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ORIGINAL RESEARCH

Determination of Nurses' Knowledge toward Medication used in Critical Care Units

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ABSTRACT

Background: The critical care unit is one of the important units in the hospital that receives critical and dangerous cases. There are medications used in these units, including shock medications. The nurse must have enough knowledge about these medications to reduce the rate of medication error and prevent harm that occurs to patients.
Objectives: To determine nurses knowledge toward drugs used in critical care units and to find out relationship between nurses' knowledge and their demographic data.
Methodology: A quantitative descriptive study was carried out in Critical Care Units at affiliated to Al-Furat Al-Awsat Hospital, Al-Hakim General Hospital, and Al-Saddr Teaching Hospital in Al-Najaf City/Al-Najaf Al-Ashraf Health Directorate. A Non-probability (convenience) sample of 77 nurses was obtained from the above settings, regardless of their characteristics. The study began from December 10th, 2022 to April, 1st, 2023. Data were collected through a special questionnaire prepared to collect the data which was divided in to two parts. The validity of the questionnaire was acquired by examination of (13) experts in the different fields, correlation utilized as a statistical approach to evaluate the reliability of the study questionnaire. Data were analyzed using descriptive and inferential statistics.
Results: The general assessment of the nurses' knowledge regarding drug in intensive care units was fail with an average score of less than (1.50), as the scores were unsatisfactory with regard to medication administration.
Conclusion: A study concluded that a nurses' knowledge about the medications used in intensive care units was Low, less than (1.50) as overall.

Keywords: Knowledge, Drug, Intensive Care Units.

INTRODUCTION

An intensive care unit (ICU), also known as an intensive therapy unit or critical care unit (CCU), is a special department of a hospital to care for people who suffer from life-threatening injuries and diseases such as kidney failure, heart attack, acute bleeding, serious infections, and serious injuries such as car accidents, falls, and shooting which requires continuous care and careful supervision from life support equipment and medication to guarantee the body's natural functions. It is performed highly trained doctors, nurses and respiratory therapists who specialize in the care of patients with critical conditions, (Anwar 2021).

Pharmacotherapy is a valuable resource in the healthcare system. However, there are risks associated with its usage, including iatrogenic injury and errors within the complicated drug-use system. The Institute of Medicine estimated in 1999 that

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medication errors result in 7000 deaths annually, with clinical error being the most common problem (Murillo-Pérez, 2016). The magnitude of this problem was brought to light by the Institute of Medicine, which also noted that there is a lack of an internationally standard taxonomy that clearly defines what constitutes an error, potential error, error cause, or contributing factor (Gracia, et al., 2019).

In spite of this, a number of studies suggest that drug-related occurrences represent 6–12% of hospital admissions and 2 out of every 1000 hospital fatalities. As such, they represent a significant public health. Errors can occur in intensive care units and have potentially more devastating repercussions for patients in ICUs. Every day, critically sick patients admitted to the ICU commit an average of 1.7 medical errors, and many of them experience a potentially fatal error. Medication mistakes comprise 78% of significant medical errors in ICU, making them the most prevalent category of errors (Gracia, et al., 2019). It is estimated that deaths from medical errors cause approximately 98,000 deaths annually. Medication errors can lead to serious injury, disability, or even death when we use inadequate medication systems or when human factors like staff shortages, fatigue, or unfavorable environmental conditions affect prescribing, transcribing, administering, and monitoring procedures (Abdelhamed, 2020). Due to the high patient volume, medication errors are more common in settings like emergency departments and ICU. Specifically, medicine is mostly administered to ICU patients (Abukhader, 2020).

The ICU nurse is primarily responsible for the care and treatment of patients during an unstable and/or critical clinical condition. The intensive care nurse's responsibilities include assessing the patient's condition and administering treatment, as well as providing ongoing support throughout the recovery period. Many factors influence safe medication management. Some argue that nurses may have insufficient knowledge and skills to perform safe medication management (Odberg et al., 2019). Ultimately, you will work directly with patients to ensure they receive the necessary medical attention and care based on their condition. Thus, the mortality rate as a result of lack of knowledge of medicines reaches high rates annually in most parts of the world, as the lack of experience or competence on the part of nurses who take care of critical cases with medicines leads to medical errors. After becoming a nurse individuals must possess the skills and expertise to carry out tasks, in medical environments, such, as intensive care units right after completing their training (Heczková and Bulava, 2018).

AIMS OF THE STUDY

This research aims to determine of nurse's knowledge toward drugs used in critical care units.

METHODOLOGY

Study Design:

A descriptive study design was determined to study nurse's knowledge toward ICU drug. Study was started from December 10th, 2022 to April, 1st, 2023.

Setting of the Study:

The study is conducted in Al-Najaf City/Al-Najaf Al-Ashraf Health Directorate / in critical care units of Al-Furat Al-Awsat Teaching Hospital. Al-Hakim Hospital, Al-Saddr Medical City. The previously mentioned hospitals have approximately 25 beds in critical care units. These units receive patients with life threatening conditions, have a special staff include: (Physicians specialized in critical care medicine, Critical care nurses, respiratory therapist and pharmacists. Many medication used in these units, the most important of these medications are shock medications. Also, have much equipment, the most important of which are a mechanical ventilator and a patient monitor.

Study Sample:

Non-probability (convenience) samples of seventy-seven (77) nurses who work in critical care units. Nurses of both sexes who work in the day and

evening shifts, and nurses who were interested in participating in this study.

Study Instrument:

The final version of the research tool consisted of two main parts for determine knowledge of nurses toward drug used in ICU as follows:

Part One: Demographic characteristics:

Social and demographic characteristics of nurses, which include (gender, age, level of education, years of service in nursing, years of service in critical care units, and the training session).

Part Two: Nurses Knowledge:

The second part of the questionnaire contains 70 items related to nurses' knowledge about drug used in ICU. Nurses' knowledge about medications in the critical care unit was assessed by giving 2 points for the correct answer and 1 point for the incorrect answer. Their knowledge was measured based on an average score of 1.5, with a score of 1.5 or higher considered Pass and less than 1.5 considered a Fail.

Data Collection:

After discussing the goals and significance of the study with the nurses and assuring them that the information they provided would be kept complete and confidential, the data was collected as a self-report (knowledge). The questionnaire takes around twenty to thirty minutes to complete.

Validity of the Instrument:

To determine a face validity of study instrument, a committee of experts with more than 10 years (χ= 26 years), skill in their field of nursing was addresses.

Statistical Analysis:

The data was analyzed through use Statistical Package for Social Science program version (26), included:

- **Descriptive Statistical**

a) Tables (Frequencies, and Percentages).

b) Figure (Bar chart)

c) Mean of score

- **Inferential data analysis:** These were used to accept or reject the statistical hypotheses, which included the following: One-way ANOVA.

RESULTS

Table (1): Socio-Demographic Characteristic of the studied Nurses

Socio-Demographic		Frequency	Percent
Age\ Years	<= 23	6	7.8
	24 - 28	36	46.8
	29 - 34	21	27.3
	35 - 39	4	5.2
	40 - 45	7	9.1
	46+	3	3.9
Gender	Male	50	64.9
	Female	27	35.1
Level of Education	Nursing preparatory	5	6.5
	Nursing institute	20	26.0
	Nursing collage	50	64.9
	Master	2	2.6
Years of experience in nursing	<= 2	21	27.3
	3 - 6	29	37.7
	7 - 10	14	18.2

	11 - 14	3	3.9
	15 - 18	3	3.9
	19 - 22	3	3.9
	23 - 26	2	2.6
	27+	2	2.6
Years of experience in Critical Care Unit	<= 2	33	42.9
	3 - 7	30	39.0
	8 - 11	8	10.4
	12 - 16	3	3.9
	26+	3	3.9
No. of Training Session	<= 2	58	75.3
	3 - 4	14	18.2
	5 - 6	4	5.2
	9+	1	1.3
Total		**77**	**100.0**

Table 1 revealed that most of the study population 36 (46.8%) were between (24-28) years age group, 50 (64.9%) were male, while most of the study sample 50 (64.9%) were Nursing Collage, the study A sample presented that the higher percentage of 29 (37.7%) were between (3) to 6) years of experience in nursing, while 33 (42.9%) of them were with (<=2) experience in critical care units (58). 75.3 %) of (< = 2) the study sample were attending formal training program directed to critical care units.

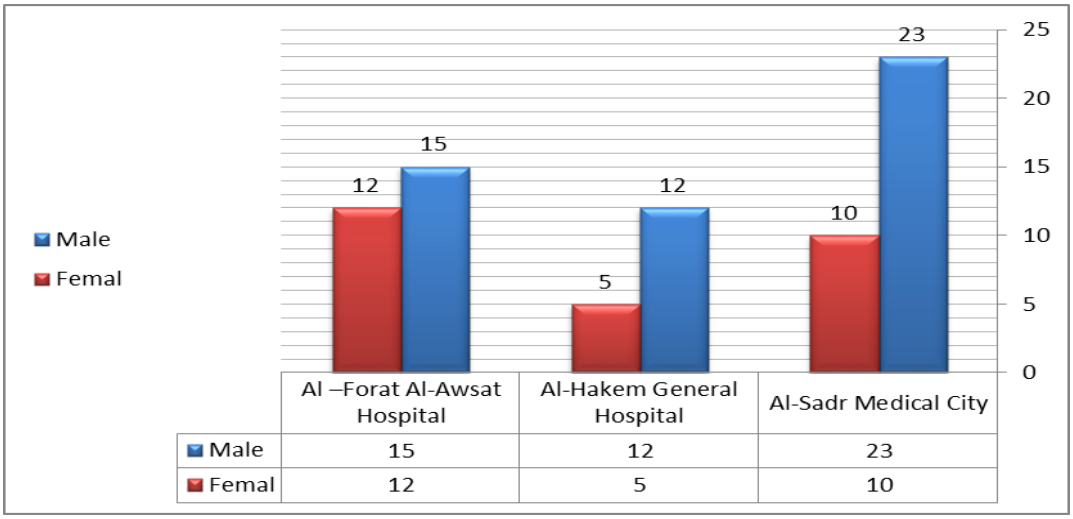

Figure (1): Shows the distribution of nurses on hospitals in the form of male and female frequencies

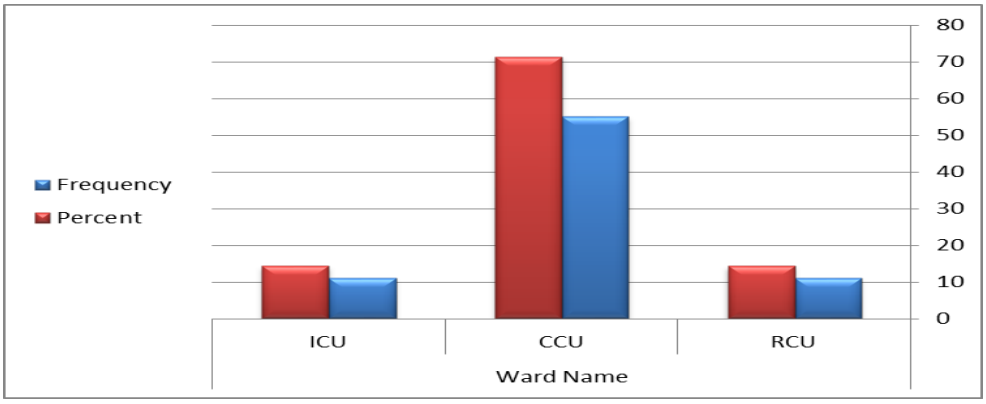

Figure (2): shows the distribution of nurses on the wards in hospitals

Table (2): Descriptive Statistics of Nurses Responses toward Knowledge related to Medication used in Critical Care Units

Questions	M. s.	Assessment	Questions	M. s.	Assessment
1- What is the action of morphine (Sevredol):	1.01	Fail	36- What are the side effects of warfarin (Marivanil):	1.06	Fail
-2 What is the method of administering morphine (Sevredol):	1.57	Pass	37- What is the appropriate use of Clopidogrel (Plavix):	1.06	Fail
-3 What are the side effects of morphine (Sevredol):	1.51	Pass	-38 What is the appropriate dose to be given to treat Clopidogrel (Plavix):	1.12	Fail
4- What is the action of heparin (Lequimin):	1.05	Fail	-39 What are the side effects of Clopidogrel (Plavix):	1.43	Fail
-5 Dosage forms of heparin (liquimin):	1.01	Fail	40-Captopril (Capoten) is used to treat:	1.10	Fail
6- Side effects of heparin (liquimin):	1.06	Fail	41-The appropriate dose for captopril (Capoten) treatment for an adult is:	1.27	Fail
-7 Dosages used for heparin (liquimin):	1.16	Fail	42-The most common side effects of captopril (Capoten) treatment:	1.75	Pass
-8 What is the action of enoxaparin (Clexane):	1.04	Fail	43-Nitroglycerin treatment is used:	1.26	Fail
-9 dosage forms of enoxaparin (Clexane):	1.03	Fail	44-The most important side effects of Nitroglycerin treatment are:	1.22	Fail
-10 Enoxaparin (Clexane) side effects:	1.30	Fail	45-Nitroglycerin treatment works on:	1.09	Fail
-11 The appropriate dose of enoxaparin (Clexane):	1.04	Fail	46-The appropriate dose for treating magnesium sulphate (Epsom Salt) for an adult is:	1.82	Pass
12- What is Amlodipine (Norvasc):	1.04	Fail	47- Indications for using protamine sulfate (Prosulf) treatment:	1.27	Fail
13- Amlodipine form (Norvasc):	1.05	Fail	48 - Lidocaine (Xylocaine) is used to treat:	1.32	Fail
-14 Side effects of amlodipine (Norvasc):	1.16	Fail	49- The appropriate dose for anesthesia for lidocaine (Xylocaine)	1.81	Pass

			treatment is:		
-15 The appropriate dose of amlodipine (Norvasc):	1.10	Fail	50- Side effects of lidocaine (Xylocaine) treatment are:	1.30	Fail
16- Dopamine (Intropin) can be used in any of the following cases:	1.16	Fail	-51 The dose of digoxin (Lanoxin) used for an adult is:	1.36	Fail
-17 The highest dose of dopamine (Intropin) can be given to adults:	1.44	Fail	-52 of the uses of digoxin (Lanoxin)are:	1.49	Fail
-18 It can cause a decrease in the level of dopamine (Intropin) in the body:	1.34	Fail	-53 Side effects of digoxin (Lanoxin)are:	1.49	Fail
-19 Complications of Lasix can be classified as follows:	1.13	Fail	54 - The effect of injecting digoxin (Lanoxin)begins after a period of time and the effectiveness continues until the end of:	1.43	Fail
-20 Furosemide (Lasix) is used in the following cases:	1.03	Fail	55- In which cases should Zantac treatment be used:	1.08	Fail
21 - Furosemide (Lasix) can be given as an initial dose according to:	1.12	Fail	56 - The appropriate dose of amiodarone (Cordarone) for an adult is:	1.23	Fail
22- The dose of Aminophylline (Neophylline) can be gradually increased for adults after the initial dose by:	1.51	Pass	57 - Among the uses of amiodarone (Cordarone) are:	1.09	Fail
23- Aminophylline (Neophylline) can be used for cases in which the patient has:	1.05	Fail	58- Side effects of amiodarone (Cordarone) are:	1.39	Fail
24- The patient taking the drug Aminophylline (Neophylline) may feel some side effects:	1.83	Pass	59-Adrenaline (epinephrine) is used to treat the following conditions:	1.27	Fail
25 - It is possible that some complications may occur related to taking the drug metoprolol (Lopressor):	1.77	Pass	-60 The recommended dose of adrenaline (epinephrine) for an adult is:	1.29	Fail
26- It is likely that metoprolol (Lopressor) will be used for cases in which the patient has:	1.26	Fail	61- The side effects of epinephrine (epinephrine) are:	1.86	Pass
-27 The dose of metoprolol (Lopressor) given to a patient suffering from angina:	1.51	Pass	62 - An overdose of adrenaline (epinephrine) or rapid intravenous injection leads to:	1.51	Pass
28- What is the appropriate use of acetylsalicylic acid (aspirin) treatment:	1.08	Fail	63-Atropine is used to treat the following condition:	1.13	Fail
-29 What is the appropriate dose for treating acetylsalicylic acid (aspirin):	1.55	Pass	64- The side effects of atropine are:	1.38	Fail
30- What are the effects or complications acetylsalicylic acid (aspirin) treatment when given:	1.61	Pass	65-The dose of atropine for an adult is:	1.43	Fail
31- What is the appropriate use of isosorbide dinitrate (Isordil):	1.22	Fail	-66 If the patient is given a dose of atropine and does not get a response,	1.68	Pass

			how long do you have to wait until you can give him the next dose:		
-32 What is the appropriate dose of isosorbide dinitrate (Isordil):	1.22	Fail	67-Common side effects of using Plasil treatment are:	1.56	Pass
-33 What are the side effects of isosorbide dinitrate (Isordil):	1.34	Fail	68- Before starting to administer enoxaparin (Clexane) treatment, the following must be taken into account:	1.19	Fail
34-What is the appropriate use of warfarin treatment (Marivanil):	1.08	Fail	69- Among the things that must be taken into account after giving enoxaparin (Clexane) treatment under the skin:	1.34	Fail
-35 What is the appropriate dose for warfarin treatment (Marivanil).	1.61	Pass	70 - The reasons for using Plasil treatment include:	1.08	Fail

M.S. (>=1.50=Pass/ >=1.49=Fail).

Table 2: this table presented that most of the study sample shows fail level of knowledge recognized items. While, pass level in their knowledge related to the items (2,3,22,24,25,27,29,30,35,42,46,49,61,62,66, and finally 67).

Table (3): Overall assessment of Nurses knowledge related to Medication used in Critical Care Unit

Questions No. = 70	M. s.	Assessment
Total Score	**1.30**	**Fail**

M.S. (>=1.50=Pass/ >=1.49=Fail).

This table show that overall assessment of nurse's knowledge related to medication in ICU. were fail at mean of score less than 1.50.

Table (4): Assessment of Nurses' Knowledge according to Hospitals

Hospital Name	M. s.	Assessment
Al-Saddr Medical City	1.28	Fail
Al-Hakem General Hospital	1.28	Fail
Al –Forat Al-Awsat Hospital	1.34	Fail

M.S. (>=1.50=Pass/ >=1.49=Fail).

This table shows the nurses knowledge toward medication used in ICU in related to each hospital were fail.

Table (5): Relationship between Nurses Knowledge about medication used in Critical Care Units and Number of trainings, years of experience and level of education.

Items	Value	df	F	Sig.
Gender	.257	23	1.289	.228 (NS)
"Years of experience in nursing"	74.442	23	2.176	.012 (**S**)
"Years of experience in ICU"	66.362	23	4.156	.000 (**HS**)
No. of Training Session	3.511	23	1.080	.400 (NS)
Level of Education	0.623	3	0.125	1.073

Table 5 shows a significant relationship between nurse's knowledge and their both years of experience in nursing and years of experience in ICU at p-value less than (0.05).

DISCUSSION:

Part One: Discussion for Patients' Socio-Demographic Data: table (1).

Nurses' knowledge of the medications used in critical care units is very important to reduce medication errors and protect the patient from harm. Therefore, this knowledge is affected by socio-demographic information. Concerning their age, the majority of study sample at age group of (24-28) years. This result match with the result of Al-Hchaim and Hamza (2016) who find in his study that the majority of the study subject's age were between (25-29) years old. Also Aziz and Lafi (2011), in their study "evaluation of nurses' practices provided to the patients who undergo open heart surgery in Sulaimani center of heart diseases" stated that the majority of the sample in study and control groups, age between (25-29) years old. About the gender of the study subjects, the highest percentage were males was in consistency with Hassan (2012) in his dissertation "Effectiveness of nursing education program on nurses knowledge and Practices toward Arrhythmia in Kirkuk's teaching hospitals" mentioned that the male is dominant gender in both (study and control groups), as he explain that males will be needed to work in critical care units' as they can perform job that needs heavy work.

About educational level, the present study indicates that the highest percentage of the study sample was graduated from nursing college. Many previous studies were in agreement with this result they found that the majority of study subjects in critical care units were graduate from university and institute (Hassan, 2012; Naseer and Hassan 2013; Younis 2014).

Concerning years of experience, the present study has revealed the majority of nurses in study were between (3-6) years of experience. This result is supported by a study done by Hassan (2012), as his results indicated that the higher percentage of study groups is less than 5 years of experience.

Regarding to the years of experience in critical care units, the present study shows that the majority of nurses have less than 2 years of experiences in ICU. This result agree with another study done by Younis, (2014), who pointed that most of the nurses in both study and control groups had (1-4) years of experience in medical and cardiac care unit.

Finally, about training sessions, the majority of the sample had (<= 2) training sessions. This results come along with Hussein and Al-Ganmi (2013) in their study "assessment of nurses' knowledge concerning cardiogenic shock for patients' in critical care unit at Baghdad hospitals" they reveals that (8.0%) only were participating in training courses.

Part (II) Discussion of the Nurses' Knowledge Concerning Drug used in ICU:

The study showed that nurses' knowledge regarding the medications used in critical care units and the method of administering them is weak and unsuccessful, less than mean of score 1.5. This result is unsatisfactory because this could lead to complications for patients. These results have been supported by many studies published in international journals.

Mansoor, (2019), who studied "the impact of maternity nurses' knowledge and practices regarding medication errors on the safety of women working in the work unit" and reported that more than half of the studied sample, had poor knowledge. Also, Fattah, et al., (2019), they studied 'nurses' knowledge about preventing medication errors' and reported that on average a third of the nurses studied were in medication error. Found that less than a third of the nurses had poor information, and just over A quarter of nurses have a very low level of knowledge and only 8% of nurses have good information about preventing medication error. In addition, the study by (Fathy, et al., 20202) who examined 30 "Exploring nurses' knowledge, attitudes, and perceived barriers toward reporting medication errors in a tertiary care facility: a qualitative approach" was contrarian and stated that nurses were on Familiar with the reporting

of medication errors, but there was a weakness toward detailing harmless medical errors. Furthermore, Kaur & Charan, (2018) they conducted a "Study to assess knowledge regarding medication errors among nurses working at SGRD Hospital, Amritsar, Pune" reported that nearly two-thirds of the nurses had fair knowledge followed by less than one-third Some of them have poor grades knowledge.

CONCLUSIONS:

The study concluded that most of the nurses were in young age (24-28) years, also the finding of the study showed that most of study sample had (<= 2) years of experience in critical care units and less than 2 training sessions in ICU. Nurses present study findings concluded that most of the nurses were fail knowledge. The study revealed that there was significant relationship of knowledge with selected socio-demographic variable i-e years of experience in nursing and years of experience in ICU.

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