EVALUATION OF KNOWLEDGE AND UNDERSTANDING OF OBSTACLES ENCOUNTERED WHEN ADMINISTERING RESUSCITATION MEDICATIONS AMONG NURSES IN LAHORE, PAKISTAN

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by

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DEDICATION

I dedicate this thesis to my parents with the utmost gratitude and devotion.

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for always inspiring and motivating me.

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All the praise is for Allah; praise which is abundant, pure, blessed and perpetual, as our Lord loves and is pleased with. By the Grace of Almighty Allah, I was able to finish this study, as my journey in pursuit of this knowledge's has been a lengthy and difficult process. It would not have been possible without the help of the certain people.

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LIST OF SYMBOLS

N	Population size
p	Anticipated frequency
d	Confidence limits as % of 100 (absolute ± 100)
DEFF	Design effect
n	Sample size

LIST OF ABBREVAITIONS

ACLS	Advanced cardiovascular life support
ADRs	Adverse drug reactions
AHA	American heart association
AV	Atrioventricular
BScN	Bachelor of science in nursing
Ca	Calcium
CaCl2	Calcium chloride
CCU	Coronary care unit
CPP	Coronary perfusion pressure
CPR	Cardiopulmonary resuscitation
DHQ	District headquarters
ECG	Electrocardiogram
ER	Emergency room
ERC	European Resuscitation Council
HAMs	High alert medications
HDU	High dependency unit
ICU	Intensive care unit
IV	Intravenous
KCl	Potassium chloride
LMICs	Lower middle-income countries
MEs	Medication errors
MI	Myocardial infarction
MScN	Master of science in nursing

NaHCO3	Sodium bicarbonate
OHCA	Out of hospital cardiac arrest
PE	Pulmonary embolism
PEA	Pulseless electrical activity
PPSC	Punjab public service commission
PVT	Pulseless ventricular tachycardia
SA	Sinoatrial
SPSS	Statistical Package for the Social Sciences
THQ	Tahsil headquarters
VF	Ventricular fibrillation
VT	Ventricular tachycardia
WHO	World health organization

LIST OF APPENDICES

PENILAIAN PENGETAHUAN DAN KEFAHAMAN TERHADAP HALANGAN YANG DIHADAPI KETIKA MENGURUSKAN UBAT- UBAT RESUSITASI DALAM KALANGAN JURURAWAT DI LAHORE, PAKISTAN

ABSTRAK

Kesilapan ubat adalah salah satu punca utama morbiditi dan kematian pesakit, yang mempunyai kesan buruk yang serius terhadap sistem penjagaan kesihatan. Kekurangan pengetahuan jururawat dianggap mempunyai peranan penting dalam kesilapan pemberian ubat yang membahayakan keselamatan pesakit. Tujuan kajian ini adalah untuk menilai pengetahuan jururawat dalam menguruskan ubat resusitasi, mengenal pasti halangan yang mereka hadapi semasa dan menganalisis pelaporan kesilapan ubat resusitasi dan faktor yang tidak menggalakkan jururawat berbuat demikian. Kajian keratan rentas telah dijalankan dalam kalangan jururawat berlesen yang bekerja di hospital awam dan swasta di bandar Lahore, yang diambil menggunakan kaedah persampelan yang mudah. Kajian keratan rentas telah dijalankan dalam kalangan jururawat berlesen yang bekerja di hospital awam dan swasta di bandar Lahore, yang diambil menggunakan kaedah persampelan yang mudah. Soal selidik yang telah disahkan dan disediakan sendiri yang diadaptasi daripada kajian terdahulu telah digunakan yang terdiri daripada lima bahagian: data sosio-demografi, pengetahuan jururawat tentang ubat resusitasi, halangan yang dihadapi semasa pentadbiran ubat resusitasi, penilaian kendiri dan peristiwa ralat resusitasi dan pelaporan halangan. Data dianalisis menggunakan SPSS versi 27, di mana pembolehubah kategori, analisis perbandingan, dan pembolehubah ujian kumpulan bebas telah digunakan. Penyelidikan itu melibatkan 409 jururawat secara keseluruhan.

Daripada jumlah itu, 44.7% mempunyai pengetahuan yang tidak mencukupi tentang ubat resusitasi, manakala 55.3% dilaporkan mempunyai pengetahuan yang mencukupi (skor > 70%). Pengetahuan yang lebih besar dikaitkan dengan umur dan pengalaman yang lebih tinggi (p 0.001), bekerja di hospital awam (p = 0.032), dan pernah menjalani latihan ACLS (p = 0.006). "Mengganggu prosedur pengurusan ubat apabila tugas lain perlu dikendalikan" (75.6%), "Pengetahuan tidak mencukupi" (69.4%), dan "Keengganan untuk bertanya soalan" (67.7%) adalah tiga halangan utama yang dialami oleh jururawat semasa memberikan bantuan pernafasan. dadah. Secara keseluruhan, 11.2% jururawat melaporkan insiden ralat ubat kepada pihak berkuasa yang berkenaan; Walau bagaimanapun, 20.5% tidak melaporkan kepada sesiapa dan majoriti (68.2%) tidak bertindak balas. Halangan utama untuk melaporkan (33.4%) dikaitkan dengan kesan buruk melaporkan kesilapan ubat ke atas jururawat (takut terhadap pendakwaan, takut kehilangan pekerjaan, kebimbangan untuk dilabel sebagai profesional kesihatan yang tidak cekap, dan takut reaksi keluarga pesakit). Masalah kedua (23.4%) adalah pengetahuan yang tidak mencukupi tentang kesilapan ubat dan amalan yang berkaitan dengan pelaporan mereka. Halangan lain yang dinyatakan termasuk kakitangan yang terbeban, kekurangan maklum balas positif, kekurangan panduan yang betul dan sistem pelaporan ralat ubat yang tidak berkesan. Keputusan berasaskan bukti menunjukkan bahawa jururawat Pakistan mempunyai kurang pengetahuan mengenai pengurusan ubat resusitasi. Selain itu, pembelajaran dan latihan berterusan jururawat di hospital diperlukan untuk mengurangkan kejadian kesilapan ubat dan penyelidikan lanjut adalah disyorkan.

EVALUATION OF KNOWLEDGE AND UNDERSTANDING OF OBSTACLES ENCOUNTERED WHEN ADMINISTERING RESUSCITATION MEDICATIONS AMONG NURSES IN LAHORE, PAKISTAN

ABSTRACT

Medication errors is one of the primary causes of patient morbidity and death, which has a serious adverse impact on the healthcare system. Nurses' lack of knowledge is thought to have a crucial role in drug administration errors that risk patient safety. The purpose of this study was to evaluate nurses' knowledge of administering resuscitation medications, identify the barriers they encounter while doing so, and explore if resuscitation medication errors are being reported by nurses. A cross-sectional study was conducted among licensed nurses working within public and private hospitals of Lahore city, recruited using a convenient sampling method. A pre-validated, self-administered questionnaire adapted from a previous study was used which consisted of five sections: socio-demographics data, nurses' knowledge of resuscitation medications, obstacles encountered during resuscitation medications administration, self-evaluation and resuscitation error events and reporting barriers was used. The data were entered using SPSS version 27, where categorical variables, comparative analysis, and independent group tests variables were used. The research included 409 nurses in total. Of whom, 44.7% had insufficient knowledge of resuscitation medications, while 55.3% were reported to have adequate knowledge (score > 70%). Significantly greater knowledge was linked to higher age and experience (p 0.001), working in a public hospital (p = 0.032), and having ACLS training (p = 0.006). "Interrupting the drug administration procedure when other duties

need to be handled" (75.6%), "Insufficient knowledge" (69.4%), and "Reluctance to ask questions" (67.7%) were the three primary obstacles experienced by nurses when administering resuscitation drugs. Overall, 11.2% of nurses reported medication error incidents to the appropriate authorities; however, 20.5% did not report to anybody and the majority (68.2%) did not respond. Major barriers to reporting (33.4%) were linked to the adverse career consequences of reporting medication errors on nurses (fear of prosecution, fear of job loss, concern of being labeled as an incompetent health professional, and fear of patient family's reaction). The second major problem (23.4%) was inadequate knowledge of medication errors and practices related to their reporting. Other noted barriers included overburdened staff, lack of positive feedback, lack of proper guidance and ineffective medication error reporting system. Evidence-based results indicates that Pakistani nurses lacks in their knowledge regarding the resuscitation medication administration, which was one of the obstacles they encountered while administering these drugs. Moreover, continuous learning and training of nurses within the hospitals is required for the reduction of medication errors events and further research in this domain is recommended.

CHAPTER 1

INTRODUCTION

1.1 Background

1.1.1 Medication safety

The healthcare industry has created an immediate definition for patient safety with numerous approaches to handle the more significant issues. Healthcare delivery is a system that lowers the risk of adverse outcomes associated with therapeutic care exposure across a wide range of disorders or conditions (Institute of Medicine Committee on Data Standards for Patient, 2004). When delivering healthcare, the objective is to avoid and reduce patient risks, errors, and harm. Since it's normal for people working in demanding, complex environments to mess up, it has become a problem that the healthcare industry had to confront in recent years. Expecting flawless performance from them is impractical (WHO, 2019).

Medication errors are preventable events that can cause irrational medication practices or patient harm when controlled by healthcare professionals, patients, or users. They can result from deviations from prescriptions or functional guidelines (Prevention, 2021). These errors might be classified first into errors in planning actions, which might be either knowledge-based or rule-based errors, while the second class is skill-based errors, which include act-based errors or recall based errors (Aronson, 2009). One-third patient harm occurs in the preparation and delivery of the drug. Errors can occur when the seven principles of medicinal treatment are neglected, including the right patient, right drug, right dose, right time, right route, right rationale and proper documentation (Rodziewicz, Houseman, & Hipskind, 2022; Smeulers, Onderwater, Zwieten, & Vermeulen, 2014).

1.1.2 Epidemiology and healthcare burden

Medication errors worldwide pose an immense burden on healthcare systems and patients, as these errors kill at least one person per day in high-income nations like the United States of America and they affect roughly 1.3 million people each year (WHO, 2017). In lower- and middle-income countries, each year poor care leads to more than 134 million adverse reactions and 2.6 million mortalities (National Academies of Sciences and Medicine, 2018).

Pakistan is a country with few resources and a high illness burden. It is concerning how the nation's healthcare system is currently functioning (Salman, Mustafa, Asif, et al., 2020). According to the latest data from Pakistan, approximately five hundred thousand people including females and kids, die each year because of medication errors (DAWN, 2021). According to a study, drug errors account for 2-5% of hospitalization days worldwide which are eighty percent avoidable (Salman, Mustafa, Asif, et al., 2020; WHO, 2019).

There is an economic burden as well, since over seven million patients are attacked by unnecessary medication errors, costing over twenty billion dollars per year across all wellness program sites (da Silva & Krishnamurthy, 2016).

1.2 Cardiopulmonary Resuscitation

1.2.1 Definitions

Cardiopulmonary resuscitation (CPR) is a complex process involving a chain of movements and techniques used to attempt to revive a patient from apparent death or unconsciousness and restore spontaneous circulation. It is a time-sensitive procedure that necessitates immediate and decisive intervention whenever a life-threatening medical emergency occurs (American heart association, 2000). This process tackles life-threatening conditions such as malfunctioning of the heart's electrical system, known as cardiac arrest. It is classified as "shockable" or "non-shockable" by clinicians based on the electrocardiogram's (ECG) regularity. The overall yearly burden of out of hospital heart arrest (OHCA) was assessed at 356,500 by the American Heart Association (AHA) in 2017 (Ludhwani, Goyal, & Jagtap, 2022). Ventricular fibrillations is the first rhythm in at least 23% of OHCAs treated by emergency medical services (Jagtap., 2021). Cardiac arrest continues to be the primary source of death globally, instigating more than 60% of all cardiovascular fatalities (Adabag, Luepker, Roger, & Gersh, 2010). Rhythms such as asystole, ventricular fibrillation, pulseless ventricular tachycardia, or pulseless electric activity are known as shockable rhythms (Clinic, 2022).

1.2.2 Shockable Rhythms

1.2.2(a) Asystole

Asystole is a circumstance of cardiac pause with lacking heart output and no ventricular depolarization, also known as flatline, as shown on the electrocardiogram. It is frequently the outcome of persistent ventricle fibrillation, arresting decompensation. Defibrillation attempts for ventricular tachycardia or ventricular fibrillation can also end in asystole (Morrisonponce., 2021).

1.2.2(b) Ventricular fibrillation

Ventricular fibrillation (VF) is a phenomenon in which the heart is incapable of efficiently circulating blood to the remainder of the body. According to the electrocardiogram, peaks are larger and the troughs are deeper, and fine ventricular fibrillation occurs when the peaks and troughs are short and shallow (Jagtap., 2021). This rhythm is usually caused by heart problems such as arrhythmia and angina (ClevelandClinic, 2021).

1.2.2(c) Pulseless ventricular tachycardia

Heart failure and organ oxygenation issues are caused by a particular type of heart arrhythmia known as pulseless ventricular tachycardia, in which synchronized ventricular contractions are substituted with extremely quick but ineffective contractions (Mathew., 2021). The ECG usually shows the QRS complex, which is quite broad.

Pulseless ventricular tachycardia (VT) can be brought on by a wide range of factors, including structural heart disease, electrolyte disturbances, medicines, and genetic or

hereditary channelopathies (Baldzizhar, Manuylova, Marchenko, Kryvalap, & Carey, 2016).

1.2.2(d) Pulseless electrical activity

Pulseless electrical activity (PEA) is characterized by organized or semi-organized electrical activity in the heart, unlike the asystole or disorganized electrical activity of ventricular fibrillation or tachycardia. It is caused by depletion of myocardial energy reserves and other factors such as hypoxia, hypothermia, trauma and thrombosis. Figure1.2 shows how these rhythms are presented on the ECG charts (Grossman., 2021).

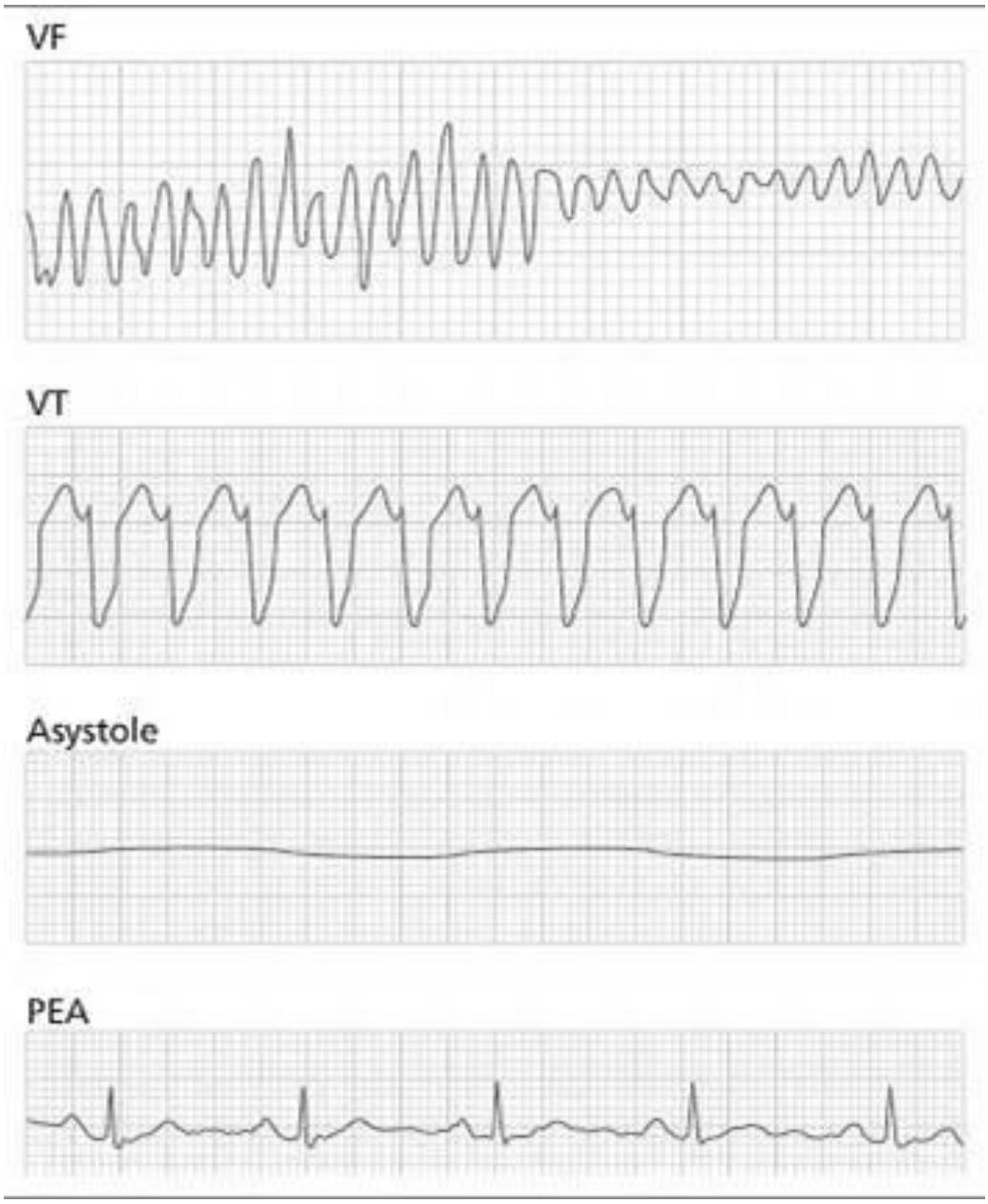

Figure 1.1 ECG charts of Asystole, ventricular fibrillation, ventricular tachycardia and pulseless electrical activity.

1.3 Resuscitation Procedure

Conventional Cardiopulmonary starts with chest compressions and mouth-to-mouth breathing at a 30:2 compressions-to-breaths ratio. For a typical adult person in heart attack, rescuers should execute chest compressions at a rate of 100 to 120 every minute and to a depth of 2 inches.

1.4 Resuscitation Medications

Emergency medications are used along the main resuscitation procedures to facilitate the process of revival by enabling electrical defibrillation and protecting the organs from prolong side effects of cardiac arrest such as hypoxia and acidosis. The Resuscitation Council recommends that these medications to be administered as quickly as possible once a cardiac arrest has been recognized (Koster et al., 2010).

1.4.1 Classification

1.4.1(a) Vasopressors

Vasopressors are medications which raise blood pressure and constrict blood vessels. Adrenergic vasopressors are used as first line therapy in cardiopulmonary resuscitation, while alpha-1 adrenergic agonists are used to enhance coronary perfusion. Non-adrenergic vasopressors such as vasopressin have a beneficial effect on acidosis and do not induce cardiac dysfunction (Krismer et al., 2002).

1.4.1(b) Vasoconstrictors

Angiotensin II is a class of resuscitation medications that raises peripheral vascular resistance through direct and indirect vasoconstrictor activities on postcapillary venules and precapillary arterioles. It has a 40-fold greater potency than norepinephrine, making it 40 times more potent than norepinephrine. Endothelin-1, a vasoconstrictor, can also be used with epinephrine to enhance coronary perfusion pressure during CPR (Günaydın, 2005).

1.4.1(c) Antiarrhythmics drugs

Antiarrhythmic drugs are used in resuscitation to help with electrical defibrillation, inhibit ventricular fibrillation, and stop significant arrhythmias. Amiodarone is the most potent drug used, while procainamide is second line. Lidocaine is the next best option for PVT after defibrillation. Magnesium is given if hypomagnesemia is suspected (Girzadas., 2021).

1.4.1(d) Alkylating agents

Alkalizing medications such as sodium bicarbonate are used in resuscitation to combat the problem of acidosis that emerges after cardiac arrest. Atropine is also used in resuscitation and is recommended by the Resuscitation Council for pulseless electrical activity (PEA) at a heartbeat that is slower than 60 beats per minute or full asystole. Atropine dose of 0.5 mg (about 10 g kg-1) intravenous IV should be administered to treat sinus bradycardia (Sreevastava et al., 2004).

1.4.1(e) Thrombolytics agents

Thrombolysis during cardiopulmonary resuscitation has been proposed to help with hemodynamic stability and survival in patients with large pulmonary embolism and acute myocardial infarction. However, thrombolytic drugs such as Alteplase should only be used when there is a pulmonary embolism condition. This is due to the potential for traumatic cardio compressions to produce bleeding during resuscitation (Böttiger & Martin, 2001). Thrombolysis is a first-line therapy for PE and MI, but is contradicted in resuscitation due to the potential for traumatic cardio compressions to cause bleeding (Spöhr & Böttiger, 2003).

1.5 Role of Nurses in Resuscitation

Nurses are the soul of the health care circle. They consecutively are a part of the patient's life care procedures, administration of drugs and are usually the first people on the scene of an arrest, conducting cardiopulmonary resuscitation (CPR) and calling the advanced life support arrest crew (Finn, 1996). A nurse who pursues her job in a specific specialty expected to have the level of knowledge or skill that is typically held by her profession's members who are actively practicing in that specialty under comparable conditions (Verklan, 2004). In Pakistan nurses are taught regarding resuscitation but has poor practices related to cardiopulmonary resuscitation (Shah, Jan, Hussain, Gul, & N, 2019). Providing correct medication at the right and precised time is a difficult task that is not a single person's job, still nurses are overburdened by other functions along with this major job. So errors frequently occur due to many obstacles in nurses work specifically in Pakistan as there is a lack of trained high quality nurses (Parveen, 2016). A significant proportion of adverse reactions can be reversed by simple interventions which includes better training, patient engagements and compliance with relevant patient safety protocols. Guidelines provided by the Resuscitation Council (UK) and the European Resuscitation Council (ERC) has offered a standardized response pathway for all health professionals during resuscitation in order to reduce adverse reaction (Koster et al., 2010).

1.6 Problem statement

There is a scarcity of data related to nurses' knowledge regarding the administration of resuscitation medications and high alert medications (HAMs). Likewise, there is a lack of research concerning the obstacles encountered by nurses' while administering these medications and the medication errors associated with those

obstacles. All of the aforementioned studies focused on one or two points, but more research in this area is advised in order to eliminate barriers, decrease medication errors, improve patient outcomes, ensure the efficacy of nurses training programmes in this area, and to assess Pakistan's reporting system for medication errors. Because of this, the current study integrates the key elements of evaluating nurses' knowledge of resuscitation medications, defining obstacles leading to medication errors, and reporting their medication errors.

1.7 Rationale of the study

Previous researchers emphasized on only one aspect of resuscitation medications practices among the nurses such as assessing their knowledge or only finding obstacles they encounter during administration while this study does not only evaluate knowledge of Pakistani nurses regarding resuscitation medications but also the obstacles, they face in resuscitation drugs administration and medication error events. In addition, barriers related to under- or non-reporting of resuscitation medication error events were also explored.

In the present study i) through evaluating nurses' knowledge regarding resuscitation medications, ii) determining the obstacles encountered while administering resuscitation medications and iii) exploring medication errors within hospitals in the past one year and underreporting them will assist the clinicians to lower medication errors and adverse expand good patient outcomes.

1.8 Research objectives

1.8.1 General objectives

The current research was carried out to evaluate the knowledge of nurses about resuscitation medications and probable barriers confronted during the administration of resuscitation medication

1.8.2 Specific objectives

a) To evaluate the knowledge of Pakistani nurses from both private and public hospitals regarding the resuscitation medication administration

b) To determine the obstacles nurses face during administration of resuscitation medications.

c) To identify of the barriers of under-reporting resuscitation medication errors as it is necessary in order to improve patients' outcomes.

CHAPTER 2

LITERATURE REVIEW

Medication errors are usually common, preventable, and place a costly strain on the national health services (Scott, 2016). Patients who experience medication errors may experience a range of issues, from slight harm to severe health changes that could result in extended hospital stays (Banning, 2006). Medical errors are the third-greatest cause of death in the United States (U.S), where they may be responsible for up to 251,000 deaths per year (Anderson & Abrahamson, 2017).

The most frequent and constant sort of error that occurs in hospitals is medication error, which can be classified into errors during prescription, transcription, dispensing, administration, or monitoring. Many nurses are aware of their obligation to uphold their cardiopulmonary resuscitation skills on a professional level, as performing resuscitation could be required as part of their clinical position. As it is known, that most of these errors occur during the administration procedure, followed by errors that occur during the prescription process of drugs (Sajjad, Gowani, Anyla, & Shireen, 2017). Nurses have the most important part in the deliverance of medications; they need to be skilled and careful while administering these medications.

2.1 Medication errors burden

Failure of drug treatment would result from a variety of circumstances, including incorrect diagnosis, unsuitable therapeutic dosage choice, use of contaminated or counterfeit drugs, patient noncompliance, poor bioavailability or uselessness of a medicine, medication error, or development of an adverse event

(Figueras & Laporte, 2003). These medication errors raises the potential for drug interactions, increases the frequency of hospital admissions and outpatient visits, extends hospital stays, increases management expenses, and elevates mortality risk, making it a leading matter, particularly in low- middle-income nations (Rasool et al., 2020). In Pakistan, which is a lower-income country, drug errors frequently result in fatalities, although these incidents are not accurately reported. The concern of high alert medication (HAMs) associated errors in the nation was recently brought to light by the death of a nine month old baby as a result of the rushed administration of 15% potassium chloride injection (Salman, Mustafa, Asif, et al., 2020). Medication errors affect seven million patients annually, leading to 3.5 million physician appointments and one million visits to emergency rooms. About forty two percent of all hospital admissions and twenty two percent of rehospitalization following discharge are due to medication linked errors internationally (Al Hamid, Ghaleb, Aljadhey, & Aslanpour, 2014).

Preventable adverse drug events (ADEs) from medication errors can harm patients and have a huge and costly impact. Although not all drug errors cause patient harm, they can have various harmful impacts like inefficiency and incorrect resource utilization, which add to the strain on the economy (Walsh et al., 2017).

2.2 Management of cardiac arrest

According to data from thirty seven European regions, there are 38 out-of-hospital cardiac arrests for all rhythms handled by emergency medical services (EMS) per year for every 100,000 people. Emergency medical services treated ventricular fibrillation arrests occur 17 times per 100,000 people each year. According to a study the survival rates for cardiac arrests with all-rhythm and ventricular fibrillation are

10.7% and 21.2%, respectively until hospital release (Atwood, Eisenberg, Herlitz, & Rea, 2005). These numbers are consistent with the most recent data for 10 North American locations. The median survival rate from hospital admission to discharge following cardiac arrest from any rhythm handled by paramedics was 8.4%. In contrast, it was 22.0% after ventricular fibrillation. (Papastylianou & Mentzelopoulos, 2012). According to the National Registry of Cardiopulmonary Resuscitation (CPR) of the American Heart Association, the overall survival rate after an in-hospital cardiac arrest is 17.6%. In 25% of cases, the opening rhythm is VF or pulseless-VT, and of those, thirty seven percent of patients survive to get out of the hospital. After pulseless electrical activity or asystole, 11.5% of patients make it out of the hospital (Meaney et al., 2010).

2.3 Assessment of nurse's resuscitation medications administration knowledge and obstacles encountered

Previous research has evaluated nurses' knowledge regarding resuscitation medications and obstacles encountered while administering resuscitation medications in different countries. A Taiwanese study by Chen and colleagues in 2014 aimed to assess the knowledge of nurses about resuscitation medications. A cross-sectional study of a well-validated questionnaire with twenty right-wrong items was carried out, and descriptive statistics were used together with stratified sampling. One hundred eighty-eight nurses actively participated. Nurses' right response percentage increased as their work experience increased reaching 70.5% right response percentage. Only 8% thought they knew enough about resuscitation drugs, and 73.9% wanted further training. The most common barrier was disruption of the drug administration procedure. Participants reported the sum of sixteen resuscitation drug errors, including five cases of atropine, three cases of epinephrine, and other medications with the eight

cases. Scientific proof findings imply that nurses need more training and experience, and they would benefit from learning more about resuscitation drugs. Additional study to verify the tool is also necessary, and nurses should be educated about these drugs (M. J. Chen et al., 2014).

Lan et al. (2014) conducted a cross-sectional study in Taiwan to evaluate common pediatric administration errors. A questionnaire comprising 20 true-false questions on pharmacology was utilized, and nurses reported the recognized pediatric administration errors. The biggest challenge nurses faced was a lack of data (61.5%), while 9.2% of the children involved in 141 pediatric drug errors experienced significant repercussions. Evidence-based findings show that pediatric nurses lack sufficient pharmacology expertise, and it is advised to employ techniques like offering ongoing instruction and double-checking dosages. Four health institutions were the only ones willing to participate in the investigation, despite the response rate of 86.8% being acceptable. More research is needed to determine the instrument's validity and reliability, particularly with regard to over-the-counter drugs. (Lan et al., 2014).

Hsaio et al. published an earlier Taiwanese study in 2010 that created and assessed an instrument to evaluate nurses' awareness of high-alert drugs and explore known administration errors. A questionnaire verified by topic experts, two pilot investigations, and a literature review were used in a cross-sectional study conducted in 2006. The first component of the questionnaire assessed nurses' understanding of high-alert drugs, while component two examined recognized administration errors. The study used descriptive statistics and snowball sampling to achieve a response rate of 79.2% among 305 nurses. The percentage of correct responses in Part 1 was 56.5, and scores were influenced by the nurses' professional experience. Only 36% of nurses thought they knew enough concerning high-alert drugs; 84% requested further

training, and the biggest challenge was a lack of knowledge (75%). There were 184 reported administration errors in total, including the use of incorrect medicine or dose (33.7%) the inappropriate dosage (32.6%), with 49% having severe effects. The snowball method was attempted to reduce sample bias by utilizing distribution that was regionally equitably distributed to RN members, but there was still a skewed sample. More research is needed to determine the validity and reliability of the instrument, as this was the initial effort to create an instrument to assess nurses' familiarity with high-alert drugs (Hsaio et al., 2010).

Another analysis by (Salman, Mustafa, Rao, et al., 2020) conducted to assess Pakistani registered nurses' understanding of high alert medications. A feasible sample method was used from 29 hospitals in Punjab Province, and 2,363 registered nurses were chosen for the study. Staff nurses made up 94.8% of the sample, while head nurses made up 5.2%. Approximately 63% of Pakistani nurses were employed by tertiary hospitals, while only 25% and 12% of the workforce were employed by district and tehsil headquarter hospitals respectively. 84% of survey participants received scores below 70%, and there was no difference in basic knowledge between age, hospitals, departments, training, positions, qualifications, and experience categories. This study revealed that Pakistani nurses have major deficiencies in their understanding of HAMs, which could have a negative impact on patient outcomes. Comprehensive pharmacology training should be provided to nurses both before and after their nursing education in school and as part of ongoing hospital-based education. Good communication between doctors, clinical pharmacists, and nurses is essential to reducing medication errors and enhancing patient care.

In 2015, a study by (Zyoud et al., 2019) evaluated the level of knowledge of nurses working in public hospitals in the West Bank, Palestine. This cross-sectional

study in 2015 used a face-to-face interview questionnaire to gather data from nurses in the West Bank in Palestine. It was divided into four sections: self-evaluation, knowledge of medication regulation and administration, sociodemographic characteristics, and knowledge of drugs. The study found that 93% of nurses in the ER, ICU, pediatric or medical wards had inadequate knowledge of high alert medications (HAMs). Training in high-alert medications and intensive care units was linked to nurses having enough expertise. The groups with the highest levels of knowledge were those with a master's degree in nursing, those employed in the intensive care units ward, head nurses, and male nurses. The two main issues were the lack of a standardized operating procedure and divergent viewpoints among physicians and nurses. This study found that nurses had a lack of understanding when administering HAMs, which could lead to medication errors. Additional training and ongoing education opportunities could be beneficial for nurses. However, some bias from unequal sampling was unavoidably existent, so additional study is needed to establish the validity and reliability of the instrument. This is the initial try to create a tool to assess nurses' understanding of high-alert drugs.

In Palestine, another study was also conducted by (Qedan, Daibes, Al-Jabi, Koni, & Zyoud, 2022) to evaluate nurses' understanding of resuscitation drugs and identify challenges they encounter when administering them. Investigations were done into the reasons why nurses didn't report errors and the inaccuracies in reporting those errors. A cross-sectional study was also conducted in the West Bank of Palestine. Data was gathered using convenient sampling and a face-to-face interview survey. The questionnaire included socio-demographic information, knowledge of resuscitation drugs (20 true or false questions), self-evaluation, reasons for not reporting ME, and recommendations to reduce ME. The study included 200 nurses and found that

resuscitation drugs were poorly understood by nurses (58.6%). The study found that male nurses had higher knowledge scores in the general ward, cardiac care unit (CCU), intensive care unit (ICU), and general ward. The top challenges nurses encountered when administering resuscitation medication were the hectic setting, lack of pharmacist availability for a full day, and different medications that appeared to be the same on the packaging. Seventy percent of nurses wanted to advance their education, and nurses and hospitals did not agree on the definition of ME. Nurses desire ongoing education and more training about resuscitation drugs to reduce medication errors, but pharmacists should properly arrange medications. This study is cross-sectional in nature, making it difficult to establish a causal link between the scales and components. The data was gathered through in-person meetings, which can lead to bias. Samples were exclusively gathered from the northern region of the West Bank, and all employed nurses were selected without taking into account their emotional or physical health conditions.

Abeer and colleagues conducted a study in Egypt to evaluate nurses' expertise and experience in handling high-alert drugs. The study was conducted at Alexandria Main University Hospital, with 167 nurses in charge of giving medication and providing direct patient care. The required information was collected using two instruments: a nurse's knowledge of HAM's questionnaire and a nurse's practice in dealing with HAM's observational check list. The average scores and mean percentage of nurses' drug knowledge and practice were used to assess their level of satisfactory or poor practice. The mean scores for practice connected to high alert medications were 23.022.50 and 39.704.30, respectively. The practice was found to be generally unsatisfactory (100.0%) with regard to the five main elements, with a mean score of 10.471.57 and a mean percentage of (74.8111.22). Nurses' knowledge and practice

regarding the administration of high-alert drugs differed from accepted guidelines. The overall level of knowledge was bad, and there was a small area with inaccurate information that could lead to harmful complications and risky practices. It is important to have a list of high-alert drugs and medication safety policies and procedures (Abeer et al 2017)

2.4 Medication errors reporting barriers

For drug management, coordination between nurses, doctors, pharmacists, and other professionals is essential. Nurses can significantly influence both the final stage of the procedure and its prevention (Sajjad et al., 2017).

The objective of this study was to assess the causes of medication administration errors occurring but not being reported in Pakistan. A cross-sectional review-based inquiry was conducted at Bolan Medical Complex Hospital in Quetta, Pakistan. A total 200 question papers were received and seven of them were disqualified due to their inadequacy. SPSS 20 was used to collect, code, classify, and perform a factual analysis. The majority of nurses agreed that there is no relaxing technique to check for proof of medicines and that patients report that medications are given precisely and according to instructions. Medication administration errors can be caused by untidy requests, difficult to detect drug taking errors, and a pharmacist not being available 24 hours a day. Staff nurses may be reluctant to disclose medication errors due to their own motivation, the need to improve, the nature of the error, and patient families', doctors', and nursing administration's fears (Ahmed Randhawa, Iqbal, Ammar, Waqas, & Minhas, 2018)

This study in Iran (Bahadori et al., 2013), examined why nurses at Iran's Abbasi Hospital in Miandoab refrain from reporting drug errors. A cross-sectional, analytical

consensus technique was used to examine all nurses (n = 100) and a questionnaire was used to gather the necessary information. ANOVA, chi-square, and the independent t-test were used to examine the collected data. The results of this investigation showed that management factors (3.56 0.996), reporting process factors (3.32 0.797), and fear of the reporting consequences (3.01 1.039) were the three most significant deterrents to reporting medication errors. Additionally, there was a strong correlation (P 0.008) between work position and concern over the repercussions of disclosing prescription errors. It is recommended that comparable studies be conducted utilizing large samples and population studies on other public and private hospitals, and the results of those studies should then be compared with those of the current study. Future research should use interventional designs to determine the primary roots of medication errors, further deterrents to reporting them, and methods to prevent or lessen their frequency.

According to (Aljabari & Kadhim, 2021), they conducted a systematic evaluation of the literature to review obstacles to reporting medical errors. MEDLINE and SCOPUS sources were explored for research, and the recommended reporting items for systematic reviews and meta-analyses guidelines were used to determine which studies were eligible. The final assessment of 30 papers, eight of which originated in the United States, used self-administered questionnaires to gather information. The majority of providers surveyed were nurses (87%), followed by doctors (27%). The most common barrier was fear of the results, followed by a lack of feedback and a negative work climate/culture. The difficulty of reporting varied greatly between centers, with the first drawback being inherent in survey and interview research and the second restriction being inevitable due to the heterogeneity of the study population and methodology. A meta-analysis is not possible, and only an

opinionated conclusion can be given due to the heterogeneity in technique and study population in the chosen research.

(Afaya, Konlan, & Kim Do, 2021) The study, conducted in 2021 analyzed the obstacles that prevent hospital nurses from disclosing medication administration mistakes. An integrative review was conducted using the search engines PubMed, Web of Science, EMBASE, and the Cumulative Index to Nursing and Allied Health Literature (CINAHL), as well as Google Scholar, to identify existing papers on barriers to drug administration error revealing from January 2016 to December 2020. Two commentators (AA and KDK) objectively evaluated the standard of all involved reports by means of the Mixed Methods Appraisal Tool (MMAT) version 2018. The main themes and subthemes that emerged as hurdles to unveiling medication administration errors included organizational barriers (deficient reporting systems, management behavior, and ambiguous meaning of medication error), as well as qualified and single barriers (fear of management/colleagues/lawsuit, individual reasons, and inadequate knowledge of errors). To improve nurses' ability to report drug delivery errors, legislators, managers, and nursing staff should come to an agreement on a common definition of what qualifies as a medication error.

Peyrovi and colleagues conducted a 2016 study to investigate the difficulties in reporting nursing errors in intensive care units at Iranian medical facilities. The analysis was descriptive and qualitative, with 16 nurses working in four general intensive care units in the Iranian region of Kurdistan providing the purposive sample. The results showed that four main obstacles preventing nurses from reporting errors were preserving one's professional reputation, avoiding penalties, legal issues, and organizational wrongdoing, feeling insecure and blaming the nurses, and not looking into the actual source of the error. It is essential to think and identify the root causes

of error occurrence, as well as to assist and protect nurses. Management must provide nurses with the necessary personal, organizational, and legal support to encourage them to report errors, identify their underlying causes, and take action to prevent them. This study was limited due to the choice of labels with the same meaning in various clinical circumstances. The experiences shared by participants covered a wide variety of topics that are likely to be relevant to many ICU nurses (Peyrovi., et, & al., 2016)

A final study by (Vrbnjak, Denieffe, O'Gorman, & Pajnkihar, 2016) was conducted to investigate the challenges nurses face when reporting drug errors and near-misses in a hospital context. A systematic review from Medline, CINAHL, PubMed, and the Cochrane Library was conducted, as well as searches on Google, Google Scholar, and reference lists of pertinent studies published in English between January 1981 and April 2015. 38 studies from the 4038 known reports were integrated into the creation. According to the discoveries, reporting medication errors is hampered by organizational barriers like culture, the reporting process, and management behavior, as well as by personal and professional barriers like fear, responsibility, and nursing features. There is a need for anonymous, effective, straightforward reporting mechanisms and supportive management practices that give nurses honest feedback.

Poor reporting attentiveness and a lack of knowledge on reporting barriers point to the need for more research as well as the development of administrative and educational strategies to overcome these barriers. Although mixed method appraisal tool (MMAT) is an effective instrument, was used to measure the quality, but because it evaluates the methodological quality of incorporated findings rather than the value of their reporting.

CHAPTER 3

METHODOLOGY

3.1 Study Design

A descriptive, cross sectional study design was used to conduct this research.

3.2 Study settings

Public and private hospitals in Lahore were selected for the study because Lahore is the capital of the most populated province (Punjab) of Pakistan. It is the country's second-largest metropolitan city and the world's 26th. Patients are regularly referred to Lahore's healthcare settings because of the city's superior healthcare delivery system as fully qualified medical professionals are present specifically within private hospitals in Lahore which are improving themselves and concentrating on the requirements of their patients in order to offer them the best possible healthcare, that's why patients in other cities are advised to get treated in Lahore city.(Irfan & Ijaz, 2011). Overall, 11 teaching hospitals, 2 district headquarters (DHQ) hospital, 4 tehsil headquarters (THQ) hospitals, 6 rural health centers and 37 basic health units are operating in Lahore (Punjab, 2018). The present study was conducted at eighteen healthcare settings (10 private, 6 public and 2 teaching hospitals). Complete details of the study settings are given in Table 3.1. Data were collected from intensive care unit, coronary care unit, high dependency unit, emergency rooms, surgical, gynecology, pediatric and oncology wards of each hospital because resuscitation medications are frequently used in those units/wards.

Table 3.1 Details of study sites

Hospital name	Category	Capacity
Jinnah Hospital	Public, tertiary	1650
Mayo hospital	Public, tertiary	2399
Sir Ganga Ram hospital	Public, tertiary	831
Doctors' hospital	Private, tertiary	250
Shaikh Zayed hospital	Semi-public, tertiary	1030
Hameed Latif hospital	Private, tertiary	324
Shaukat Khanum cancer hospital	Private, tertiary	195
Bahria Hospital	Private, secondary and tertiary	110
Nawaz Sharif social security hospital	Public, tertiary	610
Gulab Devi hospital	Semi private, tertiary	1500
Fatima memorial hospital	Private, tertiary	510
Farooq hospital	Private, tertiary	220
Indus hospital	Private, tertiary	300
Evercare hospital	Private, tertiary	165
Surgimed hospital	Private, tertiary	150
Lahore general hospital	Public, tertiary	600
Lahore university teaching hospital	Private, tertiary	460
Akhtar Saeed trust teaching hospital	Private, tertiary	300

3.3 Study Population

The targeted people included registered nurses under the Pakistani nursing council. Both female and male nurses having a diploma or higher qualifications (bachelor or master in nursing) currently providing services in the aforementioned wards of the study settings were eligible for inclusion. Nurses working in other departments, intern nurses, nursing students, and those who refused or were not able to give written informed consent and were hence not included in the study.