



Knowledge of nurses toward drugs administration at public hospitals in Sana'a city- Yemen

Abdulfatah Al-Jaradi¹, Abdulnasser A Haza'a² and Marzoq Ali Odhah²

¹ Lecture Critical Care and Emergency Nursing, Faculty of Medical Sciences, Al-Razi University, Yemen

² Assistance Professor of Critical Care And Emergency Nursing, Faculty of Medical Sciences, Al-Razi University, Yemen

Abstract

Background: Patient safety is a priority for health care organizations worldwide. Nurses need to recognize the challenges they face when administering medications to their patients.

This study aimed to assess nurses' knowledge toward drug administration.

Setting: This study was conducted in different departments in Public Hospitals in Sana'a City-Yemen.

Methodology: This is a descriptive, cross-section study, was conducting in Public hospitals in Sana'a City-Yemen. The study was covering a sample of (95) nurses in the hospital according to the study population.

Tool: Structure interview schedule: (interview questionnaire sheet) A modified version of the routine drugs administration knowledge questionnaire.

Results: Out of the 95 participants, the most of study participants were worked in labor room department (45.3%), 60.0% were aged between 25 to less than 35years. Therefore, 64.2% of participants were married and 83.2% had a 3-year nursing diploma. Most participants (49.5%) had 5 to 10 years of working experience as nurses. Above half (57.9%) of the participants had attended training courses on drug administration and 56.8% had written guidelines regarding drugs administration. 16.8% of the participants had a good level of knowledge, while (64.2%) of them had a fair level of knowledge and 18.9% of them had a poor level of knowledge regarding the drug administration.

Conclusion: In our study were shows the overall knowledge of nurses about drug administration is fair level.

Recommendation: Nurses need to be encouraged to translate their knowledge into practice and staff members should be motivated to develop their careers by studying further and gaining more knowledge and skills in the drug administration field.

Keywords: knowledge, nurses, drug administration

Introduction

Medication safety during administration is a major concern at a global level, and is related to safety and quality of patient care. Medication errors are unintended failures in the drug treatment process that can occur during prescription, dispensing, storing, preparation and administration of medications. Medication errors are one of the major concerns of nursing professionals internationally. High alert medications are considered to be one of the most medications associated with a high risk of serious harm if administered improperly, and are responsible for the majority of harmful errors (Zyoud *et al.* 2019) [16].

According to unsafe medication practices and medication errors are a leading cause of injury and avoidable harm in health care systems across the world. Globally, the cost associated with medication errors has been estimated at \$42 billion USD annually. Errors can occur at different stages of the medication use process (Abd Elmageed *et al.*, 2020) [2].

The ability of nurses to administer drugs safely will determine the quality of service and support patient safety. Nurses are also the health profession, which is often

considered as the last barrier in preventing medication errors to patients. The ability of nurses in the safe management and administration of drugs is one of the competencies that are expected to be applied in nursing care, especially in inpatient settings (Musharyanti *et al.*, 2021) [13]. The nurse has many tasks to do, and likewise in most countries around the world, to reach correct and safe administration. These tasks include preparing medications, administering medications, reporting adverse drug reactions, monitoring the effectiveness of treatment, and counseling patients about their medications (Zyoud *et al.* 2019) [16].

Significant of the study

The nurses are playing a major role in preparing, monitoring, administering, and evaluating the patient response to medication and nutritional care, the largest category in terms of the health care workforce play a major role in ensuring quality in hospitals. This study is an effort to identify the nurses' knowledge of drug administration among nurses' staff. The findings of the study will help plan a comprehensive teaching/training program that in turn will

help to improve the quality of drug administration and medication error rates.

Aim of the study

The objective of this study was to assess knowledge of nurses' toward drug administration at Public Hospitals in Sana'a City-Yemen.

1. What is the level of nurses' knowledge toward drug administration?
2. Are there differences in the nurses' knowledge level toward drug administration based on their sociodemographic characteristics?

Materials & Method

Study Design

This descriptive cross-sectional hospital-based study employed nurses' from at Public Hospitals in Sana'a City-Yemen.

Study Setting

The study was conducted in Public Hospitals in Sana'a City. The five public hospitals are Al-Thawra Modern General Hospital, Al-Kuwait University Hospital, Al-Sabeen Maternity and Child Hospital, the Republican Teaching Hospital Authority and, Zaid ben Sultan hospital. These hospitals were selected as they are the referral hospitals for most people and the service fees are low. This study was conducted from October to December 2020.

Study Population

The study population consisted of all 95 nurses' that working at Public Hospitals in Sana'a City Al-Thawra Modern General Hospital, Al-Kuwait University Hospital, Al-Sabeen Maternity and Child Hospital, the Republican Teaching Hospital Authority and, Zaid ben Sultan hospital) on a permanent or contract basis during the study period that provided direct nurse care practice.

Sample Size

The sample size was taken all 95 nurses that working at Public Hospitals in Sana'a City, with researchers consideration.

Sampling Technique

A random sampling method was applying to select all nurses' that working study setting in at Public Hospitals in Sana'a City (Al-Thawra Modern General Hospital, Al-Kuwait University Hospital, Al-Sabeen Maternity and Child Hospital, the Republican Teaching Hospital Authority and, Zaid ben Sultan hospital).

Tools of data collection

One tool used in this study to collect data:

Tool I: Self-administration structured interview questionnaire

A self-administered study questionnaire was developing to collect data. This questionnaire consists of two parts:

Part I: Socio-demographic characteristics: was covered hospital and department name, marital status, educational level, old age, years of experience, training course, and

written policy for drug administration.

Part II: was medication administration knowledge questionnaire. This part was used to assess the knowledge of nurses regarding drug administration and It was categories under 9 items covered by 35 questions include the following:

- 1) Knowledge of drug names and medication orders includes (2) questions.
- 2) Knowledge toward purpose drug administration includes (2) questions.
- 3) Knowledge toward preparations for drug administration includes (2) questions.
- 4) Knowledge toward injection routes of drugs administration includes (7) questions.
- 5) Knowledge toward therapeutic action includes (5) questions.
- 6) Knowledge toward topical and instillation routes of drugs administration include (9) questions.
- 7) Knowledge toward safe drug administration includes (4) questions.
- 8) Knowledge of the drug administration abbreviations includes (2) questions.
- 9) Knowledge toward documentation when the administration of the drug includes (2) questions.

The scoring system of the nurse knowledge questionnaire was done as follows: Each correct answer scored one point and each incorrect answer scored a zero. A higher score indicated greater nurse knowledge. The score obtained for each question summed up to get the total score for the nurse's knowledge. The total score was computed out of (35 grades). According to the nurse responses, their level of knowledge is categorized as the following: A score of 50% or less was considered poor knowledge, 51–70% fair knowledge, while 71% and above was considered as good knowledge.

Data Collection Methods and Tool

Validity and reliability of the tool

The questionnaire was adapted from previously validated and reliable studies by: The validity of the English and Arabic versions of the questionnaire was reviewed by three experts to determine if all questions were wording and word not be misinterpreting. Experts included academic staff in nursing and specialist in nursing filed, who has enough experiences in fieldwork. As a result, some questions were omitted, some adding and others rephrasing. Other questions adding were formulated by the researcher with the help of a literature supervisor and experts was make modifying to add or omit to clearly and correct misinterpreted and doubtlessness from credence and completeness of study tools. The reliability of the questionnaire was testing by using Cronbach's Alpha ($R=0.64$).

Pilot Study

The piloted of the questionnaire was performing before data collection. A pilot study was done on ten-nurses working in the study setting on items in a questionnaire to assess the clarity, feasibility of the study, and drawbacks of the questionnaire. Following the pilot study, minimal modifications to the layout and presentation of the instrument were madding. The pretest nurses were excluded from the final study sample.

Data collection methods

Self-administered questionnaire was collected during the period of October to December 2020. Data was collecting through the one month. The questionnaire was filling during working hours; verbal consent forms and filling questionnaires was placing into sealing by the researcher and taken from each unit daily. All of the collected data has been checked by the researcher daily for completeness and finally.

Data Processing and Statistical Analysis

The collected data were coded and analyzed using PC with the Statistical Package for Social Sciences (SPSS version 20) and tabulated frequency and percentages were calculated. Descriptive statistics as frequency, distribution, mean, and standard deviation were used to describe different characteristics. The Chi-square test was used for testing relationship between categorical variables. The level of significance selected for this study was p value equal to or less than 0.05.

Study Variables

- **Dependent variables:** Knowledge of nurse toward drugs administration
- **Independent variables:** Age, marital status,

educational level, years of experience, training course.

Ethical consideration

1. Approval of the study was obtained before carrying out this study from the ethical committee of the faculty of Medical Sciences, Al-Razi University, Sana'a City-Yemen.
2. Formal permission was obtained from the authorities for the collection of data.
3. The data was collecting from Public Hospitals in Sana'a City (Al-Thawra Modern General Hospital, Al-Kuwait University Hospital, Al-Sabeen Maternity and Child Hospital, the Republican Teaching Hospital Authority and, Zaid ben Sultan hospital).
4. The investigator first introduced her and explained the need and purpose of the study.
5. The knowledge level assessing after obtaining permission from all nurses.

Results

The collected data were analyzed statistically and the results were categorized into the following parts:

Part I: Socio-demographic characteristics of the studied participants.

Table 1: Distribution of the participants according to their socio-demographic characteristics

Socio-demographic characteristics	No.	%
Age group		
• 20 to 25 year	15	15.8
• 26 to < 35 year	57	60.0
• ≥ 35 year	23	24.2
Mean ± SD	30.7 ± 4.77	
Marital status		
• Single	32	33.7
• Married	61	64.2
• Divorcee	2	2.1
Education level		
• Diploma degree	79	83.2
• Bachelor degree	16	16.8
Years' experience		
• Less than 5 years	26	27.4
• 5 to 10 years	47	49.5
• More than 10 years	22	23.2
Mean ± SD	7.8 ± 5.01	
Department name		
• Critical care units of Gynecology	8	8.4
• Emergency for Gynecology department	18	18.9
• Operation department	6	6.3
• Labor department	43	45.3
• Gynecological department	20	21.1
Training course		
• Yes	55	57.9
• No	40	42.1
Written guidelines regarding drugs administration		
• Yes	54	56.8
• No	41	43.2

Table (1) Portrays the distribution of the participants according to their socio-demographic characteristics. The table shows that more than half (60.0%) of the nurses at the age group 5 to 10 years old, around two quarters (64.2%) of

nurses were married, the majority (83.2%) of the participants were have diploma in nursing. Fifty percentages of the nurses have 5 to 10 years of experience; slightly less than two fifths working at labor department. Furthermore,

less than two fifths (42.1%) of the nurses reported that they didn't received any training regarding drug administration. Finally, more than two fifths (56.8%) of the nurses reported

that they written guidelines regarding drugs administration.

Part II: Participants knowledge toward drug administration

Table 2: Distribution mean score knowledge of participants toward drug administration (n=95).

Knowledge toward drugs administration	Mean ± SD
Knowledge toward drugs names and medication orders	1.29 ± 0.60
Knowledge toward purpose drugs administration	0.84 ± 0.73
Knowledge toward preparations for drugs administration	1.64 ± 0.62
Knowledge toward therapeutic action	2.82 ± 0.95
Knowledge toward injection routes of drugs administration	3.87 ± 1.23
Knowledge toward topical and instillation routes of drugs administration	5.36 ± 1.79
Knowledge toward safe of drugs administration	2.39 ± 1.05
Knowledge toward documentation when the administration of the drug	1.56 ± 0.58
Knowledge toward the drugs administration abbreviations	1.43 ± 0.66
Total Knowledge	21.21± 4.27

Table (2) shows the distribution of participants according to their mean knowledge domain score regarding drug administration. Knowledge toward topical and instillation routes of drugs administration, injection routes of drugs administration, therapeutic action and safe of drugs administration reflect higher mean score (5.36 ± 1.79, 3.87 ± 1.23, 2.82 ± 0.95, and 2.39 ± 1.05 respectively). Whereas, mean score of nurses knowledge preparations for drugs administration, toward documentation when the administration of the drug, the drugs administration abbreviations, drugs names and medication orders and purpose drugs administration represent the lower mean score (1.64 ± 0.62, 1.56 ± 0.58, 1.43 ± 0.66, 1.29 ± 0.60 and 0.84 ± 0.73 respectively). Finally, mean score of participants total knowledge regarding drug administration is 21.21± 4.27.

Discussion

Nurses that work in delivery rooms should be encouraged to report the errors to facilitate the improvement and provision of training on side effects and monitoring of drugs. The reporting system should be developed in order to ensure the reporting of all the errors or other factors identified prior to the errors. The most effective approach in preventing drug errors is not condemnation or punishment but rather a focus on improving knowledge, skills, and abilities. Approaches such as voluntariness, no exposure, no punishment, encouraging self-sufficiency, learning opportunities based on errors, updating knowledge, skills, and abilities should be followed (Alan 2019) [3].

The objective of this study was to find out of nurse knowledge toward drug administration in Public Hospitals in Sana'a City-Yemen. The results of this study were based on the primary data gathered from 95 nurses. All the participants in the current study were working in the study siting and were taken by a random sampling method. The medication administration is primarily the responsibility of the nurse whose knowledge and practice influence the health outcome of patients. The nurse plays an important role in health promotion and prevention.

In our study, the results were showing the most (44.2%) of nurses were working in the labor department, more than half (64.2%) of nurses were married within 25 to less than 35years old (60.0%).

These results agree with other studies that show in the first study about Knowledge about the administration and regulation of high alert medications among nurses in Palestine: a cross-sectional study Zyoud *et al.*, (2019) [16] who shows that about 280 participated in the study; these participants were working in the labor department room.

This result was inconsistent with Abd Elmageed *et al.*, (2020) [2] who reported that, slightly more than half (54.3%) of the nurses at the age group 26-45 years old, and the majority of the nurses reported that they didn't received any training regarding medication administration. In addition, this finding is similar with study Shamsuddin & Shafie, (2012) [15] that showed the nurses at the age group 25-30 years old (57.3%).

The current study revealed that, the higher (69.9%) of nurses were had diploma degrees. This could be because studying nursing education is more accessible in many nursing institutes all over Yemen, while there are a limited

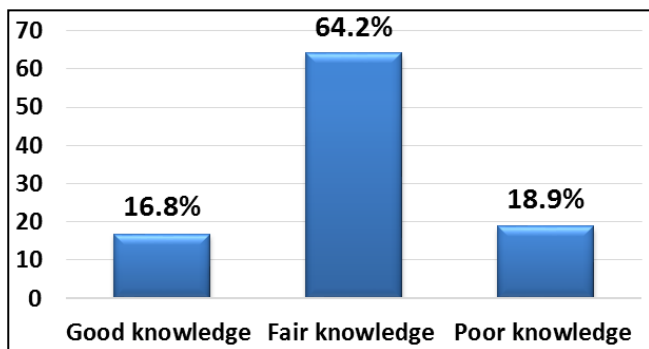


Fig 1: Distribution overall knowledge level of participants toward drug administration (n=95)

Figure (1) shows the total overall knowledge level of participants toward drug administration, about two third (64.2%) of participants were had fair knowledge. Follow about (18.9) of nurses were had poor knowledge. While about (16.8%) of them were had good knowledge.

Part III: The association between participants' knowledge and their socio-demographic characteristics.

There were no significant associations between the participants' age, material status, education level, years' experience, department name, training courses and written guidelines regarding drugs administration and the overall level of knowledge towards drug administration were found to be non-significant at p-value > 0.05.

number of nursing colleges that have opened in the last few years.

This finding agrees with a study was conducted by Abd Elmageed *et al.*, (2020)^[2] who found that slightly more than two fifths (40.7%) of the nurses were have diploma in nursing. Moreover, Kumar & Bashetti, (2017)^[12] showed that the majority of staff nurses were educational status (60%) are having a diploma.

The present study accepted with the study was conducted by Shamsuddin & Shafie, (2012)^[15], who found that, the majority of the respondents were diploma holders.

The results also revealed that, the most of the nurses at the group 5 to 10 years of experience. This result is consistent to that of Shamsuddin & Shafie, (2012)^[15], who found that slightly less than half (45.9%) of ICU nurse had years' experience from 5-10 years.

Our results study revealed that, the overall knowledge of nurses toward drug administration, about two third (70.5%) of nurse were had fair knowledge. Theses result agree with Shamsuddin & Shafie, (2012)^[15] who mentioned that, nurses from the selected wards had an average level of knowledge in the preparation and administration of medications. Furthermore, our result similar with the study by Nair, (2011)^[14] who illustrated that, 57% had fair knowledge and 17% had good knowledge

The present study unaccepted with the study was conducted with Giannetta *et al.*, (2020)^[19] who found that, the majority 83% of the sample agreed that a good knowledge of drug calculation was useful to reduce medication administration errors such as a good knowledge of guidelines, protocols and procedures.

On the line, these finding was consistent with Heczková & Bulava, (2018)^[10] the mean success rate on the test was 53.4%. The highest range of knowledge was demonstrated by already qualified students at the end of specialized studies with prior work experience in ICU, the lowest by students just before graduation.

On the same line, this finding is agreed with Di Muzio *et al.*, (2017)^[8] whom highlighted that almost all the surveyed nurses (93%) are aware that an adequate knowledge of the drugs dosage calculation is essential to reduce the occurrence of medication errors in the drugs preparation phase.

These our results are in disagreement with Abd Elmageed *et al.*, (2020)^[2] who reported that, slightly less than two thirds (62.9%) of nurses have poor total knowledge score regarding medication administration. Moreover, our result not compatible with Di Simone, *et al.*, (2018)^[6] who reported that, only 15.6% of nurses judged excellent their level of knowledge about preparation and administration of medications. However, our results contradict Kumar & Bashetti, (2017)^[12], who founded 46.67% had inadequate knowledge, 40% had moderate knowledge regarding the administration of medication. Moreover, Alan, (2019)^[3] who founded that, 47.6% of the participants have good knowledge level regarding drug interactions and side effects of the drugs.

The present study show that there was no statistical significant differences between total knowledge score and socio-demographic in nearly all items of socio-demographic. It indicate that there was no effect of socio-demographic data on knowledge. This result agreement with

Youssif *et al.*, (2013)^[1] whom mentioned that nurses working at emergency room were more likely to report medication administration errors than other units. This finding disagreement with Bifttu *et al.*, (2016)^[4]; Feleke *et al.*, (2015)^[5]; Johnson and Thomas, (2012)^[11] whom showed that years of experience statistically associated with nurses' knowledge.

Our results this disagreement with other results reported by Dimuzio *et al.*, (2017)^[8] since they studied knowledge, attitudes, behavior and training needs of ICU nurses on medication errors in the use of IV drugs and declared that the strongest associations for appropriate knowledge are related to having a university degree. This finding may attribute to that the minority of the studied nurses in the current study having bachelor degree

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