MEDICATION ADMINISTRATION PRINCIPLES AND ERRORS AS PERCEIVED BY NURSES CARING FOR ELDERLY PATIENTS

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Abstract

Background: Medication administration principles and errors for nurses caring for elderly patients play a significant role for improving elderly people health and decrease hospitalization. The current study **aimed** to assess medication administration principles and errors as perceived by nurses caring for elderly patients. **Design**: A descriptive research design was used in this study. **Setting**: The study was conducted at inpatient departments in Beni-Suef University hospital. **Sample**: A convenient sample of (120) nurses was recruited at the current study. **Tools**: Three tools were used I): Questionnaire sheet assessing respondents' opinions about Medication administration principles II): Observation checklist of Medication administration principles. III): Opinionnaire sheet examined the types, stages, and causes of medication administration errors. **Results**: The majority of studied subjects (72.3%) applied the medication administration principles for caring for elderly patients. on the other hand, (27.7%) were not applying medication administration principles in general; the majority of the nurses (73.5%) observed doing the medication administration principles for caring for elderly patients. on the other side, (26.5%) observed not applying medication administration principles in general, most of the studied subjects (82.7%) agreed on all listed medication administration errors in the opinionnaire. **Conclusion**: Based on the results of the present study it was concluded that nurses demonstrated satisfactory competency levels regarding medication administration indicated by good practice demonstration level, medication administration principles, and medication errors. The current satisfactory nurses' scores of medication administration are the main reason for the increase in the importance of high-quality elderly patients' care. **Recommended** that: Developing educational programs and upgrading nurses with assessing patient's condition, documentation correctly in medication charts. Increase nurses' awareness regarding medication preparation to be administered (check labels, prepare injections, observed aseptic techniques).

Key words: Medication, Administration, Rights, Errors, Principles, Elderly people.

INTRODUCTION:

Total number of people more than of 60 years or older will increase from 900 million to 2 billion between years of 2015 to 2050 (moving from 12% to 22% of the total global population). It is shown that people are fast getting older than the past. About 80% of older people will live at low- and middle-income nations at 2050.Global life probability at birth in 2016 was 72 years (74.2 years for females and 69.8 years for males) and alternating from 61.2 years in the WHO African Region to 77.5 years in the WHO European Region **(1).**

Egypt is still the most highly populated country in the Middle East, as well as the second - most populous country in Africa. Egypt's wider population accounts 1.2% of total people of. Total number of elderly people will increase to 9.2% in 2021 in Egypt. It is expected by 2050 elderly persons to be 20.8% of total population in Egypt **(2).** Aging is unavoidable state and also chronic state that all people will finally enter this stage. Aging process is a part of natural progress of human life cycle. It is cellular repair mechanism and biosynthetic combined with cellular degeneration that have compensated for degeneration in youth **(3).**

The World Health Organization's (WHO) third global patient safety challenge, "Medication without Harm," was announced in 2017 with the purpose of improving medication safety, considering the fact that medication errors are a main risk factor in injuries and preventable harm in national healthcare systems around the world, costing an estimated 42 billion US dollars (USD) per year. In February 2018, a study on the frequency and cost of medication errors in Britain was released in accordance to a WHO challenging task, estimating that 237 million medication errors occur in Britain per year at all levels of the pharmacological procedure **(4).**

It is critical for nurses to comprehend medication administration's different ideas and ways it reduces the risk of harm to people who receive these medications. Aside from the fact that there are various medication administration guidelines, the eight most important " rights" of medication administration are: ensuring a clear, complete, current, legible, and proper medication order; educating patients about all of their medications; understanding the people and system factors that increase medication errors and near misses and taking steps to prevent them; and taking the appropriate action toward medication errors to solve it at a significant level **(5).**

Medication safety has been a key concern in hospitals. In the pharmaceutical process. In order, there are various steps and personnel involved. Medication mistakes can happen at any point in the procedure, but they're most frequent throughout administration. Medication administration errors (MAEs) are thought to happen in 20% to 25% of all medication administrations. Errors in prescription and dispensing can be detected when a pharmacological order moves closer to patient administration. Because this is the final phase before a patient receives medication, interventions to reduce errors during administration are very essential **(6).**

Medicine is a compound that contains a chemical with known biological effects that is added to active ingredients or just includes inactive ingredients. The active ingredient is typically a medicine or precursor, although it could also be a biological component. A medicinal product, according to a codicil, is one that is aimed to be taken by or administered to a person for one or more of the specified objectives: as a placebo, to prevent illness, to make a diagnosis, to test for the potential of an adverse effect, to adjust a physiological, biochemical, or anatomical function or abnormality, to consider replacing an omitted component, to relieve a side effect, to treat illness, or to encourage pain medicine **(7).**

Medication administration, that is a primary function of nurses in hospital setting, is rapidly being taken over by nursing professionals. To promote patient safety, following the required procedure to ensure that the correct drug is given at the right dosage and via the most efficient route. Before administering any prescription, the nurses providing the therapy should be knowledgeable of the advantages of the prescribed route including the indications, contraindications, and side effects of the medication they will be administering **(8).**

Prescription, transcribing, dispensing, and administration are all stages of the medication, administration process when errors may occur. Nevertheless, according to recent studies, medication administration errors are much more likely at the administration phase. Medication administration is usually handled by nurses. Medication administration errors include the wrong dose, the wrong time, the wrong medication, the wrong route, omissions, changing doses, the wrong patient, and a lack of documentation **(9).** Knowledge-based errors arise when there is a lack of knowledge or when knowledge is applied incorrectly in any clinical circumstance. To address difficulties, the health-care team must be confident in their critical thinking talents, as well as their ability to analyze and recall stored knowledge. The

necessity for a knowledge-based application is superseded by the improvement of practice and experience in every particular industry. The development of skills, which leads to expertise, decreases the possibility of medication errors **(10).**

Significance of the study

A medication error is any unavoidable incident that could result in or actually causes medication error injury while the drug is being administered to patients and under the care of a healthcare professional. Medication mistakes frequently result in symptomatic adverse results such severe morbidity, extended hospital admissions, incorrect therapy, and death. Using both formal and informal reporting methods, the Institute of Medicine's (IOM) study emphasized the need for a systematic approach to pharmaceutical errors and emphasized the importance of identifying and having to learn from errors **(11).**

Studies have shown that medication errors are the main indicator of poor hospital outcomes, including up to 6.5 percent of hospital stays that result in disabilities and fatality. To the best of the researchers' present knowledge, only a small number of studies have been conducted in Egypt that have only examined the frequency and factors that contribute to nursing medication errors, the culture of safety, and the development of a protocol for safety measures **(12).**

Subjects and Methods:

Aims of this study: -

This study aims to assess medication administration principles and errors as perceived by nurses caring for elderly patients.

Research questions

In order to address the purpose of the study, the following study question was formulated:

1. Are nurses applied the principles of medication administration?
2. What are the types, stages and causes that lead to medication administration error?

Research design:

A descriptive/cross-sectional research design was utilized in this study.

Settings:

The study was conducted at inpatient at Beni-Suef University hospital.

Subjects:

A convenience sample of 120 nurses working in different departments and caring for elderly patients, the nurses' selection was regardless of their gender, age, years of experience, or category of education at Beni-Suef University hospital and agreed to participate in the study.

Tools of data collection:

Three tools were used to collect data:

Tool (I): Adopted from many sources (13)(14)(15)(16) and created by the researcher Questionnaire sheet aimed at eliciting respondents' opinions about Medication administration principles consists of two parts:

Part I: Socio-demographic features

This part aimed to collect data about elderly people's socio-demographic characteristics, including age, gender, educational level, marital status, monthly income, etc.

Part II: Medication administration principles:

It includes Medication administration principles developed by the researcher. It consists of (15) items it includes data assessing medication administration principles as nurses perceived.

Scoring system:

Each item was checked for presence as: yes (1) or no (0). The subjects' scores were ranged (from 0 to 15).

Tool (2): observation checklist of Medication administration principles: Adopted from many sources (17) (18) (19) (20) and created by the researcher

Aiming to assess the application of medication administration principles performed by nurses caring for elderly patients developed by the researcher. The researcher directly observed the nursing while giving the medication to the patients in different day work times. It consists of (21) main items covering the applied principles (before, during, and after) medication administration as nurses perform.

Scoring system:

Each item was checked: done (1) and not done (0). The subjects' scores were ranged (from 0 to 21). Those who obtained 60% or more as a total score are considered a satisfactory practical level, and those who obtained less than 60% will be considered an unsatisfactory practical level.

Tool (3): an opinionnaire sheet:

Adopted from *Al-Shara (2011)* aimed at identifying the types, stages and causes of medication administration errors in elderly patients as perceived by nurses**. (21).**

Scoring system:

It consists of (22 items) classified into three parts concerned with types (9 items), stages (6 items) and causes (7 items) of medication errors scored as (0-1) whereby (0) refers to not agree and (1) as agree).

Tools Validity:

The validity of the research instruments was evaluated a panel of five Faculty members of community health nursing and medical surgical nursing department reviewed the previous tools. Members of the jury group evaluated the study aids based on their comprehensiveness, correctness, and linguistic clarity. Some elements

were corrected, added, and/or omitted based on their recommendations.

Reliability:

Cronbach's alpha was used to assess the research tool's internal consistency. It was0.762 for the research tool. Pilot study:

A pilot study was conducted on 10% of the entire study sample (12 participants) to test the applicability, efficiency, clarity of tools, the evaluation of field work feasibility, and to discover any potential hurdles that could confront the investigator and interfere with data collection. Based on the outcomes of the pilot research, necessary adjustments were made, such as the omission of certain questions from the tool in order to reinforce their content or for greater simplicity and clarity. The pilot research sample was not included in the main study sample.

Fieldwork

Data of the current study were collected from July 2021 to September 2021, once official permissions were granted as the following:

A. The questionnaires tool 1, 3 (personal data, Medication administration principles questionnaire, Nurses opinion at medication administration errors) were distributed to all nurses present at the shift. Each nurse received a copy of the questionnaire from that was self-administered. Each one completed her / his copy and handed it back to the researcher at the same session. This technique provided a high response rate and allowed the researcher to offer a clarification if there are confusing question. (The average time of filling the questionnaires was 20-30 minutes for both.

B. The observation was performed during morning, afternoon, and night shifts. It was done for staff nurses caring for elderly patients, this process took 3 months from July 2021 to September 2021. The researcher visited study setting 3 times per week during different shifts according to the time available to the researcher.

III. Administrative Design.

The dean of the school of nursing at Beni-Suef University addressed an official letter asking for authorization to conduct the research to Beni-Suef University hospital in

order to secure their clearance to carry out this study. This letter contained the purpose of the research as well as photocopies of data collection instruments in order to get permission and assistance with data collection.

Ethical Consideration

Prior to data collection, the project received primary permission from the Faculty of Nursing Beni-Suef University's scientific research ethical council. The medical directors of chosen departments gave their approval for the study to be conducted. The head nurses of these units gave their verbal consent. Furthermore, participation in the study was entirely voluntary, and participants gave their informed consent after being informed about the study's goal and nature. Also included in the ethical considerations is the possibility of withdrawing from the study at any moment. The information's confidentiality and anonymity will be ensured by coding the data.

IV: Statistical Analysis:

The data for the analysis was collected from the study tools, categorized, tabulated, and analyzed, and data input was done with the SPSS software (statistical package for social sciences version 20). Descriptive statistics were used in this study (e.g., mean, standard deviation, frequency, percentage). To assess the study hypotheses, significance tests were used (i.e., paired and unpaired t-test, chi-square test, and ANOVA test). Between quantitative variables, Pearson's correlation coefficient was used. When p 0.05, a significant level value was evaluated. The more significant the finding, the smaller the P-value obtained: The P-value is the probability of mistake of the conclusion.

RESULTS:

Part I: Description of sociodemographic characteristics of studied:

Table (1) Percentage Distribution of the subjects' demographic characteristics (n=120).

Variables	Study sample (n=120)	
	No.	%
Age group		
<25	88	72.7
>25-35	15	12.4
>35-45	15	12.4
>45	2	1.7
Total	120	100%
Mean±(SD) 23.8±(7.10)		
Gender		
Male	56	46.3
Female	64	52.9
Level of education		
Diploma	9	7.4
Technical	99	81.8
Bachelor	12	9.9
Years of experience		
<5	88	72.7
5-10	30	24.8
>10	2	1.7

Table (1) revealed that (72.7%) of the studied nurses aged (<25) years old and had five years of experience (1.7%). On the other side, (1.7%) nurses aged above (45) years old. More than half of them (52.9%) were females. Furthermore, (81.8%) of them were graduated from technical institutes.
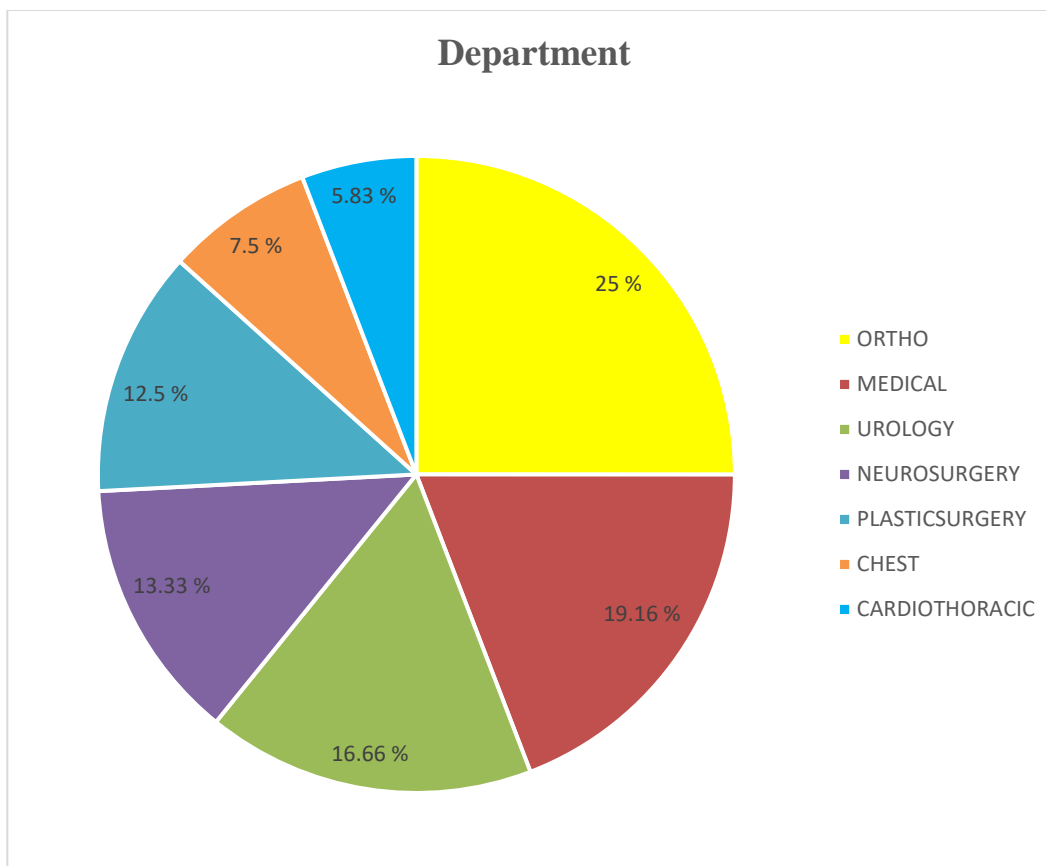
Figure (1) Percentage Distribution of the Studied Sample in Relation to their working departments (n=120).

Figure (1) Percentage Distribution of the Studied Sample showed (25%) of the studied nurses were working in the Orthopedic department, while (5.83%) was working in the Cardiothoracic department.

Part II: Nurses agreement about medication administration principles of elderly patients: (Table 2).

Table (2): Nurses agreement about medication administration principles of elderly patients. (n=120):

	Medication administration principles questionnaire	Agree		Disagree	
		NO.	%	NO.	%
1.	Nurses practice safe and effective medication management and use the eight rights of medication administration principles.	113	94.2%	7	5.8%
2.	Nurses perform medication reconciliation in collaboration with patient, patient family and Health-care team.	82	68.3%	38	31.7%
3.	Nurses carried out physician medication order safely.	87	72.5%	33	27.5%
4.	Nurses are accountable for validating the accuracy and completeness of the transcription of the order before administering the medication to the patient.	100	83.3%	20	16.7%
5.	After medication administration nurses should document at medication chart.	89	74.2%	31	25.8%
6.	Nurses integrates infection prevention and control principles, standards in the medication management process like hand washing.	74	61.7%	46	38.3%
7.	Nurses who prepare the patient's medications should give medications to the patient by him/herself	85	70.8%	35	29.2%
8.	Nurses can administer labeled medication with an order from physician.	109	90.8%	11	9.2%
9.	Nurses administer medications according doctor order time.	86	71.7%	34	28.3%
10.	Medication sharps disposal after administration is responsibility of nurse to handle.	90	75%	30	25%
11.	Nurses are doing allergy test to the possible allergic medication.	82	68.3%	38	31.7%
12.	Medication error reporting is the responsibility of the assigned nurse	77	64.2%	43	35.8%
13.	When writing medication dose at patient file it should contains number of times, Rout of administration and stop date.	81	67%	39	32.5%
14.	If you discover that medication that ordered maybe wrong name of medication, you need get clarification and confirmation from doctor.	81	67.5%	39	32.5%
15.	Maintain patient privacy during medication administration.	66*	55%	54	45%
Total		**87**	**72.3%**	**33**	**27.7%**

Table (2) presented that (72.3%) of the studied nurses perceived the medication administration principles for caring for elderly patients. on the other hand, (27.7%) of them disagreed on medication administration principles in general. In particular, (94.2%) subjects apply safe and effective medication management and use the eight rights of medication administration principles. At the same time, (55%) of them maintain privacy during medication administration.

Part III: Observed nurses' performance of medication administration principles tables

(Table 3- A). Observed nurses' performance of medication administration principles tables (Before medication administration): n=120):

Item	Done		Not done	
	No.	%	No.	%
1-Before medication administration				
1-Preparation:				
1.1. Prepared a safe environment	91	75.8%	29	24.2%
1.1.1 Good lightening surround patient	102	85%	18	15%
1.1.2 Proper position of patient during medication administration	111	92.5%	9	7.5%
1.1.3 Provide side rails to prevent from fall due to some medication side effect	80	66.7%	40	33.3%
1.2. Prepared all needed equipment	97	80.8%	23	19.2%
1.3. Prepared a clean and tidy work area	79	78.9%	41	34.2%
1.4. Ensured accuracy of physician's orders	63*	52.5%	57	47.5%
1.5. Checked communication book/diary for relevant instructions/changes	83	69.2%	37	30.8%
1.6. Review patients file carefully:				
1.6.1 Patient history	79	65.8%	41	34.2%
1.6.2 Patient medications	63*	52.5%	57	47.5%
1.6.3 Patient allergies	83	69.2%	37	30.8%
1.6.4 Check patient conscious level to detect medication rout	77	64.2%	43	35.8%
1.6.5 Maintain patient safety for fall from medication adverse effects	81	67.5%	39	32.5%
1.6.6 Check patient medications on hold and/or stop date	97	(80.8%)	23	19.2%
2. Obtained informed consent if needed	81	67.5%	39	32.5%
3. Obtained necessary information (special precautions to administer medication safely e.g. blood Pressure, pulse, temperature, glucose, lab values)	77	64.2%	43	35.8%
4. Recorded obtained information on medication sheet before pouring medication	94	78.3%	26	21.7%
5. Check the 8 Rights:				
5.1 Right patient	65*	54.2%	55	45.8%
5.2 Right medication	72	60%	47	39.2%
5.3 Right dose	95	79.2%	25	20.8%
5.4 Right route	110	91.7%	10	8.3%
5.5 Right time	106	88.3%	14	11.7%
5.6 Right documentation	102	85%	18	15%
5.7 Right to refuse	98	81.7%	22	18.3%
5.8 Right to educate patient about importance of medication for his treatment and medication side effects	102	85%	18	15%
6. Prepared medications with correct labelling	87	(72.5%)	33	27.5%
Average	87.5	73%	32.5	27%

Table (3-A) illustrates that (73%) of the studied nurses observed doing the medication administration principles for caring for elderly patients before medication administration. on the other side, (27%) observed not applying medication administration principles before medication administration in general. In particular, the most observed and frequent applied principles were put the patient in proper position during medication administration (92.5%), check the right route, (91.7%). While, the less frequent applied principles were Ensured accuracy of physician's orders (52.5%), Patient medications (52.5%).

Table 3-B) Observed nurses' performance of medication administration principles tables (during medication administration): n=120):

Item	Done		Not done	
	No.	%	No.	%
2- During medication administration				
7. Performed hand hygiene	62*	51.7%	58	48.3%
8. check labels, prepare injections, apply aseptic techniques with needles and syringes during medication administration	65*	54.2%	55	45.8%
9. Maintained patient privacy	81	67.5%	39	32.5%
10. Identified patient with 2 ways: 10.1 Wrist band	96	80%	24	20%
10.2 hospital number	96	80%	24	20%
11. Explained to patient what drug is, its action, and side effects	104	86.7%	16	13.3%
12. Gave medication following instruction at medication chart	103	85.8%	17	14.2%
13. Completed administration observe patient for oral medication: 13.1 swallowing	81	67.5%	39	32.5%
13.2 confirm that the patient taken already	81	67.5%	39	32.5%
13.3 patency of Intravenous	83	69.2%	37	30.8%
13.4 patency of feeding tube	87	72.5%	33	27.5
14. Properly discard needles, ampoules, and vials	83	69.2%	37	30.8%
Average	85	71%	35	29%

Table (3-B) illustrates that (71%) of the studied nurses observed doing the medication administration principles for caring for elderly patients during

medication administration. on the other side, (29%) observed not applying medication administration principles during medication administration in general. In particular, the most observed and frequent applied principles were explained to patient what drug is, its action, and side effects (86.7%), gave medication following instruction at medication chart (85.8%). While, the (13.3% and 14.2%) less frequent applied principles were performed hand hygiene (48.3%), check labels, prepare injections, apply aseptic techniques with needles and syringes during medication administration (45.8%).

Table 3-C): Observed nurses' performance of medication administration principles tables (After medication administration): n=120):

Item	Done		Not done	
	No.	%	No.	%
3-After medication administration				
15. Performed hand hygiene	91	75.8%	29	24.2%
16. If missed or patient refused	89	74.2%	31	25.8%
16.1 Documented on medication chart	94	78.3%	26	21.7%
16.2 Checked the causes of refusing taking medication	108	90%	12	10%
17. Returned medication to locked cupboard	105	87.5%	15	12.5%
18. Evaluated patient's response to medication actions and reaction	75	62.5%	45	37.5%
19. Documented on medication chart 19.1 Signed on medication chart	80	66.7%	40	33.3%
19.2 double check with another nurse	80	66.7%	40	33.3%
Average	**90**	**75%**	**30**	**25%**

Table (3-C) illustrates that (75%) of the studied nurses observed doing the medication administration principles for caring for elderly patients after medication administration. on the other side, (25%) observed not applying medication administration principles after medication administration in general. In particular, the most observed and frequent applied principles were checked the causes of refusing taking medication (90%), returned medication to locked cupboard (87.5%). While, the less frequent applied principles were evaluated patient's response to medication actions and reaction, Signed on medication chart (37.5% and 33.3%), respectively.

Part IV: Table (4): Frequency distribution of studied nurses' opinion about medication errors as the perception. (n=120)

Table (4- A) :): Frequency distribution of studied nurses' opinion about medication errors as the perception. (A-Types of medication errors). (n=120).

Medication Error		Agree		Not agree	
		No	**%**	**No**	**%**
A-Types of medication errors					
1.	Wrong route	99	82.5%	21	17.5%
2.	Changing of medication	98	81.6%	22	18.3%
3.	Frequency of medication	100	83.3%	20	16.7%
4.	Wrong drug	94	78.3%	26	21.6%
5.	Wrong dose	99	82.5%	21	17.5%
6.	Wrong patient	63*	52.5%	57	47.5%
7.	Wrong time	79	65.8%	41	34.2%
8.	No date or wrong date	72	60%	48	40%
9.	Wrong documentation	56*	46.7%	64	53.3%
Total mean		**84.4**	**70%**	**35.6**	**30%**

Table (**4**-A) shows that (70%) of the studied subjects agreed on all listed medication administration errors in the opinionnaire regarding to the types of medication errors. On the other side, (30%) perceived that they did not agree to the listed medication administration errors in the opinionnaire regarding to the types of medication errors. In relation to the nurse's opinion for each item, frequency of medication was the most frequent type of medication administration error as nurses perceived with frequency (83.3%). In contrast, the less frequent perceived type of error was Frequency of medication (16.7%) and Wrong route (17.5%).

Table (4-B) :): Frequency distribution of studied nurses' opinion about medication errors as the perception. (B- Stages of medication errors): (n=120)

Medication Error		Agree		Not agree	
		No	%	No	%
B-Stages of medication errors					
1.	Missing of medication(nurse)	77	64.2%	43	35.8%
2.	Patient monitoring(nurse)	78	65%	42	35%
3.	Physician ordering (physician)	93	77.5%	27	22.5%
4.	Administration(nurse)	82	68.3%	38	31.7%
5.	Pharmacy dispensing (pharmacist)	81	67.5%	39	32.5%
6.	Transcribing(pharmacist)	86	71.7%	34	28.3%
Total mean		**83**	**69%**	**37**	**31%**

Table (**4**-B) shows that (69%) of the studied subjects agreed on all listed medication administration errors in the opinionnaire related to stages of medication errors. On the other side, (31%) perceived that they did not agree to the listed medication administration errors in the opinionnaire related to stages of medication errors. In relation to the nurse's opinion for each item, physician ordering was the most frequent type of medication administration error as nurses perceived stages of medication errors (77.5%). In contrast, the less frequent perceived type of error was physician ordering, with a frequency of (22.5%) and Transcribing (28.3%).

Table (4-C) :): Frequency distribution of studied nurses' opinion about medication errors as the perception. (C- Causes of medication errors): (n=120)

Medication Error		Agree		Not agree	
		No.	%	No.	%
C-Causes of medication errors					
1.	Work overload	102	85%	18	15%
2.	Personal neglect	74	61.7%	46	38.3%
3.	Insufficient training	104	86.7%	16	13.3%
4.	Complicated prescription	100	83.3%	20	16.7%
5.	New staff	77	64.2%	45	37.5%
6.	Unfamiliarity with patient's condition	40*	33.3%	80	66.7%
7.	Unfamiliarity with medication	67*	55.8%	53	43.2%
Total mean		**81**	**67%**	**40**	**33%**

Table (**4**-C) shows that (67%) of the studied subjects agreed on all listed medication administration errors in the opinionnaire related to causes of medication errors. On the other side, (33%) perceived that they did not agree to the listed medication administration errors in the opinionnaire related to causes of medication errors. In relation to the nurse's opinion for each item, insufficient training was the most frequent type of medication administration error as nurses perceived with frequency (86.7%). In contrast, the less frequent perceived type of error was Insufficient training, with a frequency of (13.3%) and Work overload (15%).

DISCUSSION:

This study was congruent with the study that aimed to examine the rate of nurses' adherence to medication safety stated that very few studies had been carried out on medication administration error frequency. Previous studies of medication error frequency relied mostly on clinical nurse surveys, which may have resulted in significant undercounting. As a result, the author created a checklist based on basic medicine principles, such as the Five Rights, infection guidelines, and drug documentation rules. Direct observation of 293 cases of pharmaceutical activities was conducted, data was gathered, and adherence percentages per item were determined **(22).**

Furthermore, these findings contradict the findings of study, which looked into the rate of medication errors perceived. The findings of this study could be used to make medication administration recommendations easier to follow for clinical nurses. Previous studies on the frequency of medication errors relied mostly on surveys of clinical nurses, which may have resulted in significant undercounting. Basic pharmaceutical principles, such as the Five Rights, infection advice, and drug documentation requirements, were used to create a checklist in this study. **(23).**

In addition, this research matched the Nursing Assessment of Medication Acceptance (NAMA) was created to evaluate nurses' adherence to medication principles. The purpose of this study was to look at the NAMA's validity and dependability. A total of 121 Japanese individuals were enrolled in the study. A test-retest approach and a parallel-test method were used to examine reliability. The main result showed how to estimate the tool's test-retest dependability. All of the test-

retest correlation coefficients ranged from 0.53 to 0.74. The total scores and all sub-scores were significantly associated, and the author concludes that evaluating medication adherence among staff nurses requires high reliability and validity **(24).**

Besides, this study differed from which aimed to provide a systematic evaluation of factors that influence nurses' adherence to patient-safety standards. Findings: Six studies were found that focused on double-checking policies of medicines management, nursing handover between wards, cardiac monitoring and surveillance, and care-associated infection precautions, among other topics. Nurses' adherence to drug administration principles was influenced by patients' participation, healthcare professionals' knowledge and attitudes, and nurse collaboration **(25).**

Moreover, the research conducted by contradicted the current findings. The goal of the study was to see if the nurses followed the national criteria for patient safety when it came to medication administration. The current study's goal was met by employing a descriptive design. In the current investigation, a suitable sample of 48 nurses took part. The study found that nurses mostly followed the standards of eliminating wrong-medication sites, wrong-patient, and wrong-surgical procedures, and promoting effective communication among health-care staff and the nurses at the governorate hospitals in Port Said did not follow all of the national patient safety criteria, according to the report **(26).**

The goal of this study was to analyze nurses' perspectives on the prevalence and reporting of medication administration errors based on their clinical experiences. In all departments of King Khalid Public Governorate Hospital in the Hafer El-Batinat Kingdom of Saudi Arabia, the study used a descriptive cross-sectional survey with a self-report questionnaire. A total of 253 nurses were present. This research identified five reasons why medication administration errors (MAEs) occur, as well as three reasons why MAEs do not report. Nurses believe that just a small number of MAEs are reported. The orthopedic department was more likely than other units to report medication administration problems **(27).**

Identifying the prevalence of medication administration errors in elderly persons, along with medicine administration-related differences from safe practice, and factors linked to these errors (patient acuity, bed occupancy, staffing levels, medication administrators' qualifications, dose calculation skills, hospital level, unit type, and so on). A cross-sectional observational design was used in this research. It

takes place in medical and surgical units at eight different government hospital from February to August 2015. The main consequence was the discovery of 296 medication errors, the majority of which were timing and omission errors. Wrong-dose and wrong-route mistakes were both linked to interruptions and patient acuity. Patient identification or asepsis were the most common causes of medicine administration departures from best practices. A total of sixteen out of fifty dose estimations were erroneous. When it came to calculate parenteral dosages, incorrect answers were most common **(28).**

The goal of this study was to find and explain methods for measuring and describing Nurses' drug administration skills. From 2007 to 2018, papers were found in the CINAHL, PubMed, Scopus, Cochrane, PsycInfo, and Medic databases. There was a total of 727 studies found, with 22 of them being included in this study. Questionnaires or surveys, observation, knowledge tests or exams, focus group interviews, chart reviews, and voluntarily reported errors were all identified as assessment methods. Medication administration skills were divided into nine categories: safe ordering, handling, storing, and discarding, preparation, administration, documentation. Evaluation, assessing medication-related issues, calculation skills, collaboration with other professionals/patients, and reporting of medication data. The findings revealed that many areas need to be improved in order to improve pharmaceutical safety **(29).**

Conclusion:

Based on the results of the present study it was concluded that nurses demonstrated satisfactory competency levels regarding medication administration indicated by good practice demonstration level, medication administration principles, and medication errors. The current satisfactory nurses' scores of medication administration are the main reason for the increase in the importance of high-quality elderly patients' care. Furthermore, there is a statistically significant relationship between the average of nurses' responses to the relevant principles of medicine administration observational checklist (before, during, and after) and the average of nurses' either agree or disagree perceptions to the observational checklist there is 22 items' opinionnaire of the types, stages, and causes of medication administration. While there was no significant statistical difference was found

between the gender, age, and educational level of the studied subjects and their mean responses to the three measured outcomes.

Recommendation

The suggestions were derived from the results of the present research:

1- Developing educational programs and upgrading Nurses infection hand washing, for example, is a good example of controlling guidelines and norms in the medicine management processes.

2- Developing educational programs and upgrading nurses with assessing patient's condition, documentation correctly in medication charts.

3- Increase nurses' awareness regarding medication preparation to be administered (check labels, prepare injections, observed aseptic techniques with needles and syringes, etc.)

4- Designing an efficient medication sheet includes all points that should be check before, during, and after administration.

5- Establishing and unifying policy and procedure books that include medication administration checklist to ensure consistency.

6- To gather the data that is more generalizable about this problem, the study should be replicated on a bigger sample picked from other geographical areas in Egypt.

DISCLOSURES

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