Barriers to Reporting Medication Administration Errors as Perceived by Nurses Working at Mansoura University Hospital: A Cross-Sectional Study

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Abstract

Background: Medication errors are one of the top ten preventable causes of harm in health care settings.They pose a serious threat to patient safety and have the potential to cause serious injury or even death. Despite the fact that early medication errors detection and proper reporting are the first steps in preventing similar ones in the future, the vast majority of errors are not reported. **Aim:** To investigate barriers to reporting medication administration errors as perceived by nurses working at mansoura university hospital. **Research design:** A cross-sectional descriptive research design was utilized. **Setting:** The study was carried out at the inpatient departments affiliated to Mansoura University Hospital in Egypt. **Study subjects:** A convenience sample of 134 nurses were selected to achieve the aim of the present study. **Tools:** The data relevant to the study were collected using two tools: nurses'socio-demographic characteristics, and work-related data, and medication administration errors reporting questionnaire. **Results:** The estimated medication administration error reporting rate was found to be 20%. The most common causes of medication administration errors were nurse staffing (3.5±1.4) and physician communication (3.4 ±1.4). Moreover, the most important barriers to reporting the errors were administrative responses (3.9 ± 1.5) and fear of reporting errors (3.7± 1.6). **Conclusion:** The current study concluded that 80% of medication administration errors were not reported. Moreover, the common causes of MAE were factors related to nurse staffing and physician communication. Furthermore, the two significant barriers preventing nurses from reporting medication-related errors were administrative response and fear. **Recommendation:** Healthcare institutions should create a system that incorporates incident reports and a safe work environment free from punishment and blaming to raise the rate of medication error reporting.

Keywords: Medication Administration Errors, Barriers to Errors Reporting, Nurses Perceptions**.**
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Introduction

Patient safety is a worldwide health concern that includes a variety of medical care procedures, such as the prevention of harmful events and the safe use of surgical techniques and medication practices.Unsafe medication practices are a significant patient safety challenge**.** The overwhelming persistent risk of medication errors (MEs) is presented in World Health Organization (WHO) report, which estimates that adverse events arising from MEs are one of the ten leading causes of avoidable harm in health-care settings worldwide. Globally, millions of patients suffer injuries, disabilities, and deaths due to unsafe and poor-quality health care **(WHO, 2020; WHO,2017)**.

The Food and Drug Administration (FDA) receives more than 100,000 reports each year associated with suspected MEs, with an estimated death rate of 7,000–9,000 and a global cost of 42 billion US dollars annually in the United States **(FDA, 2019).** The nature and burden of medication-related harm vary between high- and low-income countries. In developed countries, WHO estimated that patients living in low income countries suffer twice as much from medication-related harm and disability than those who do not, approximately one in every ten patients suffers harm while receiving care. Due to the lack of an accurate national reporting system, it is difficult to obtain precise MEs statistics and associated harm in Egypt. However, the study carried out in Egypt at Benha University Hospital found that medication errors account for 10.5% of total medical errors **(WHO, 2020; Shehata, Sabri, & Elmelegy, 2016)**.

The National Coordinating Council for Medication Errors Reporting and Prevention (NCC-MERP) defines medication administration

errors (MAEs) as "any avoidable incident that leads to improper medication usage or patient harm". MAEs arise when weak medication systems, professional practice, and human factors such as fatigue, poor environmental conditions, or staff shortages affect prescribing, dispensing, product labeling, packaging, nomenclature, administration, communication, education, and monitoring processes. Additionally, the current COVID-19 epidemic has greatly increased the risk of MAEs and associated injury because of workload pressure and unfamiliar brand-new drugs (**WHO, 2020; Al-Worafi, 2020)**.

The nursing staff is one of the primary care providers who are directly involved in the preparation and administration of the majority of the drugs prescribed in hospitals not only for adult patients but also for children and women in general and intensive care units. Nurses play a front-line role in medication administration, they can be sources, contributors, or observers of MAEs, therefore, they have a professional, legal, and ethical responsibility to identify and report errors. However, recent studies reported that nurses are one of the main contributors to MAEs, making two-thirds of the errors and failing to report 60% of them (**Afaya, Konlan, &Kim Do, 2020; Nourian, Babaie, Heidary, & Nasiri, 2020; Liu, et al., 2018; Ferrah, Lovell,& Ibrahim, 2017; Albukhodaah,2016)**.

In the Middle-Eastern countries, including Egypt, a systematic review study evaluating medication errors (MEs) found that the common causes of MAEs among nurses were lack of knowledge regarding prescribing skills and pharmacological treatment, poor adherence to drug prescribing and administration guidelines, confusion over medications with similar names, a high workload, new untrained staff, unclear instructions or use of abbreviations, and miscommunications between health-care providers (**Thomas, et al. 2019**).

The serious burden of MAEs extends beyond financial cost; patients suffer physical and psychological suffering, which has a significant negative impact on patient satisfaction and decrease trust in the healthcare system. Consequently, the prevention of MAEs is a high priority and the first step in the prevention process is detecting and reporting errors. Early reporting will enhance root cause analysis, provide concrete solutions that promote the internal development of the health care system, and improve patient safety by eradicating harmful consequences hat might have an adverse impact on a patient's health and life (**Al-Worafi, 2020**; **Wondmieneh, Alemu, Tadele,& Demis, 2020; Ni, Lingren, Hall, Leonard, Melton& Kirkendall, 2018**).

In this context, the WHO's third global patient safety challenge, entitled "Medication Without Harm," aimed to achieve a global commitment to preventive strategies to prevent medication-related harm associated with unsafe medication practices by 50% over a five-year period. To achieve this goal, a universal investigation of barriers to reporting MEs is urgent **(WHO, 2017)**.

Although many studies have been conducted to identify the factors that influence nurses' decisions to report medication errors, there is a need to identify these factors from the perspectives of different nurses around the world for two reasons: the first is to promote and support research in this area as part of patient safety research, and the second is to serve as representatives to help researchers explore solutions, design guidelines, and develop targeted programs that eliminate MAEs and reporting barriers. Given the importance of this vital health concern, it seems imperative to investigate barriers to reporting medication administration errors as perceived by nurses working at mansoura university hospital.

Significance of the study:

Despite the best efforts of international healthcare organizations to prevent MAEs, medication errors still happen and harm patients. Clinical observation showed that MAEs are quite prevalent in the hospital setting and that the nurses face several barriers to reporting errors. MEs have been investigated in several studies that have so far been carried out in Egypt. However, the issues addressed are limited to the rate of error and nurses' knowledge of these errors. **(Nasr Abd El Aziz, Ahmed, & Abolwafa, 2020; Elsayed, Abusaad, & Hashem, 2020; Abd Elmageed, Soliman, & Abdelhamid, 2020; Doaa, Neveen & Sameh, 2017).**

Consequently, little is known regarding barriers that interfere with reporting medication errors (MEs) from the nurses' perspectives. In response to the global call for action endorsed

by the WHO, "Medication Without Harm," the current study investigates the barriers to reporting medication administration errors among nurses.

Aim of the study:

The study aimed to investigate barriers to reporting medication administration errors as perceived by nurses working at mansoura university hospital.

Research questions:

- What barriers to reporting medication administration errors do nurses perceive?
- Is fear the most significant barrier to reporting errors?
- Do barriers to reporting errors differ significantly according to nurses working unit?

Research variable:

- The dependent variable of this study was "Reporting of medication administration error"
- The independent variable was "Barriers" that interfere with error reporting.

Operational definitions:

- Medication administration errors: Any preventable event that occurs accidentally when a medicine is administered, or prepared for administration and that has the potential to cause or contribute to improper medication usage or patient harm or threaten patients live.
- Barriers to error reporting: Any situation or obstacle that makes it difficult for nursing personnel to act appropriately and be reluctant to disclose and report an error.

Subjects and Methods:

Study design:

A descriptive cross-sectional research design was operated to conduct the study.

Settings of the study:

The study was carried out on nurses working in inpatient departments such a medical, surgical, urology, neurology, orthopedic, and burns units affiliated to Mansoura Main University Hospital (MUH).

Subjects:

A convenience sample of 134 nurses working at MUH was recruited for participation in the current study. The study participants were selected from the above-mentioned setting according to the following:

Nurses' inclusion criteria: The registered nurses (RNs) from both genders with different educational levels, provide direct patient care, had been employed for more than one year, and are willing to participate in this study.

Nurses' Exclusion criteria: All the managers, supervisors, and head nurses were excluded from this study.

Tools for data collection:

The instruments for data collection included two tools, nurses' socio-demographic characteristics and work related data, and a medication administration errors reporting questionnaire.

Tool I: Nurses' Socio-Demographic Characteristics and Work- related Data

This tool was developed by the researcher based on the review of recent relevant literatures (**Alamrani, 2020; Nourian, Babaie, Heidary, & Nasiri, 2020)** to collect the following data; age, gender, marital status, qualification, years of experience, and working unit.

Tool II: Medication Administration Errors Reporting Questionnaire

This self-administered questionnaire was adopted from **(Wakefield, Uden-Holman& Wakefield, 2005)**. This scale is consistently and widely used to examine causes and barriers to reporting medication errors. This questionnaire consisted of (53) questions covering three well-defined areas as follows:

Part A: Causes of medication administration errors

This part consists of 18 items with four subscales regarding nurses' perception of causes of MAEs such as medication packaging (n=3), physician communication (n=6), nurse staffing (n=4), pharmacy processes (n=3), transcription-related (n=2).

Part B: Barriers to reporting medication administration errors

This part consists of 15 items with four subscales covering nurses' perception of barriers of MAEs such as disagree with error definition (n=4), reporting effort (n=2), Fear to report the error (n=5), and an administrative response (n=4).

Part C: Percentage of medication errors actually reported.

This part consists of 20 items regarding the percentage of MAEs actually reported; 9 items for non-IV medication and 11 items for IV medication.

Scoring system

For the first two parts, participants' agreement with each item was rated on a six-point Likert-type scale from 1 (strongly disagree) to 6 (strongly agree). Subscale values are calculated by adding the value of each item and dividing by the number of items in the subscale (calculating the standard mean; total item scores divided by the number of items in each sub-scale). According to the nurse, a score closer to six in each item and sub-scale indicates a greater effect of that factor in obstructing error reporting.

In the third section, participants were given a ten-point rating scale and asked to estimate the percentage of errors that actually reported when administering IV and non-IV-related medications. Each point on the scale corresponds to a range of MAEs percentage being reported (category 1 = 1 to 20%). The estimated percent of errors reported was represented by the frequencies for each percent increment.

Validity and reliability

Content validity was tested by a panel of five experts in the fields of medical-surgical nursing, critical care nursing, and medical biostatistics. The experts revised the tools for clarity, relevancy, comprehensiveness, simplicity, and applicability. Tools evaluation was firstly done independently, and then items with debates were discussed in detail until having consensus. All suggested modifications were done to improve the questionnaire validity till the final format used in the current study was obtained. The reliability of the proposed study tools was tested by Cronbach's Coefficient Alpha to measure the internal consistency of tool I ($\alpha = 85$) and tool II ($\alpha = 0.73$) based on Kuder Richardson 21 co-efficient for categorical data which reflects that the tools are reliable **(Charter, 2007)**.

Pilot study

A pilot study was carried out before starting data collection on 10% of the studied nurses who were excluded from the study to evaluate the tools' clarity, feasibility, and applicability and estimate the time needed to fill them out. Based on the result of the pilot study, the required refinement and necessary modifications were done prior to data collection.

Ethical Considerations:

- Official permission was obtained before conducting the current study from the Mansoura University Hospital administrator after explaining the nature and purpose of the study.
- Ethics approval, the study procedure was reviewed and approved by the Ethical Committee of the Faculty of Nursing, Mansoura University.
- Informed consent was attained from the nurses who accepted to participate in the study after clarifying the aim of the study. The researcher emphasized that participation in the study was voluntary and they have the right to withdraw from the present study at any time during the research process.
- Privacy and data confidentiality were absolutely ascertained to all studied nurses.

Fieldwork& Data collection:

Data collection covered 3 months, starting from the beginning of January 2020 until the end of Marsh 2020. Fieldwork is accomplished through the following phases.

1. Preparatory/ development phase:

This phase includes the development of the study tools. After an extensive review of recent literature, the researcher was acquainted with the actual dimension and magnitude of the problem. Consequently, the researcher designed tools for data collection; tool I was developed by the examiner to assess nurses' socio-demographic characteristics and work related data, and tool II was adopted by the researcher to evaluate nurses' perceptions regarding barriers to

reporting medication administration errors. The final English version of the tool was translated into Arabic then back to english (back translation) and tested for content validity and reliability. Following that, the final Arabic version of the tool was ready for data collection.

2. Evaluation phase:

Once the permission to carry out the current study was obtained, the researcher was presented in the nurses' working area and provide the necessary explanations regarding the research objectives and potential benefits of the current study to the nurses. The researcher confirmed the confidentiality of data that will be collected to be used only for scientific research. The nurses who agree to participate in the study have been interviewed by the researchers to collect the necessary data pertinent to the study after obtaining written approval from each participating nurse. Subsequently, the questionnaires were given once to the participants, and they were requested to complete them.The time taken to fill out each questionnaire by the participated nurses was around 20-30 minutes. Afterward, the obtained data from 134 completed questionnaires were analyzed to assess nurses' perceptions regarding barriers to reporting MAEs.

Statistical analysis:

After data were collected, it was modified, coded, and entered into statistical software IBM SPSS version 22 (**SPSS, Inc. Chicago, IL**). All statistical analysis was done using two-tailed tests. P value less than 0.05 was considered to be statistically significant. Descriptive analysis based on mean with standard deviation for medication errors and all scale variables. Frequency and percent distribution was done for all variables including demographic data, causes of a medication error, barriers of medication administration errors reporting, and types of errors reported with its percentage. Cross tabulation was used to compare and test for association and distribution of barriers to reporting errors and their causes by nurses' work unit (**Statistics, 2013**).

Results

Table (1): Illustrates the percentage distribution of socio-demographic characteristics and work-related data among the participating nurses. As shown, the high percent of the respondents were younger than 40 years old, female and married (65.7%, 90.3% and 82.1%, respectively). Regarding nurses' work-related characteristics, nearly three-quarters of the participants (74.7%, and 74.6%, respectively) were highly educated (baccalaureate or higher) and had work experience from 6-10 years.

Figure (1): Reveals percentage distribution of the studied nurses according to their working area. It can be seen that more than two-thirds of the study participant (27.6%, 22.4%, and 20.9%) were recruited from medical, neurological, and surgical units, respectively.

Table (2): Displays the total mean and standard deviation scores of items and main subscales of causes of medication administration errors among the studied nurses. This table provides evidence that nurse staffing (3.5±1.4) and physician communication (3.4 ±1.4) were the common causes of MAEs. It is noteworthy that, nearly two-thirds of the studied nurses (62.7%) reported their agreement that the most common cause contributing to MAEs concerning nurse staffing was inadequate unit staffing level (3.9±1.8). Furthermore, more than half of the nurses (58.2%) agree that illegible physicians' medication orders (3.6±1.8) were a predictor of MAEs in physician communication.

Table (3): Shows an estimated percentage of medication administration errors actually reported by nurses in their working units. It was found that the estimated MAEs actually reported was found to be 20%. The observed rates of MAEs reported for intravenous medications (IV) were ranged from 1 to 19% and from 4 to 20 % for non intravenous (non-IV) medications. The highest prevalent errors in IV medication included drugs administered to the wrong patient, medication given, but not ordered by the doctor, the wrong choice of fluid, and the wrong method of administration (66.4%, 65.7%, 61.9%, and 61.2%), respectively. Furthermore, the most common types of errors in non-IV medications included medication given but not ordered by the

doctor, wrong drug, wrong patient, and wrong dose (69.4%, 67.9%, 67.9%, and 66.4%), respectively.

Figure (2): Illustrates the total mean and standard deviation of the subscale scores of barriers to reporting MAEs among the studied nurses. This figure confirms that the major barriers to error reporting were administrative responses and fear, with total mean scores of (3.9 ± 1.5) and (3.7± 1.6), respectively. It is worth noting that, disagreeing with the error definition (3.1±1.5) was the lowest barrier to reporting errors from nurses' point of view.

Table (4): Shows the total mean and standard deviation scores of subscales' items of barriers to reporting MAEs among the studied nurses. It was noticed that the most important barriers in reporting MAEs concerning the administrative response subscale were "too much emphasis placed on medication errors as a measure of the quality of nursing care provided" and "when medication errors occur, nursing administration focuses on the individual rather than looking at the systems as a potential cause of the error" with mean scores of (4.2±1.7) and (4.2±1.8), respectively. Moreover, the most common cause of not reporting errors in the fear subscale was "nurses could be blamed if something happens to the patient as a result of the medication error" and that "the patient or family might develop a negative attitude toward the nurse, or may sue or take legal action against a nurse if an error is reported", with mean scores of (4.0 ±1.8) and (3.8 ±1.9), respectively.

Table (5): Compares the studied nurses' perception regarding causes and barriers to reporting MAEs by their working units. There were no significant differences between the studied nurses' perceptions regarding causes of MAEs according to their working units ($p > 0.05$), except for "medication packaging" and "documentation/ transcription have significantly differed among nurses ($p=0.049^*$). In addition, fear was the only barrier to reporting MAEs that did not significantly differ among nurses regardless of their working units ($p > 0.05$).

Table (1): Percentage distribution of nurses according to socio-demographic characteristics (N=134).

Socio-demographic data	N	%
Age in years		
< 40 years	88	65.7%
≥ 40 years	46	34.3%
Gender		
Male	13	9.7%
Female	121	90.3%
Marital status		
Single	19	14.2%
Married	110	82.1%
Widow	5	3.7%
Educational level		
Diploma degree	34	25.4%
Bachelor degree	50	37.3%
Master degree	40	29.9%
PhD. Degree	10	7.5%
years of experience:		
1-5 years	6	4.5%
6-10 years	28	74.6%
> 10 years	100	20.9%

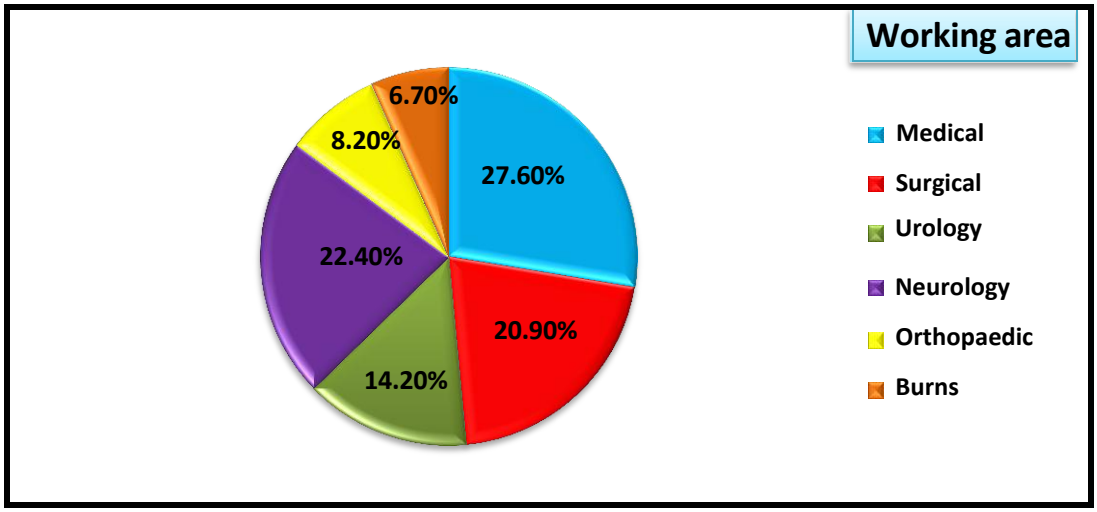


Figure (1): Percentage distribution of the studied nurses according to the working area (n = 134).

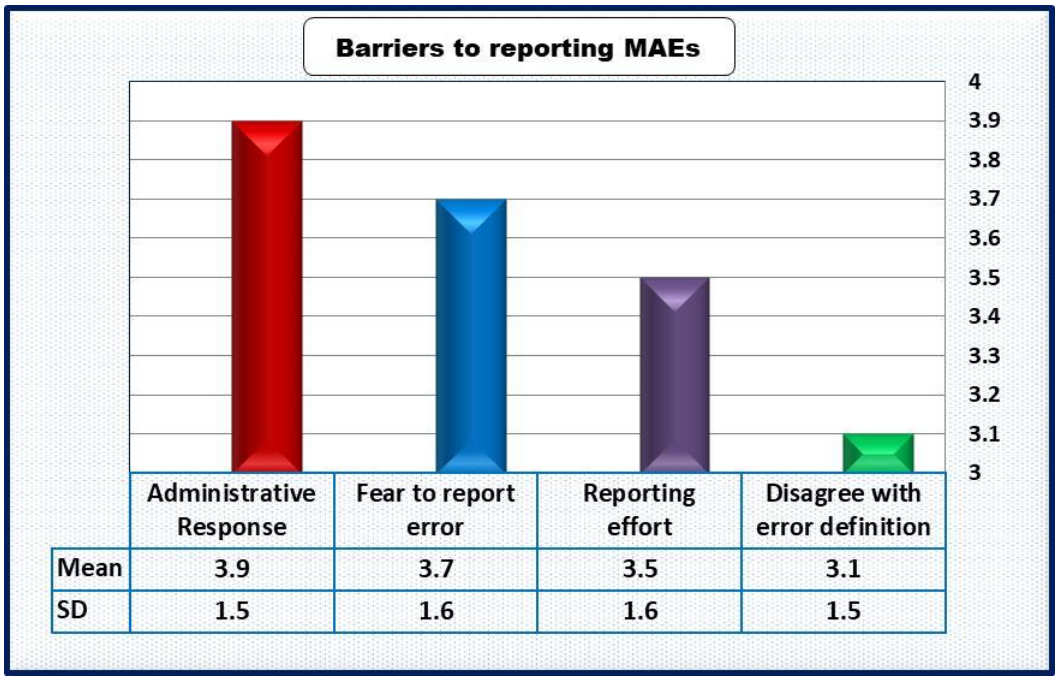
Table (2): Total mean and standard deviation scores of items and main subscales of causes of medication administration errors among the studied nurses (N=134).

Subscales	Items	Agreement		Item Mean ± SD	Domain Mean ± SD
		N	%		
Medication Packaging	The names of many medications are similar.	70	52.2%	3.4 (1.8)	(3.4 ±1.6)
	Different medications look alike.	74	55.2%	3.5 (1.7)	
	The packaging of many medications is similar.	73	54.5%	3.5 (1.7)	
Physician Communication	Physicians' medication orders are not legible.	78	58.2%	3.6 (1.8)	(3.4 ±1.4)
	Physicians' medication orders are not clear.	74	55.2%	3.5 (1.7)	
	Physicians change orders frequently.	69	51.5%	3.4 (1.6)	
	Abbreviations are used instead of writing the orders out completely.	69	51.5%	3.4 (1.8)	
	Verbal orders are used instead of written orders.	64	47.8%	3.3 (1.7)	
	Poor communication between nurses and physicians.	68	50.7%	3.3 (1.6)	
Nurse staffing	Nurses get pulled between teams and from other units.	60	44.8%	3.5 (1.2)	(3.5 ±1.4)
	Nurses are interrupted while administering medications to perform other duties.	61	45.5%	3.0 (1.6)	
	Unit staffing levels are inadequate.	84	62.7%	3.9 (1.8)	
	All medications for one team of patients cannot be passed within an accepted time frame.	83	61.9%	3.8 (1.7)	
Pharmacy processes	Pharmacy delivers incorrect doses to this unit.	56	41.8%	2.9 (1.7)	(3.0 ±2.0)
	Pharmacy does not prepare the medication correctly.	48	35.8%	2.8 (1.6)	
	Pharmacy does not label the medication correctly.	52	38.8%	3.1 (1.9)	
Documentation	Medication orders are not transcribed to the Kardex correctly.	58	43.3%	3.1 (1.7)	(3.0±1.6)
	Errors are made in the Medication Kardex.	52	38.8%	3.0 (1.7)	

Table (3): Estimated percentage of errors actually reported by nurses in their working units regarding intravenous (IV) and non-intravenous (non-IV) medications.

Type of medication Errors	Estimated percentage of errors reported											
Intravenous (IV) errors	**0-20%**	**21-30%**	**31-40%**	**41-50%**	**51-60%**	**61-70%**	**71-80%**	**81-90%**	**91-99%**	**100%**	**Average**	**Rank**
1- Wrong method of administration.	61.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.16	6
2- Wrong time of administration.	45.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.49	1
3- Wrong patient.	66.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.84	19
4- Wrong Dose.	56.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.07	9
5- Wrong drug.	59.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.04	11
6- Medication is omitted.	54.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.11	8
7- Medication is given, but not ordered by doctor	65.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.92	15
8- Medication administered after the order discontinued.	56.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.28	3
9- Given to patient with a known allergy.	58.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.35	2
10- Wrong choice of fluid.	61.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.03	12
11- Wrong infusion rate.	57.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.20	5
Non-intravenous (NIV) errors												
1- Wrong route.	62.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.04	10
2- Wrong time.	58.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.16	7
3- Wrong patient.	67.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.88	17
4- Wrong Dose.	66.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.90	16
5- Wrong drug.	67.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.86	18
6- Medication is omitted.	65.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.97	13
7- Medication is given, but not ordered by doctor.	69.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.80	20
8- Medication administered after the order discontinued.	65.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.96	14
9- Given to patient with a known allergy.	63.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.17	4

Data are expressed as frequency (percentage).



Figure(2): Total mean and standard deviation scores of main subscales of barriers to reporting medication administration errors among the studied nurses(N=134).

Table (4): Total mean and standard deviation scores of subscales' items of the barriers to reporting medication administration errors among the studied nurses (N=134).

Subscales	Item	Agreement		Item mean (SD)	Domain mean (SD)
		N	%		
Disagree with error definition	Nurses do not agree with hospital's definition of a medication error.	48	35.8%	2.9 (1.7)	(3.1±1.5)
	Nurses do not recognize an error occurred.	64	47.8%	3.2 (1.8)	
	Medication error is not clearly defined.	68	50.7%	3.4 (1.6)	
	Nurses may not think the error is important enough to be reported.	57	42.5%	3.1 (1.7)	
Reporting effort	Filling out an incident report for a medication error takes too much time.	64	47.8%	3.4 (1.8)	(3.5±1.6)
	Contacting the physician about a medication error takes too much time.	78	58.2%	3.6 (1.6)	
Fear to report error	Nurses believe that other nurses will think they are incompetent if they make medication errors.	64	47.8%	3.4 (1.9)	(3.7±1.6)
	The patient or family might develop a negative attitude toward the nurse, or may sue the nurse if a medication error is reported.	78	58.2%	3.8 (1.9)	
	Nurses are afraid the physician will reprimand them for the medication error.	76	56.7%	3.7 (1.9)	
	Nurses fear adverse consequences from reporting medication errors.	71	53.0%	3.5 (2.0)	
	Nurses could be blamed if something happens to the patient as a result of the medication error.	86	64.2%	4.0 (1.8)	
Administrative Response	The response by nursing administration does not match the severity of the error.	69	51.5%	3.5 (1.8)	(3.9±1.5)
	Too much emphasis is placed on medication errors as a measure of the quality of nursing care provided.	95	70.9%	4.2 (1.7)	
	No positive feedback is given for passing medications correctly.	77	57.5%	3.8 (1.9)	
	When medication errors occur, nursing administration focuses on the individual rather than looking at the systems as a potential cause of error.	91	67.9%	4.2 (1.8)	

Table (5): Comparison between the studied nurses perception regarding causes and barriers to reporting MAEs by their working unit.

Factor	Working unit						p-value
	Medical	Surgical	Urology	Neurology	Orthopedic	Burns	
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	
Causes of medication administration errors							
Medication packaging.	3.5± 1.8	4.2±1.0	3.2±2.0	3.1±1.8	3.5±1.4	2.7±0.9	0.049*
Physician Communication.	3.6±1.5	3.8±1.3	3.1±1.5	3.2±1.4	3.3±1.3	2.6±1.4	0.190
Nurse staffing.	3.6±1.2	3.7±1.3	3.3±1.6	3.8±2.0	3.5±1.4	2.8±1.3	0.557
Pharmacy processes.	3.2±2.8	3.5±1.6	2.1±1.8	2.5±1.5	3.5±0.8	2.7±1.2	0.121
Documentation/Transcription.	2.9±1.6	3.7±1.5	2.6±1.8	2.9±1.6	3.4±1.1	2.4±1.5	0.049*
Barriers to reporting medication administration errors							
Disagree with error definition.	2.8±1.4	4.3±1.5	2.6±1.3	2.8±1.5	3.2±1.3	2.9±0.9	0.001*
Reporting effort.	3.3±1.6	4.6±1.2	3.0±1.6	3.1±1.6	3.4±1.3	3.1±1.2	0.001*
Fear to report error.	3.8±1.8	4.3±1.5	3.8±1.7	3.3±1.9	3.2±1.4	2.8±0.9	0.112
Administrative response.	3.8±1.7	4.4±1.2	4.5±1.3	3.6±1.8	3.5±1.5	3.0±1.0	0.048*

* Statistically significant at the 0.05 level

Discussion

Quality improvement in healthcare is the cornerstone of patient safety. Medication administration errors (MAEs) are the most frequent type of medical error experienced by nurses and healthcare providers, which poses a serious threat to patient safety and quality improvement. Improving patient safety by preventing medical errors and associated preventable adverse incidents through an efficient

reporting system, helps countries develop patient safety policies and practices **(Fathi, et al., 2017)**.

Considering patient safety challenges, of which MAEs are one, and taking into account that early error detection and a proper reporting system are the first steps in preventing further similar ones in the future. Given the crucial role nurses play in medication administration, they are susceptible to MAEs. Consequently, it is imperative to understand the nurses' perspectives on the causes of MEs as well as the reasons why they are not reported. Therefore, this study aimed to investigate barriers to reporting medication administration errors as perceived by nurses working at Mansoura university hospital.

By looking at the basic demographics and work-related characteristics of the nurses under the study, the current study found that the highest percentage of the participants were females, highly educated" Bachelor degree or postgraduates", and had more than five years of work experience. This finding may be explained by the fact that, in Egyptian society, women are more likely than men to pursue nursing careers, and young nurses are more likely to provide direct patient care.This result is consistent with the studies of **Nasr Abd El Aziz, Ahmed, & Abolwafa (2020); Doaa, Neveen, & Sameh (2017); Abusaad& Etawy (2015)** in Egypt in which most of the nurses were young adults, female, with moderate to high levels of education and had more than five years of experience asregistered nurses.

In the same direction, the study carried out in Iran by **Fathi, et al. (2017)** and in Saudi Arabia by **Ala'a, Aljasser, & Sasidhar (2016)** confirmed this conclusion. Conversely, these findings do not always agree with the results of the study by **Mekonen, Gebrie, & Jemberie (2020)** in Ethiopia, which found that more than half of the participants were male. This may be related to regional differences in working conditions and culture.

In Egypt, 77% of patients were harmed by MAEs which lengthen hospital stays, and increase the cost of therapy to correct error-related complications (**Tehewy, Fahim, Gad, Gafary, & Rahman, 2016**). Parenteral medication administration accounts for 70.5% percent of the common errors committed by nurses. Staff nurses are at risk of committing medication-related adverse events because they don't have enough time to administer drugs in accordance with the five rights (**Mekonen, Gebrie, & Jemberie, 2020**).

In this context, the current study emphasized that the most common intravenous medication (IV) errors included drugs administered to the wrong patient, giving medication without a doctor's order, the incorrect choice of fluid, and incorrect administration, as well as the wrong drug and wrong dose for non-IV medications. This result is consistent with the findings of **Fathi, et al.,(2017) and You, Choe, Park, Kim, & Son (2015)** who found that the most frequent non-IV related MAEs were giving the medication to the the wrong patient, followed by administering incorrect medication doses and the incorrect choice of drugs. Similar to this, incorrect medication infusion rates, wrong patient administration, incorrect medication dosages, and incorrect drug selection were the most frequent IV-related MAEs.

These results contradict the study done by **Abusaad& Etawy (2015)** in Egypt entitled "Medication administration errors at Children's University hospitals: nurse's point of view" which reported that the route of medication adminstration and changing of medication were the highest-ranking two types of medication-related errors. This finding can be explained by the fact that pediatric drug administration can be administered by a variety of methods as well as the fact that doctors can change medicine without informing the charge nurse if the child's health condition changes quickly. Another different study done by **Wondmieneh, Alemu, Tadele, & Demis (2020)** in Ethiopia found that the most frequent type of MAE was a wrong-time error. The difference between studies environment and the workplace is probably what has caused this discrepancy.

In examining the reasons behind MAEs according to the studied nurses' perspectives, it was found that the main significant causes of MAE were factors related to nurse staffing, such as a shortage of nurses, and physician communication when the physicians' medication orders are not legible. These results can be explained by the fact that insufficient staffing increases workload and increases the risk of medication error, in addition to poor communication between doctors and nurses

causes misinterpretations of medication prescription instructions.Similarly, numerous studies conducted by **Alamrani (2020); Shehata, Sabri,& Elmelegy (2016); Abusaad, & Etawy (2015); You, Choe, Park, Kim, & Son (2015),** supported the studied nurse's viewpoint and confirmed that inadequate staffing, unclear medication orders, incomplete prescribing instructions, and a lack of knowledge and experience regarding medication names that sounded similar to other medications were considered the main factors attributed to MAEs. Additionally, the low nurse-to-patients ratio which creates a heavy nursing workload was highlighted in earlier studies to be the main cause of the majority MAEs **(Alblowi, Alaidi, Dakhilallah, & Alamrani, 2020; Elsayad, Shazly, & Mahmoud, 2017)**.

Furthermore, it has been shown that poor quality of medication prescription, in particular, unclear medication orders, is one of the factors contributing to MAEs. In this regard, the National Coordinating Council for Medication Error Reporting and Prevention (NCCMERP) recommends that physicians should use electronic medication computerized provider orders (MCPO) (**Alamrani, 2020**).

Medication errors are crucially life-threatening because they have a negative impact on the patient's health and safety. Reporting medication errors is the first step in prevention, demonstrating the feasibility of error analysis, fostering the internal growth of the healthcare system, and ultimately lowering the severity of errors, their consequences, and mortality. Despite the fact that reporting MEs helps preserve patient safety, only around 60% of errors are ever reported. The low reporting rate of MEs by nurses is a serious concern that warrants special attention from health policymakers and hospital management. Therefore, barriers to reporting MAEs should be investigated in light of this context **(Nourian, Babaie, Heidary, & Nasiri, 2020; Ni, Lingren, Hall, Leonard, Melton, & Kirkendall, 2018; Fathi, et al. 2017)**.

Accordingly, the current study findings estimate that the majority MAEs not reported. This may be related to the fact that fear of error consequences can influnce nurses' decision to report errors, and this is consistent with the findings of previous studies, which documented that 70-80% of actual MAEs were not reported. due to the fear of punishment **(Alamrani, 2020; Soydemir, Intepeler, &Mert 2017; Bifftu, Dachew, Tiruneh, & Beshah, 2016).**

Going with this context, the current study focused on exploring the barriers that affect nurses' decision to report MAEs which found that "administrative reaction" and "fear" were the two main barriers to MAEs' reporting that the participating nurses strongly confirmed. Noticeably, negative administrative reactions when a nurse commits a mistake are based on the administration's perception that medication errors are a measure of the quality of nursing care provided as well, focusing on the individual rather than the system as a potential cause of the error when a medication error occurs were considered an organizational barriers to reporting errors. Another significant concern that prevents nurses from reporting errors is the nurses' fear of being held accountable and blamed if a patient is injured as a result of an error, as well as the fear that a patient or family may take legal action if a ME is disclosed.

Likewise, similar findings were reported in the previous studies conducted in Iran, Saudi Arabia, Taiwan, Turkey, South Korea, and Egypt, which revealed that the strongest perceived barriers to reporting MEs were managerial factors such as distorting administrative reactions, blaming, and negative feedback from the nursing heads. As a result, nurses believe that it is better not to report errors and avoid responsibility. As well, fear of reporting errors legally and professionally is the most important factor that hinders error reporting (**Nourian, Babaie, Heidary, & Nasiri, 2020**; **Alamrani, 2020; Dirik, Samur, Seren Intepeler, & Hewison, 2019; Yung, Yu, Chu, Hou, & Tang, 2016; You et al. 2015)**.

In comparing nurses' perceptions regarding barriers to reporting MAEs according to their working units, it was noticed that fear was the only barrier to reporting MAEs that did not significantly differ among nurses regardless of their working units. All nurses agree that fear is the core cause of the failure to report MAEs. This finding may be explained by the fact that fear is a natural emotion and a normal part of the human experience that happens to everyone regardless of human differences in response to a danger or a

perceived threat, and MAEs represent a threat to the nurses' reputation and career future.The studied nurses' perceptions regarding fear as a core barrier to errors reporting is confirmed by the findings of earlier studies from various international healthcare settings, which found that fear is the main obstacle to reporting MAEs among nurses in different countries, and that fear can take many diverse forms in different societies and cultures regardless of any individual or organizational characteristics. Furthermore, fear of the consequences of error reporting which includes negative reactions from patients and their families, loss of employment, and legal consequences were identified as a major factor influencing reporting **(Alrabadi, et al. 2020; Alves, Carvalho, & Albuquerque, 2019; Dyab, Elkalmi, Bux, & Jamshed, 2018; Lee, 2017).**

Finally, the current study findings spot light on nurses' perspectives regarding MAEs reporting barriers which are similar to previous studies in different healthcare settings worldwide, making them globally comparable as one of the patients safety challenges that need solutions.

Conclusion

Based on the findings of the current study, it can be concluded that the majority of medication administration errors were not reported. Moreover, the common causes of MAE were factors related to nurse staffing such as a shortage of nurses, and physician communication when the physicians' medication orders are not legible or unclear. Furthermore, the two significant barriers preventing nurses from reporting medication-related errors were "administrative response" and "fear".

Recommendations

On the light of the current study findings, the following recommendations are suggested:

- An electronic reporting system (incident report) should be implemented to increase the rate of MAE reporting. In addition, technology strategies should be delivered to decrease the number of medication errors including computerized physician order entry, and automated medication administration records.
- A safe working environment that is free from punishment, blame, and fear is required. Moreover, an open feedback system that enables nurses to use reported errors as a learning opportunity and encourage nurses to report MEs by using rewards and motivation should be created at the organizational level
- An in-service educational program regarding the consistent definition of what comprises MEs and methods of errors reporting should be developed at organizational level to increase the nurses' ability to report errors.
- Future research should replicate the study using a representative sample from various healthcare settings to provide a comprehensive understanding of the factors contributing to MAEs and barriers to reporting and to allow generalization of the findings.

Limitation of the study

This study had some limitations that should be considered when interpreting the results. The cross-sectional design of the current study makes it difficult to establish a cause-and-effect relationship between the MAEs and the identified factors. Moreover, the current study setting was limited to Mansoura University Hospital in Egypt due to time constraints hence, its findings cannot be generalized.

Implication of this study

This study presents an original survey based on the real perspectives of the nurses at Mansoura University Hospitals, an Egyptian medical university hospital that offers primary care services as well as opportunities for teaching and training. The current study has two impacts: first of all, recognition of MAEs' causes and the barriers that prevent nurses from reporting errors is considered evidence-based research in Egypt that can be added to patient safety research. Second, it enables decision-makers in Egyptian healthcare settings in identifying the root causes of MAEs and the obstacles to reporting in order to create evidence-based preventative strategies that upgrade nurses' practices and promote patient safety standards.

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Conflicts of Interest

The authors proclaim that there was no conflict of interest to report concerning this research or its findings.

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