

Research Article

Critical Care Nurse's Practice Regarding Medication Administration Safety in Intensive Care Units at Governmental Hospitals in Gaza Strip

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Abstract

Background: Administration of medications is primarily the nurse's responsibility. This study aimed to assess intensive care nurses' practice of safe medication administration in governmental hospitals in the Gaza Strip.

Methods: This study utilized descriptive, cross-sectional, analytical design. The sample of the study consisted of 116 ICU nurses from five governmental hospitals (Al Shifa Hospital, Indonesy Hospital, Shohada Al Aqsa hospital, European Gaza Hospital, and Nasser Hospital). For data collection, the researcher used Patient Safety Assessment in Medication Administration Questionnaire and Observation Checklist. A pilot study was conducted on 20 nurses, and reliability of the Patient Safety Assessment in the Medication Administration Questionnaire was 0.908.

Results: The results showed that 66.4% of study participants were male nurses and 33.6% were female nurses, mean age was 28.97 years, 85.4% have bachelor degree, mean experience was 4.18 years, mean income was 1431.64 New Shekel, and 67.2% are working mixed shifts (morning, evening, and night). The practice of safety medication administration indicated that the highest score was in right route (93.8%), the right time (91.8%), right patient (90.7%), right way (89.5%), right recording of administered medication (88.9%), right answer (86.7%), right guidance (86.5%), right dose (86%), right medication (85.3%), and the overall score was 88.6%. Also, observation of nurses indicated high practice of safe medication administration with an average score of 83.6%. There were statistically insignificant differences in the practice of safe medication administration related to the hospital, gender, qualification, age, experience, and income.

Conclusion: The study concluded that intensive care nurses handling medication safely at a moderate level and more. The authors demonstrated the need to provide adequate number of qualified nurses in Intensive Care Units, and encouraged nurses to participate in training programs about safe medication preparation and administration.

Keywords: Safe Medication Administration; Nurses; Intensive Care Units; Gaza Strip

Introduction

Patient Safety (PS) consists of the identification, analysis and management of patient-related risks and incidents, in order to make patient care safer and minimize harm to patients [1]. Medication safety is a part of PS and is defined as freedom from accidental injury during the course of medication use; activities to avoid, prevent, or correct adverse drug events which may result from the use of medications [3]. Unsafe medication practices and MEs are the most important preventable factor that influences Patient safety [2].

The administration of medications is primarily the nurse's responsibility, on which nurses spend up to 40% of their time on administering medication [4]. Medication Errors (MEs) account for 78% of the serious MEs in an ICU, in addition to accidental patient fall are among the most common adverse events reported in hospitals, complicating approximately 2% of hospital stays [5]. Medication Administration Errors (MAEs) are the most common types of medication errors posing dangerous consequences for patients, health professionals and health institutions [6].

Intensive Care Units (ICUs) provide lifesaving care for critically ill patients; it is associated with significant risks for adverse events and serious errors with multiple interactions occurring between multidisciplinary health care providers, patients, and medical devices with increasingly complex interface [7]. In the ICUs, hospitalized patients receive more drugs than patients in other units, and are most vulnerable to being exposed to medication errors due to care complexity, severe illness, and providing life-sustaining treatment [8].

ICU nurses work in a complex work environment that changes moment by moment [9], and many organizational factors such as nurse workload or distractions during medication tasks may increase the risk for errors [10]. Thus, understanding the issue of workload and complex interactions are necessary to reduce errors during medication administration [11]. Also, human factors contributing to errors, such as neglecting instructions and double-check procedures, are still common [12].

Nurses represent the last safety check in the chain of events in the medication administration process [13]. Therefore, this study aimed to assess the practice of ICU nurses regarding safe medication administration in governmental hospitals in the Gaza Strip (GS).

Methods and Materials

This study utilized descriptive, cross-sectional, analytical design. The population of the study consisted of all the critical care nurses who are working in ICUs at governmental hospitals in Gaza Strip. Their total number is about 122 nurses. The sample of the study is the same as the population (census). 116 nurses participated in the study with a response rate 95%. The study was conducted in ICUs at governmental hospitals in Gaza Strip. The study has been conducted during the period from August 2021 to March 2022. Male and female nurses, who are working in ICU at governmental hospitals in Gaza Strip. The researcher used an observation check list to measure safety practice of medication administration in the ICU.

Results

Table 1 showed that 52 (44.8%) of the study participants were aged 26 – 30 years, 34 (29.3%) were aged 25 years and

less, and 30 (25.9%) were aged 31 years and more, mean age was 28.97 ± 5.231 years. In addition, 99 (85.3%) have bachelor's degree, 12 (10.3%) have postgraduate studies (Master degree or PhD), and 5 (4.3%) have diploma certificate. Furthermore, 78 (67.2%) of study participants have 1 – 4 years of experience in ICU, 21 (18.1%) have 5 – 9 years of experience in ICU, 17 (14.7%) have 10 years and more experience in ICU, and the mean years of experience was 4.18 ± 4.047 . The results also showed that 51 (44%) of study participants have a monthly income of 1201 – 1700 NIS, 47 (40.5%) have an income of 1200 NIS and less, 18 (15.5%) have an income of more than 1700 NIS, and the mean income was 1431.64 ± 382.620 NIS. Moreover, 78 (67.2%) of study participants work mixed shifts (morning, evening, and night), 30 (25.9%) work morning shift only, and 8 (6.9%) work evening-night shifts.

Table 1: Sociodemographic characteristics of study participants (n= 116).

Variable	Number	Percentage (%)
Gender		
Male	77	66.4
Female	39	33.6
Age		
25 years and less	34	29.3
26 - 30 years	52	44.8
31 years and more	30	25.9
Total	116	100
Mean age= 28.97 years SD= 5.231 years		
Qualification		
Diploma	5	4.3
Bachelor	99	85.4
Master/ PhD	12	10.3
Total	116	100
Experience in ICU		
Less than 5 years	78	67.2
5 – 9 years	21	18.1
10 years and more	17	14.7
Total	116	100
Mean= 4.18 years SD= 4.047 years		
Income		
1200 NIS and less	47	40.5
1201 – 1700 NIS	51	44
	3	
More than 1700 NIS*	18	15.5
Total	116	100
Mean= 1431.64 SD= 382.620 NIS		
Work shifts		
Morning	30	25.9
Evening-night	8	6.9
Mixed shifts	78	67.2
Total	116	100

*NIS= New Israeli Shekel

Table 2 showed that the highest score was in right route with mean score 4.68 and mean score 93.8%, followed by right time with mean score 4.58 and mean percent 91.8%, right patient with mean score 4.53 and mean percent 90.7%, right way with mean score 4.47 and mean percent 89.5%, right record of administered medication with mean score 4.44 and mean percent 88.9%, right answer with mean score 4.33 and mean percent 86.7%, right guidance with mean score 4.32 and mean percent 86.5%, right dose with mean score 4.30 and mean percent 86%, and the lowest score was in right medication with mean score 4.26 and mean percent 85.3%. The overall mean score was 4.43 and mean percent 88.6%, which indicated a high level of practicing safety medication administration among ICU nurses.

Table 2: Level of practice of safety medication administration.

Domains	Mean	SD	Mean %	Rank
Right patient	4.53	0.665	90.7	3
Right medication	4.26	0.593	85.3	9
Right route	4.68	0.409	93.8	1
Right time	4.58	0.501	91.8	2
Right dose	4.30	0.599	86.0	8
Right record of administered medication	4.44	0.642	88.9	5
Right guidance	4.32	0.612	86.5	7
Right way	4.47	0.817	89.5	4
Right answer	4.33	0.681	86.7	6
Overall average	4.43	0.434	88.6	

Table 3: Activities performed by the nurse during medication preparation and administration.

No.	Activity	Al Shifa	Al Aqsa	EGH	Nasser	Indonesy	Mean
1	Identify the patient by full name	100.0	100.0	100.0	80.0	100.0	96.0
2	Identify the patient by file number (MRN)	85.7	0	100.0	0	60.0	49.14
3	Check the prescribed medication against the kardex	100.0	100.0	80.0	100.0	100.0	96.0
4	Prepare the medication for one patient at a time	85.7	75.0	100.0	60.0	100.0	84.14
5	Follow the guidelines for constitution or dilution of medication	85.7	100.0	100.0	100.0	100.0	97.14
6	Read the name of drug before preparation and match it with the kardex	100.0	100.0	100.0	80.0	100.0	96.0
7	Read the route of administration before preparation of medication	100.0	75.0	100.0	100.0	100.0	95.0
8	Wash hands with soap and water or alcohol rub before preparation of medication	100.0	50.0	80.0	40.0	40.0	62.0
9	Read the expiration date and confirm the medication is not expired before preparation of medication	100.0	100.0	100.0	20.0	20.0	68.0
10	Read the amount/concentration of stock drug in the vial before preparation	85.7	50.0	100.0	100.0	100.0	87.14
11	Calculate the specific dose accurately	100.0	100.0	100.0	100.0	100.0	100.0
12	Cleanse vial of IV/IM medication and withdraw the required dose accurately	71.4	75.0	100.0	80.0	100.0	85.28
13	Take the medication to the patient on the medication trolley	85.7	75.0	60.0	0	60.0	56.14
14	Clean the administration site of IM injection with alcohol swab	100.0	100.0	100.0	60.0	80.0	88.0
15	Cleanse (scrub) administration port of IV tubing with alcohol swab	85.7	0	60.0	20.0	40.0	41.14
16	Check the IV cannula or central line for patency	85.7	100.0	100.0	100.0	100.0	97.14
17	Administer IV medication according to the designed flow rate	100.0	100.0	100.0	100.0	100.0	100.0
18	Sign the administered medication immediately after administration	100.0	100.0	100.0	100.0	100.0	100.0
19	Evaluate the effectiveness of the administered medication	100.0	100.0	80.0	40.0	100.0	84.0
20	Report any abnormal or unexpected side effects caused by the medication	100.0	100.0	100.0	40.0	100.0	88.0
Average score		94.0	80.0	93.0	66.0	85.0	83.6

Table 3 showed the activities performed by the nurse during medication preparation and administration. Activities such as identifying the patient by full name, checking the prescribed medication against the Kardex, following the guidelines for the constitution or dilution of medication, reading the name of the drug before preparation and matching it with the Kardex, calculating the specific dose accurately, checking the IV cannula or central line for patency, and Administer IV medication according to the designed flow rate showed the highest weighted mean ($\geq 90\%$). Whereas, the lowest weighted mean was noted in activities such as identifying the patient by file number (MRN), cleansing (scrub) administration port of IV tubing with alcohol swab, and taking the medication to the patient on the medication trolley ($\leq 60\%$).

Discussion

This study aimed to assess the practice of safe medication preparation and administration among ICU nurses in governmental hospitals in GS. The sample of the study consisted of

116 ICU nurses. The results reflected high level of practicing safety medication preparation and administration among ICU nurses. The highest score was in right route, followed by right time, right patient, right way, right record of administered medication, right answer, right guidance, right dose, and the lowest score was in right medication.

The researcher observed the ICU nurses during preparation and administration of medication. The results of observation showed high performance in some activities and low performance in other activities. Activities done by all the nurses included calculating the specific dose accurately, administering IV medication according to the designed flow rate, and signing the administered medication immediately after administration.

Activities done by the majority of nurses included following the guidelines for constitution or dilution of medication (97.14%), checking the IV cannula or central line for patency (97.14%), identifying the patient by full name (96%), checking the prescribed medication against the kardex (96%), and read-

ing the name of drug before preparation and match it with the kardex (96%).

Other activities done by nurses less frequently including identifying the patient by file number (49.14%), cleanse (scrub) administration port of IV tubing with alcohol swab (41.14%), take the medication to the patient on the medication trolley (56.14%), and washing hands with soap and water or alcohol rub before preparation of medication (62%).

The highest average score of performance regarding medication preparation and administration was in Al Shifa Hospital (94%), followed by EGH (93%), Indonesy Hospital (85%), Shohada Al Aqsa Hospital (80%), and the lowest score was in Nasser Hospital (66%). The overall average score among all the hospitals was 83.6%.

These results disagreed with the results of Mukherjee et al. (2020) which revealed that all the observed nurses did not check the expiry date of the medication, none of the nurses made double check of medication, in 96.7% of the observed events, aseptic techniques were not followed during the preparation of IV medication, in 90% of the events proper hand washing was not performed prior to medication preparation and in 86.7% of events, hand washing was not performed after preparation of IV medication. In addition, the results of Wondmieneh et al. (2020) found that only 24% of the observed nurses washed their hands before preparation of medication, 84.9% administered the right medication to the right patient, 76.9% administered the right dose, 85.8% used the right route, 65.3% administered medication at the right time, and 48% documented the necessary information.

Conclusion

The study concluded that observation of nurses during preparation and administration of medication showed high performance in dose calculation, administration of IV medication according to designed flow rate, documentation of given medication, and checking the IV site for patency before administration of medication.

Moreover, ICU nurses practiced safe medication administration to high extent, and above moderate barriers to safe medication administration, because that they follow the guidelines of medication preparation and administration to high extent, and that would decrease the possibility to make errors.

Recommendation

The study authors recommend the ICU nurses to participate in periodical training programs about safe medication preparation and administration to keep their knowledge and skills updated, to get a preceptor-ship of new nurses to improve their skills and competence in safe medication preparation and administration, and to ensure double-check of high alert medication to avoid errors and unwanted complication that may threaten patient's life.

Ethical Approval

Before starting the study, ethical approval to conduct the study was approved by the Ministry of Health. The study participants were requested to sign an informed consent that states the purpose of the study as well as the voluntary nature of participation and confidentiality of the information gathered.

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Authors contributions

Concepts, design, manuscript preparation, reviewing the questionnaire, and manuscript editing done by all authors.

Conflict of Interest

There are no conflicts of interest to be declared.

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