experience, what approach do you consider the most effective in addressing medication errors in the ICU setting? Please elaborate on why you believe this approach is beneficial.

5. In your opinion, what are the contributing factors that lead to medication errors being underreported in the ICU? How can healthcare professionals overcome these barriers and encourage reporting?

6. Could you suggest strategies or interventions that can help foster a culture of reporting and learning from medication errors in the ICU? Have you witnessed any successful initiatives in this regard?

7. In your experience, how does effective communication among healthcare professionals impact medication safety in the ICU? How can interdisciplinary collaboration be promoted to minimize medication errors?

8. Are there any specific challenges or barriers that you have encountered in the ICU regarding medication safety? How do you suggest addressing these challenges to ensure better patient outcomes?

9. What role do you believe technology can play in reducing medication errors in the ICU? Are there any specific technological advancements or systems that you have found helpful in your practice?

10. How do you personally approach medication administration in high-stress situations in the ICU? What strategies do you employ to ensure accuracy and prevent errors during these critical moments?

11. What are your thoughts on the role of standardized protocols and checklists in medication administration? How can they be effectively implemented in the ICU to improve patient safety?

12. In your opinion, what role does leadership play in promoting a culture of medication safety in the ICU? How can nurse leaders or managers contribute to minimizing medication errors?

13. Are there any specific educational or training programs that you believe can help enhance nurses' medication administration skills and reduce errors in the ICU? Have you participated in any such programs?

ملحق (3)

Themes	Codes
Active failure	Medication preparation room
	Fearing
	slips and lapses
	Violations
Impact of errors	Severity of outcome
	Frequency of errors
	delayed diagnosis
	wrong medication
Error-producing condition	Staff workload
	Lack of using technology
	Miscommunication
	Lack of knowledge
Medication safety strategies	Communications and cooperations
	Developing training programs
	Errors analyzing
	Encouraging a non-punitive reporting culture
	Round of pharmacist
	using technology

ملحق (4)

جامعة الإسراء
ISRA UNIVERSITY

President Office | مكتب الرئيس

Ref: .... | الرقم: ع س ن/ 383

Date: .... | التاريخ: 2023/6/9

السادة وزارة الصحـــة المحترمون

عطوفة الدكتور مدير عام مستشفى التوتنجي الاكرم

الموضوع: تسهيل مهمة طالبة ماجستير الحالات المزمنة

تحية طيبة وبعد،

تهـــديكم جامعـــة الاســـراء أطيـــب تحياتهـــا، وترجـــو إعلامكـــم بـــأن الطالبـــة " عبيـر محمـد حسين برهومـة" مـن كليـة التمريض/ماجستير تمـريض الحـالات المزمنـة تقوم بإعداد دراسة بعنوان:

"استكشاف العوامل المساهمة في الأخطاء الدوائية في وحدة العناية المركزة في المستشفيات الحكومية الأردنية " من وجهة نظر الكادر التمريضي"

""Exploring the Factors Contributing to Medication Errors in The Intensive Care Unit of Governmental Jordanian Hospitals: perspective from Nurses""

وذلـــك اســـتكمالاً لمتطلبـــات الحصـــول علـــى درجـــة الماجســـتير فـــي تخصـــص تمـــريض الحـــالات المزمنـــة ويســـتدعي ذلـــك تطبيـــق أدوات دراســـتها علـــى الكـــادر التمريضـــي في مشافكم.

لـــذا نرجـــو التكـــرم بالموافقـــة علـــى تســـهيل مهمـــة جمـــع المعلومـــات لتـــدعيم رســـالتها، مؤكـــدين أن المعلومـــات التـــي ستحصـــل عليهـــا الباحثـــة ســـتبقى ســـرية وســـيتم اســـتخدامها فقط لأغراض البحث العلمي.

وتفضلوا بقبول فائق الاحترام

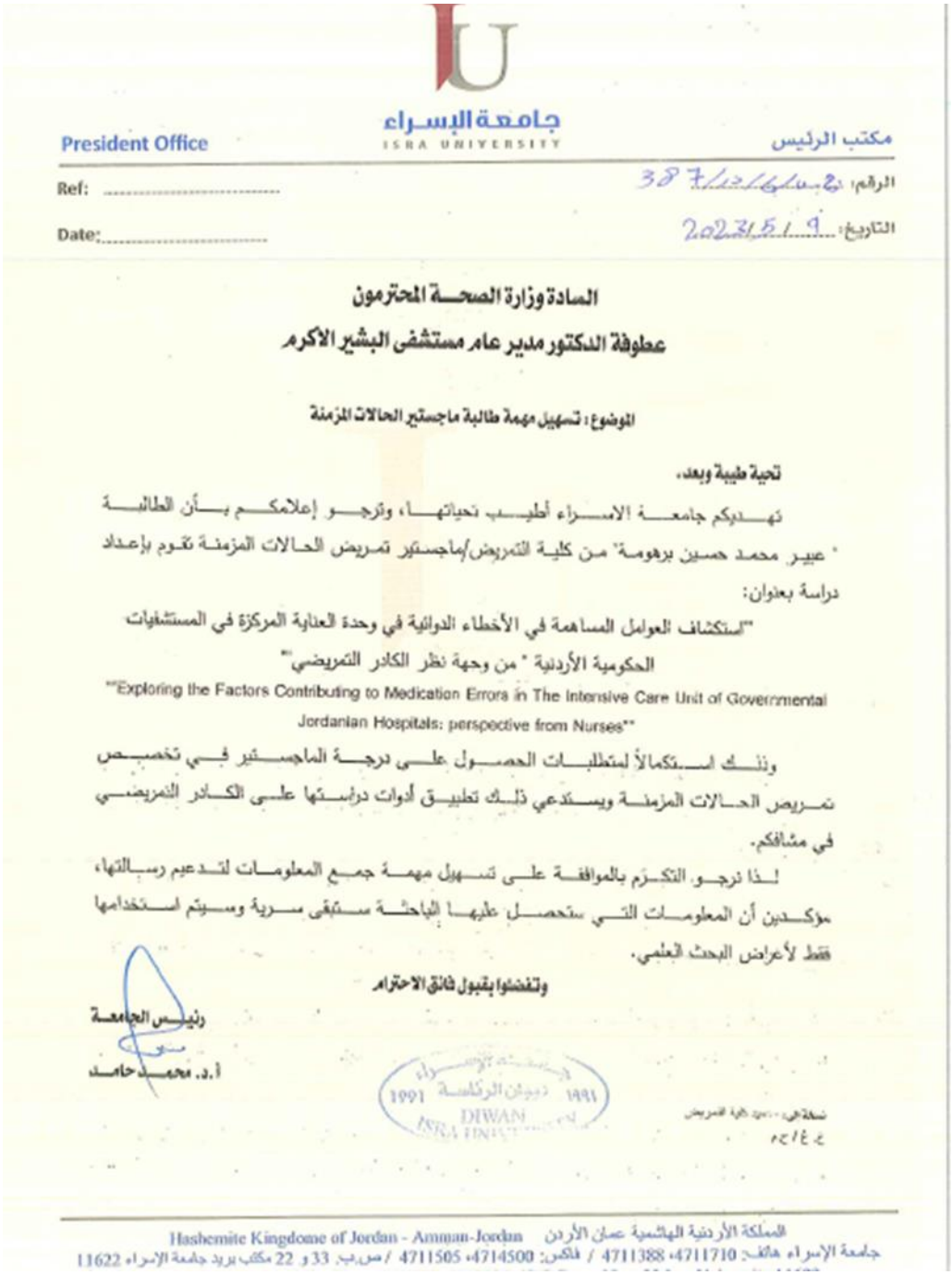
رئيـــس الجامعـــة

أ.د. محمـــد حامـــد

جامعة الإسراء - ديوان الرئاسة - DIWAN - ISRA UNIVERSITY - 1991

نسخة إلى: - عميد كلية التمريض

ملحق(5)



جامعة الإسراء
ISRA UNIVERSITY

President Office — مكتب الرئيس

Ref: ..... — الرقم: 387/12/2023

Date: ..... — التاريخ: 2023/5/9

السادة وزارة الصحة المحترمون

عطوفة الدكتور مدير عام مستشفى البشير الأكرم

الموضوع: تسهيل مهمة طالبة ماجستير الحالات المزمنة

تحية طيبة وبعد،

تهديكم جامعة الاسراء أطيب تحياتها، وترجو إعلامكم بأن الطالبة " عبير محمد حسين برهومة" من كلية التمريض/ماجستير تمريض الحالات المزمنة تقوم بإعداد دراسة بعنوان:

"استكشاف العوامل المساهمة في الأخطاء الدوائية في وحدة العناية المركزة في المستشفيات الحكومية الأردنية " من وجهة نظر الكادر التمريضي"

"Exploring the Factors Contributing to Medication Errors in The Intensive Care Unit of Governmental Jordanian Hospitals: perspective from Nurses"

وذلك استكمالاً لمتطلبات الحصول على درجة الماجستير في تخصص تمريض الحالات المزمنة ويستدعي ذلك تطبيق أدوات دراستها على الكادر التمريضي في مشافكم.

لذا نرجو التكرم بالموافقة على تسهيل مهمة جمع المعلومات لتدعيم رسالتها، مؤكدين أن المعلومات التي ستحصل عليها الباحثة ستبقى سرية وسيتم استخدامها فقط لأغراض البحث العلمي.

وتفضلوا بقبول فائق الاحترام

رئيس الجامعة

أ.د. محمد حامد

ديوان الرئاسة DIWAN 1991

نسخة إلى: عميد كلية التمريض

Hashemite Kingdome of Jordan - Amman-Jordan المملكة الأردنية الهاشمية عمان الأردن

جامعة الإسراء هاتف: 4711710، 4711388 / فاكس: 4714500، 4711505 / ص.ب 33 و 22 مكتب بريد جامعة الإسراء 11622

ملحق(6)

وزارة الصحة

الرقم MOH/REC/2023/187

التاريخ ....

الموافق ....

قرار لجنة أخلاقيات البحث العلمي

اجتمعت لجنة أخلاقيات البحث العلمي بتاريخ 7 /2023/6 لمناقشة البحث العلمي المقدم من قبل طالبة الماجستير /عبير محمد حسين برهومة.

بعنوان :

(استكشاف العوامل المساهمة في الأخطاء الدوائية في وحدة العناية المركزة في المستشفيات الحكومية الاردنية "من وجهة نظر الكادر التمريضي")

وبناء عليه قررت اللجنة الموافقة على البحث العلمي من قبل المذكورة اعلاه مع الالتزام بأخلاقيات البحث العلمي وتم التوقيع من قبل أعضاء اللجنة حسب الأصول.

مقرر اللجنة	عضو	عضو	عضو
وحدة تنمية الموارد البشرية	المدير الطبي	الصيدلانية	اخصائي جراحة عامة
السيد/اكرم العتالي	د.حسن اصربوع	حنان سرطاوي	د.جهاد البيراوي
عضو	عضو	عضو	عضو
استشاري أمراض باطنية	مدير مديرية المختبرات	أخصائي الأطفال	المدير الاداري والمالي
د.يوسف القديمات	د.اروى النادي	د.عصام الخواجا	د.هاني القضاة

رئيس اللجنة

مدير ادارة مستشفيات البشير

الدكتور علي عزات العبداللات

المملكة الأردنية الهاشمية

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ملحق(7)

بسم الله الرحمن الرحيم

وزارة الصحة

الرقم تعليم/معلومات/٦٠٢٠

التاريخ

الموافق ١٤/٦/٢٠٢٣

مدير ادارة مستشفيات البشير
مدير مستشفى الدكتور جميل التوتنجي/سحاب

تحية طيبة وبعد ،،،

أرفق طيـاً صـورة عن كتــاب مدير ادارة مستشفيات البشير / رئيس لجنة أخلاقيـات البحث العلمي رقـــم م ب أ / لجنة أخلاقيات /٨٧٥٢ تاريـــخ ٢٠٢٣/٦/١٢ بخصـوص الموافقة لطالبة ماجستير تمريض الحالات المزمنة **عبير محمد حسين برهومة** من كلية التمريض / جامعة الاسراء اجراء بحث بعنوان :-

(استكشاف العوامل المساهمة في الأخطاء الدوائية في وحدة العناية المركزة في المستشفيات الحكومية الاردنية " من وجهة نظر الكادر التمريضي ")

وذلك عن طريق اجراء مقابلات وجاهية مع الكادر التمريضي في ادارة مستشفيات البشير ومستشفى الدكتور جميل التوتنجي / سحاب .

أرجو التكرم بالإيعاز لمن يلزم تسهيل مهمة إجراء البحث أعلاه ، على أن يتم موافاة لجنة أخلاقيات البحث العلمي / ادارة مستشفيات البشير بنتائج الدراسة العائدة للبحث المذكور.

وتفضلوا بقبول فائق الاحترام

مدير مديرية التعليم والتدريب الطبي

الدكتورة رهام الحمود

م.س

المملكة الأردنية الهاشمية

هاتف ٠٠٩٦٢٦٥٢٠٠٢٣٠ فاكس ٠٠٩٦٢٦٥٦٨٨٨٧٣ ص.ب ٨٦ عمان ١١١١٨ الأردن - البريد الإلكتروني: www.moh.gov.jo

استكشاف العوامل التي تساهم في حدوث الأخطاء الدوائية في

وحدة العناية المركزة في المستشفيات الحكومية الأردنية: وجهة نظر الممرضات

اعدت من قبل:

عبير برهومة

اشرف عليها

د.عبدالله الغنمين

مع

د. حمزة ابو ناب

الملخص

خلفية: الدراسة:

يتم استخدام الأدوية لعلاج الأمراض المعدية، ووقف آثار الأمراض المزمنة، وتخفيف الألم. لكن الادوية يمكن أن تؤذيك أيضًا إذا لم تستخدمها بالطريقة الصحيحة. ويمكن أن تحدث الأخطاء في المنزل أو في المستشفى أو في عيادة الطبيب أو في الصيدلية. تعد أخطاء إدارة الدواء (MAEs) نوعًا شائعًا من الأخطاء. (آدم وآخرون، 2020)

الهدف: تهدف هذه الدراسة إلى دراسة العوامل التي تساهم في حدوث الأخطاء الطبية في وحدات العناية المركزة في المستشفيات الحكومية الأردنية من وجهة نظر الممرضين.

الطريقة :استخدمت الدراسة منهجية محددة وأجريت في مستشفيين حكوميين في الأردن. تم استخدام ثلاث طرق متميزة لجمع البيانات: المقابلات شبه المنظمة وجهاً لوجه، ومراجعة الوثائق، والملاحظة. تضمنت أداة جمع البيانات الأولية مقابلات شبه منظمة وجهًا لوجه مع عينة مكونة من 24 مشاركًا، وتحديدًا الممرضات، عبر المستشفيين. خضعت البيانات التي تم جمعها من دراسات الحالة للتحليل الموضوعي، وذلك باستخدام تقنية تحليل الإطار واسترشادا بالمبادئ الراسخة.

النتائج: بينت الدراسة مدى انتشار الأخطاء في وصف الأدوية واعتبرت من أهم العوامل التي تساهم في الخطأ الطبي والتي تصنف على أنها فشل نشط، وتأثير هذه الأخطاء، والحالة المنتجة للخطأ، واستراتيجية سلامة الدواء.

الخاتمة: استخدمت الباحثة منهجية البحث النوعي الذي تم اختياره لملاءمته لتحقيق أهداف الدراسة وغاياتها.، وقد تم اختيار عبنة مكونة من 24 مشاركًا لإجراء المقابلات، من مستشفيين مختلفين، حيث أجرت الباحث مقابلات حصرية مع أفراد من مهنة التمريض، مع التركيز بشكل خاص على العاملين بالمستشفيات الحكومية، وقد.تم اتخاذ القرار باستخدام مقابلات شبه منظمة وجهًا لوجه لجمع البيانات، مع التركيز بشكل خاص على إشراك الأفراد في الأخطاء الصادرة عن الممرضين.

الكلمات المفتاحية: الخطأ، الدواء، الحكومي، وحدات العناية المركزة، المستشفيات الأردنية، الممرضي