

Nurses' Perception and Performance Regarding Medication Errors in Emergency Room

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Abstract

Background: Medication errors (MEs) are a critical patient safety issue. Nurses are often responsible for administering medication to patients, thus their perceptions and performance regarding medication errors in emergency room can provide valuable guidance for the development of interventions aimed to mitigate errors. **Aim:** The aim of this study was to assess the nurses' perception and performance regarding medication errors in Emergency room. **Design:** A descriptive exploratory research design was utilized in this study. **Setting:** The study was conducted at the Emergency room at El- Fayoum University hospitals. **Subjects:** The study subjects included a convenient sample of all staff nurses (**n=65**) in the Emergency room at El- Fayoum University hospital. **Data collection tools:** 1st tool. Nurses' questionnaire regarding medication administration errors in emergency room, 2nd tool. Nurses' performance observational checklist regarding medication errors in emergency room, 3rd tool. The Modified Gladstone scale (self-administered sheet). **Results:** the current study revealed 78.5% of the studied nurses have an unsatisfactory level of total knowledge regarding medication errors while 72.3% of the studied nurses have incomplete performance regarding medication errors in emergency room and 53.8% of the studied nurses have negative perception regarding medication errors in emergency room **Conclusion:** the current study revealed more than three quarters of the studied nurses had unsatisfactory level of total knowledge regarding medication errors in emergency room and slightly less than three quarters had incomplete performance room. Also, more than half of them had a negative perception. **Recommendations:** Develop training programs for nurses in emergency room to enhance their knowledge and performance regarding medication errors.

Keywords: Nurses' Perception, Performance, Medication Errors, & Emergency Room

Introduction:

Medication errors (MEs) are a critical patient safety issue. Nurses are often responsible for administering medication to patients, thus their perceptions and performance regarding medication errors in emergency room can provide valuable guidance for the development of interventions aimed to mitigate errors. An emergency department is a dedicated area in a hospital that is organized and administered to provide a high standard of emergency care to people in the community who perceive the need for, or are in need of, acute or urgent care including hospital admission (*Schroers et al., 2021*).

An emergency department is designed to provide health services to patients who are

physiologically unstable and need continuous examination and treatment based on the progression of their disease. Naturally a major part of critical care is performed in this department (*Liu et al., 2022*). Definition of emergency room: a hospital room or area staffed and equipped for the reception and treatment of persons requiring immediate medical care (*Javed et al., 2022*).

Medication errors can occur in every hospital worldwide and can lead to unpleasant consequences for patients and patients' families and add to escalating medical costs. According to the *Schroers et al. (2021)*, healthcare costs in the United States total \$3.8 trillion in 2019. Industrialized countries, including the U.S.,

spend more money per person on healthcare than developing countries where the U.S. has the highest per capita globally. A significant amount of healthcare expenses can be attributed to prescribed medication prices (*Tibuakuu, 2019*).

There are a number of different approaches to classifying medication errors. One approach is to base the classification on the stage in the sequence of medication use process, such as prescribing, transcribing, dispensing, administration or monitoring. Another approach is to consider the types of errors occurring, such as wrong medication, dose, frequency, administration route or patient (*Syyrila, 2023*).

Medication Error Risk Factors: High volume, Poor handwriting, Inexperienced staff, Challenging patient populations, Lack of follow-up, Lack of appropriate monitoring, Lack of policy enforcement, medically complex patients, Medications requiring calculations, Environmental factors, Poor communication, Shift work, Workplace culture, Verbal orders, finally Interpersonal factors such as external stress (*Alyami et al., 2022*).

The literature reported different reducing strategies of medication errors that health care providers should apply to practice for improving patient's safety. Topics range from prevention of medication errors in specialty settings to error-prevention strategies for drug naming, labels, and packaging, as well as the use of automation and electronic prescribing to reduce error risk (*Saada, 2021*).

The key to implementing a successful intervention that minimizes medication management errors is understanding how and why it occurs. Since nurses find themselves "the last link in the chain of drug therapy" where the error can reach the patient, they have traditionally been blamed for errors. However, the reality is that the circumstances in which the person responsible for the error, as well as the strategic decisions of the organization with which they work, are often the main determinants of error. Frameworks for the analysis of medical errors have been developed as well as the categories of recording medication

errors that recognize this distinction (*Abdulmutalib & Safwat, 2020*).

Performance means Practice of practical nursing the performance of health care acts that require knowledge, judgment, and skill and must be performed under the supervision of an advanced practice registered nurse, registered nurse, the practice of practical nursing includes, but is not limited to: collecting health care data to assist in planning care of persons; administering and delivering medications and treatments as prescribed by an authorized licensed provider; implementing nursing interventions and tasks; providing basic teaching for health promotion and maintenance (*Yu-Tong et al., 2022*).

Nurses play an influential role in preventing, identifying, and reporting medication error. Despite the medication error, some nurses fail to report the error because of their perceived barrier. Nurse's perception should be changed to prevent medication error by enhancing their knowledge regarding the safe practices of medication administration. Nurses are the line of defense for patient's safety in administering medication, detecting and managing errors during patient care. There is a lack of statistics about the medication error as the committed persons do not report it (*Dirik et al., 2019*).

Numerous hospitals across the world have adopted safety reporting systems (SRS) to document occurrences that may jeopardize patient safety. The system consists of an incident description followed by extensive clinical and patient information. Active learning and better perception regarding health approaches can decrease the rate of unfavorable occurrences, hence eliminating similar errors from occurring in the future. The health care practitioner must understand that drug mistake reporting is not an employer's fault, but rather a systemic failure. When a multidisciplinary approach to healthcare systems is used, errors are rarely the responsibility of a single individual. Despite greater reporting of pharmaceutical mistakes, analysts claim that medication errors remain underreported in practical terms (*Alsaadi, 2021*).

Aim of the Study:

The aim of this study was to assess the nurses' perception and performance regarding medication errors in Emergency room through the following objectives:

1-Assess the nurses' level of knowledge regarding medication errors in Emergency room.

2-Assess the nurses' level of practice regarding medication errors in Emergency room.

3- Assess the nurses' perception regarding medication errors in Emergency room.

Research Questions: -

1.What is the nurses' level of knowledge regarding medication errors in Emergency room?

2.What is the nurses' level of practices regarding medication errors in Emergency room?

3.What is the nurses' perception regarding medication errors in Emergency room?

Material And Methods

Research Design: A descriptive exploratory research design was utilized in this study.

Study setting: The study was conducted at the Emergency room at El- Fayoum University hospitals.

Study Subjects: The study subjects included a convenient sample of all staff nurses (n=65) in the Emergency room at El- Fayoum University hospital.

Tools of Data Collection

Data for this study was collected by using the following three tools.

Tool (1): Nurses' questionnaire regarding medication administration errors in emergency room

This tool was developed by the investigator after reviewing of relevant

literatures (Alandajani et al., 2022; Fathy et al., 2021; Udi, 2021) and included two parts as the following:

Part I: Demographic data of the studied nurses:

This part was used to assess demographic characteristics of the studied nurses including age, gender, educational level, number of years of experience, attending training courses for prevention of medication errors, and working in any of the other departments in the hospital before working in the emergency department).

Part 2: Nurses' knowledge regarding medication errors in emergency room

This part was used to assess nurses' knowledge regarding medication errors in Emergency room, it was composed of 39 questions divided into five parts: knowledge regarding medication (nine items), knowledge during medication preparation (seven items), knowledge during medication administration (12 items), knowledge after medication administration (four items), knowledge regarding complications of medication administration (seven items).

Scoring system:

The total score of this part was 39 grades, the complete correct answer was scored as one point and the incorrect or unanswered was scored as a zero point. These scores were summed and were converted into a percent score. It was classified into 2 categories:

- **Satisfactory knowledge** if score \geq 80%. (32-39 grades)

- **Unsatisfactory knowledge** if score from $<80\%$. (0-31 grades)

Tool (2): Nurses' performance observational checklist regarding medication errors in emergency room

This tool was developed by the investigator based on review of the relevant literature (Fathy et al., 2021; Udi, 2021). It was

used to assess nurses' performance regarding medication errors in Emergency room, it was composed of 84 items divided into five parts: practices regarding general preparation principles (11 items), practices regarding medication administration (17 items), practices regarding administering nebulizer (14 items), practices regarding bolus IV administration (19 items), practices regarding post medication administration (23 items).

Scoring system:

The total score of nurses' performance was 84 grades, each item was evaluated as "Done" was scored one mark and "not done" was scored zero score. These scores were summed up and were converted into a percentage score. It was classified into 2 categories:

- **Adequate practice** if score $\geq 80\%$. (68-84 grades)
- **Inadequate practice** if score from $<80\%$. (0-67 grades)

Tool (3): The Modified Gladstone scale (self-administered sheet)

This tool was adapted from (**Gladstone & Osborne ,1995**) to assess nurses' perception regarding medication errors in emergency room. It was composed of 25 items divided into two parts:

- 1-Nurses perception regarding causes of medication errors (10 items).
- 2-Nurses perception regarding reasons for not reporting medication errors (15 items).

Scoring system:

The total score of nurses' perception were 50 grades, each item was evaluated as "Agree" was taken two score, "uncertain" was taken one score and "disagree" was taken zero score. These scores were summed up and were converted into a percentage score. It was classified into 2 categories:

- Positive perception if score $\geq 80\%$. (40-50 grades)
- Negative perception if score from $<80\%$. (0-39 grades)

Face and Content Validity

Face validity was done based on jury opinions which were elicited regarding the tools' format, layout, and clarity of parts.

Content validity was conducted to determine the appropriateness of each item to be included in the questionnaire sheet. Minor modifications were done based on the jury recommendations.

Pilot Study

A pilot study was conducted on 10% of the study subjects (seven staff nurses). The aim of the pilot study was to determine clarity, applicability of the tools and to estimate the time required for fulfilling the questionnaire sheets. Those participants in the pilot study were included in the main study sample. Based on the pilot study, no modifications were done, and the final version was prepared for distributing to the staff nurses.

Fieldwork

The researcher met the study subject at the emergency department in El- Fayoum University Hospitals, Egypt from the beginning of November 2022 to the end of February 2023. The researcher collected data from Saturday and Tuesday 9:00 am to 12 pm regularly for 2 days a week for data collection. The investigator collected data by himself through meeting the study subjects and explaining the purpose of the study to them in the study settings. The questionnaire sheets were distributed and completed by the study subjects. The investigator was present all the time while filling in the forms to answer any questions .

The total time needed to complete nurses' questionnaire regarding medication errors in the emergency room ranged between (15-20) minutes. The total time needed to complete nurses' perception regarding medication errors in emergency room ranged

between (5-10) minutes. The investigator was available all the time during fulfilling the forms to answer any questions. Also, the researcher checked the completeness of each filled sheet after the study subjects completed it to ensure the absence of any missing data. the researcher distributes the questionnaire for all nurses. Also, the researcher observes nurses' performance without notifying them.

Ethical considerations informal and legal consent

Prior study conduction, the research approval was obtained from the Scientific Research Ethical Committee in Faculty of Nursing, Ain Shams University. In addition, an approval was obtained from the director of El- Fayoum University Hospitals either medical or nursing before starting the study. The researcher was assuring anonymity and confidentiality of the study subject data and informed them about research purposes. All participants were informed about the study aim, process, and they were allowed to choose to participate or not in the study and they have the right to withdraw from the study at any time. Ethics, values, culture, and beliefs were respected.

Statistical analysis

The statistical analysis of data was done by using the computer software of Microsoft Excel Program and Statistical Package for Social Science (SPSS) version 25. Data were presented using descriptive statistics in the form of frequencies and percentage for categorical data, the arithmetic mean (\bar{X}) and standard deviation (SD) for quantitative data. Cronbach's alpha coefficient was used to determine the reliability of the tool. Qualitative variables were compared using chi square test (χ^2), P-value to test association between two variables and Pearson correlation test (R- test) to the correlation between the study variables .

Degrees of significance of results were considered as follows :

-P-value > 0.05 Not significant (NS)

-P-value ≤ 0.05 Significant (S)

- P-value ≤ 0.01 Highly Significant (HS).

Results:

Table 1 shows that, 47.7% of the studied nurses their age ranged between 20-<30 years, the Mean SD of age was 31.2 ± 7.19 years. As regard to gender, 69.2% of them were female. Also, 64.6% of the studied nurses have nursing technical institute. Moreover, 61.5% of them have < 5 years of experience, the Mean SD of years of experience was 5.14 ± 4.91 years. Moreover, 4.6% of them attend training courses for prevention of medication errors, 100.0% of them attend training courses about nursing role for prevention of medication errors. In addition, 15.4% of them work in other departments in the hospital before working in the emergency department, 40.0% of them work in department of internal medicine.

Figure 1 illustrates that, 78.5% of the studied nurses have unsatisfactory level of total knowledge regarding medication errors in emergency room. While 21.5% of them have satisfactory level of total knowledge.

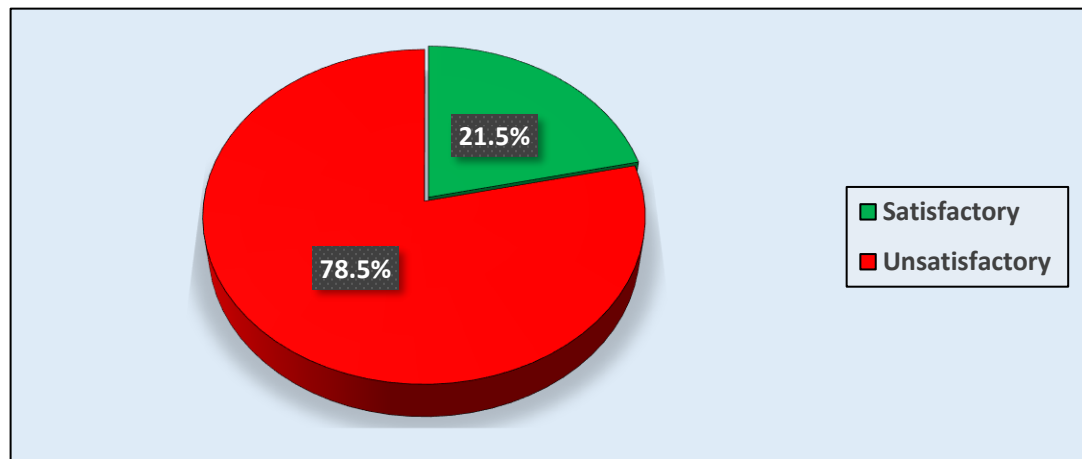
Figure 2 displays that, 72.3% of the studied nurses have incomplete performance regarding medication errors in emergency room. While 27.7% of them have complete level of total practice.

Figure 2 reveals that, 53.8% of the studied nurses have negative perception regarding medication errors in emergency room. While 46.2% of them have positive perception.

Table 2 indicates that, there was highly significant positive correlation between total knowledge score and total performance score and total perception regarding medication errors in emergency room among the studied nurses at ($P < 0.01$).

Table (1): Frequency distribution of the studied nurses according to their demographic data (n=65).

Items	No.	%
Age (year)		
20-<30	31	47.7
30-<40	25	38.5
≥ 40	9	13.8
Mean SD	31.2 ± 7.19	
Gender		
Male	20	30.8
Female	45	69.2
Educational level		
Nursing Diploma	23	35.4
Nursing Technical Institute	42	64.6
Bachelor of Nursing	0	0.0
Number of years of experience		
< 5	40	61.5
5- 10	20	30.8
> 10	5	7.7
Mean SD	5.14 ± 4.91	
Attending training courses for prevention of medication errors		
Yes	3	4.6
No	62	95.4
Working in any of the other departments in the hospital before working in the emergency department?		
Yes	10	15.4
No	55	84.6
If yes, what is the department? (n=10)		
Cardiac care unit	1	10.0
Department of Urology	2	20.0
Orthopedic department	2	20.0
Operations department	1	10.0
Department of Internal Medicine	4	40.0

**Figure (1)** Percentage distribution of the studied nurses according to their total knowledge regarding medication errors in emergency room (n=65).

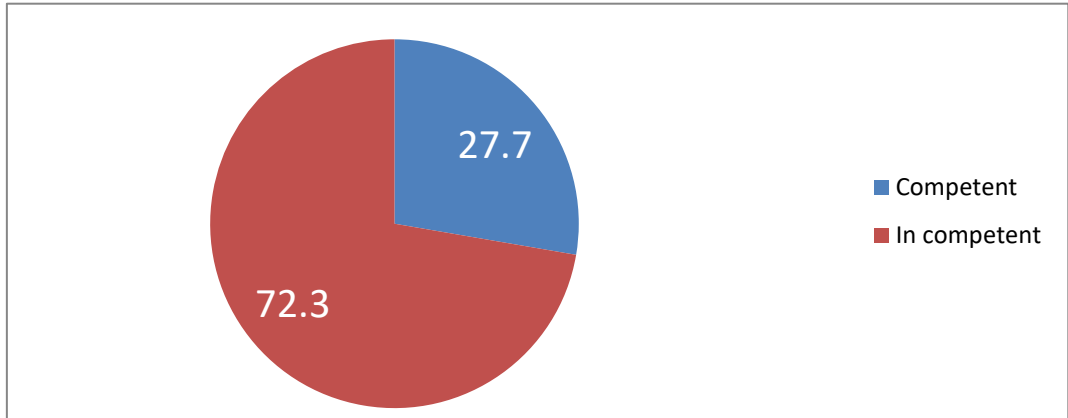


Figure 2: Percentage distribution of the studied nurses according to their total performance regarding medication errors in emergency room (n=65).

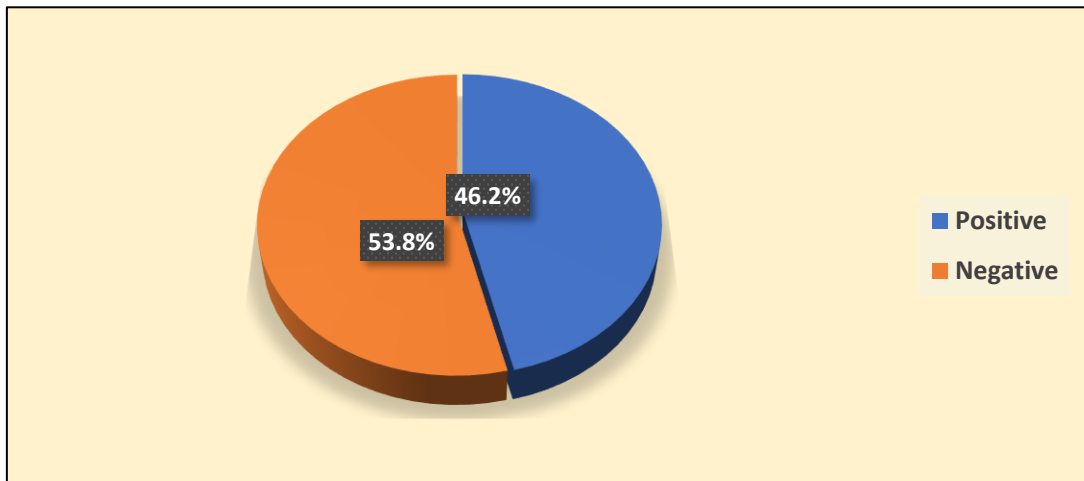


Figure (3): Percentage distribution of the studied nurses according to their total perception regarding medication errors in emergency room (n=65).

Table (2): Correlation between total knowledge score and total performance score and total perception regarding medication errors in emergency room among the studied nurses (n=65).

Items	Total knowledge		Total performance	
	r	P-Value	r	P-Value
Total performance	0.831	0.000**		
Total perception	0.654	0.000**	0.938	0.000**

r= correlation coefficient test.

Correlation is significant at the 0.01 level (2-tailed).

Discussion:

Medication errors are defined as the failure to properly implement physicians' orders and can occur at any stage of the medication use process, including administration, preparation, dispensing, application, or distribution. The administration of medication is one of the most important and complicated processes of nursing care that requires adequate knowledge and proper performance on the part of the nurses (*Alhusein et al., 2021*). The current study aimed to assess the nurses' perception and performance regarding medication errors in Emergency room.

The findings presented in **Figure 1** indicate that a majority of the studied nurses have an unsatisfactory level of knowledge regarding medication errors in the emergency room. This is a concerning issue as medication errors can have serious consequences, including patient harm and increased healthcare costs. Several studies have highlighted the need for improving medication safety in the emergency department and enhancing the knowledge and skills of healthcare professionals in this setting (*Naguib et al., 2020; Patanwala et al., 2018*).

One potential solution to address this knowledge gap is through targeted educational interventions. A study by *Ismail et al. (2020)* found significant improvements in nurses' knowledge and practice regarding medication administration. Additionally, incorporating technology-based solutions such as clinical decision support systems and barcode medication administration systems has also been shown to reduce medication errors in the emergency department (*Sheu et al., 2019*).

Mekonnen et al., (2020) investigated nurses' knowledge regarding medication administration and have reported similar findings to this study. Also, a study conducted in Ethiopia showed that only 52.2% of the nurses had good knowledge regarding medication administration. *Kaya et al. (2021)* found improving in the knowledge and attitudes of nurses towards medication safety. Another study by *Al-Ruthia et al. (2020)* found that incorporating medication safety practices into nursing education curricula improved nursing students' knowledge and attitudes towards medication safety. Moreover, a study conducted

in Saudi Arabia reported that 43.8% of the nurses had inadequate knowledge regarding medication administration (*Al-Jumaili et al., 2021*). These findings suggest that there is a need to develop strategies to improve nurses' knowledge and skills in medication administration.

Medication errors are a significant concern in healthcare, as they can cause harm to patients and lead to negative outcomes. A study conducted in Saudi Arabia found that only 36.5% of nurses had good knowledge of medication administration, and 72.3% reported that they had experienced medication errors in the emergency room setting (*Aljedai et al., 2018*). Similarly, a study in Iran reported that only 35% of nurses had good knowledge of medication errors and their reporting procedures (*Reisi et al., 2017*).

To address these knowledge gaps, various interventions have been proposed and implemented, including educational programs, simulation-based training, and the use of technology to support medication management (*Zainal et al., 2020; Vaidya et al., 2018; Agyekum et al., 2017*). These interventions have been shown to improve nurses' knowledge and skills related to medication administration and management of medication errors.

The findings in the current study in **Figure 2** provide the majority of the nurses, 72.3%, have an incomplete level of performance, which suggests the need for further training and education to improve patient safety and reduce medication errors. *Alswayyed et al. (2021)* found medication errors occur in approximately 7% of all hospital admissions, with 1 in 5 of those errors resulting in harm to the patient.

These findings are consistent with previous studies that have reported high rates of medication errors in emergency departments (EDs) worldwide (*Chuengkriankrai, 2019; Daliri et al., 2018; Raju et al., 2021*). Inadequate performance regarding medication administration is particularly concerning, as medication administration errors are a major cause of patient harm and mortality in EDs (*Leape et al., 2019*). One possible explanation for the high rate of medication errors in emergency departments is the fast-paced and high-stress nature of emergency care, which can

lead to lapses in concentration and errors in medication administration (*Daliri et al., 2018*).

Furthermore, *Belleli et al. (2021)*; *Raju et al. (2021)* highlights the importance of developing strategies to reduce medication errors in the ED, such as implementing computerized physician order entry systems, barcode medication administration systems, and other technological solutions that can improve medication safety. Medication errors are a significant concern in healthcare, and their prevention is critical to ensuring patient safety and quality of care.

The findings from **Figure 3** highlight that a significant proportion of the studied nurses have a negative perception regarding medication errors in the emergency room. Negative perceptions may have an impact on the reporting and handling of medication errors. Therefore, it is essential to address the root causes of these negative perceptions to promote a positive culture of medication safety in healthcare settings. Previous studies have also reported negative perceptions regarding medication errors among healthcare professionals. a study by *Gholami et al. (2021)* found that nurses in Iran had negative perceptions regarding medication errors, which were associated with a lack of trust in the healthcare system, fear of punishment, and the belief that medication errors are inevitable.

Similarly, a study by *Smith et al. (2020)* reported negative perceptions among healthcare professionals in the UK, including fear of blame, lack of organizational support, and poor communication. To address these negative perceptions, healthcare organizations can implement strategies such as open communication, non-punitive reporting systems, and ongoing education and training on medication safety (*Abdulraheem et al., 2021*; *Smith et al., 2020*). Additionally, promoting a culture of safety, where healthcare professionals are encouraged to report errors and near misses, can also help to improve perceptions and ultimately reduce medication errors in healthcare settings (*Nuckols et al., 2021*).

The findings of **Table 2** highlight the importance of nurses' knowledge on medication errors and its potential impact on their performance and perception. This is consistent with previous research that has shown a positive correlation between nurses' knowledge of

medication errors and their ability to prevent and manage such errors (*Lada et al., 2019*). These findings are consistent with previous research that has shown a positive correlation between knowledge and performance in medication error prevention among nurses (*Alhawassi et al., 2020*; *Chalak et al., 2019*). In addition, several studies have shown that training programs that enhance nurses' knowledge of medication errors can lead to improved performance in medication error prevention (*Ahmed et al., 2020*).

Furthermore, the significant positive correlation between knowledge, performance, and perception underscores the importance of ongoing education and training programs for nurses in order to enhance their knowledge, skills, and abilities to identify and prevent medication errors. A systematic review by *Koohestani et al. (2018)* found that education and training programs significantly improved nurses' knowledge and performance in medication management, resulting in reduced medication errors.

Conclusion:

The current study aimed to assess nurses' perception and performance regarding medication errors in emergency room and found that more than three quarters of the studied nurses had unsatisfactory level of total knowledge regarding medication errors in emergency room. Accordingly, slightly less than three quarters of the studied nurses had incomplete performance regarding medication errors in emergency room. Also, more than half of the studied nurses had negative perception regarding medication errors in emergency room. The current study indicated that, there was highly significant positive correlation between total knowledge score and total performance score and total perception regarding medication errors in emergency room among the studied nurses at ($P = < 0.01$).

Recommendations:

Based on the study findings, the following recommendations were suggested in order to promote nurses' perception and performance regarding medication errors in emergency rooms.

1. Develop training programs for nurses in emergency rooms to enhance their knowledge and performance regarding medication errors.

2. Implement training programs that focus on identifying and preventing medication errors, as well as on proper medication administration techniques.

3. Encourage a positive culture towards reporting medication errors in emergency rooms by providing feedback to nurses who report medication errors, and by emphasizing the importance of reporting errors for patient safety.

4. Provide nurses with adequate resources and support to help them perform their duties effectively.

5. Ensure that there are enough staff members to handle the workload, provide access to up-to-date medication information, and create a supportive work environment.

6. Conduct regular evaluations of nurses' knowledge, performance, and perception regarding medication errors in emergency rooms to monitor progress and identify areas for improvement.

7. Collaborate with other healthcare professionals, such as pharmacists and physicians, to develop and implement strategies for preventing medication errors in emergency rooms.

8. Develop standardized procedures for medication administration, improve communication and collaborate among healthcare professionals, and using technology to enhance medication safety.

Further studies

1. Explore the effectiveness of training program for preventing medication errors in emergency rooms.

2. Investigate the impact of training program regarding technology-based interventions on medication safety.

3. Examine the impact of medication errors on patient outcomes emergency rooms in.

4. Examine the relationship between nurse-to-patient ratios and workload and medication errors.

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