

Evaluating the rate and type of medication errors by nurses: a study at the general hospital in southern Iran

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ABSTRACT

Purpose:The drug is the most commonly used medicinal product in health-service provider units and the proper implementation of medicinal prescription is of the basic nursing measures calling for the use of knowledge, techniques, and skills. One of the most common medical and nursing errors is medication errors, the occurrence of which causes serious health problems for patients. The present study was conducted to evaluate the rate and type of medication errors made by nurses in ShahidMohammadi Hospital, Bandar Abbas, in 2017. **Methodology:**This descriptive cross-sectional study with the analytical design was conducted in 2017 on 257 nurses from ShahidMohammadi Hospital of Bandar Abbas selected by sampling method. The inclusion criteria were having a bachelor's degree and one year of work history and the exclusion criteria were the nurses with management posts, head nurses, and those unwilling to participate in the study. Data collection tool was a researcher-made checklist with their validity and reliability evaluated. Data were analyzed in SPSS 18 and descriptive and analytic tests. **Results:**The results indicated that out of 257 nurses participating in the study, 93.8% were females, 89.5% had master's degree, and the mean age of nurses was 31.92 ± 4.78 years and the mean work history was 7.52 ± 4.6 years. There was a significant relationship between medication errors with education and participation in drug administration classes and employment in other hospitals based on an independent t-test ($P=0.001$). The most commonly reported medication errors were the wrong patients (34.65%), drug dosage (20%), drug type (19.98%), drug registration (19.5%) and time (13%), and the least errors were related to the administration method (3.3%). **Conclusion:**based on the results, it is necessary that nursing managers pay reasonable attention to the ratio of patients with staff in wards and reduction of the workload and working hours of nurses as these factors can increase the probability of developing medication errors. According to the nurses' medication errors, re-acquiring classes to be familiarized with the principles of drug administration and encourage nurses to report medication errors and the positive response of managers in this regard.

Keywords: Medication errors, nurses, hospital

Introduction

A drug is the most commonly used medicinal product in health-service provider units and the proper implementation of

medicinal prescription is of the basic nursing measures calling for the use of knowledge, techniques, skills, and attention to advancement in improving the patient safety, accounting for about 40% of nurses' activities ^[1]. Among the significant examples of patient safety threatened is the proper administration of the drug ^[2]. Nowadays, patient safety is considered as an index of healthcare services that creates conditions preventing any harm to the patient ^[3, 4]. Medication errors are of the commonest nosocomial errors accounting for 20% of medication errors and the fifth cause of death in America, and given its high prevalence and risks, it is of the most important safety indices of the patient ^[5-7]. The results of studies have indicated that in Canada about 7% of hospitalized patients suffer from unwanted complications because of medication

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errors^[8, 9]. Complications resulting from medication errors lead to adverse effects, like the increase in the mortality rate and increase in the length of hospitalization and medical expenses, imposing an annual cost of \$ 77 billion to the governments, of which about 37% of these cases can be prevented^[10]. One has to note that medication errors are of the significant clinical problems that may happen at any stage of the drug administration process. However, common medication error includes errors in drug administration, not respecting appropriate timing of medication, not respecting the appropriate way of administering a drug, administering medicine more than the prescribed prescription, giving the wrong medication to the patient, and error in medication calculation^[11, 12]. The quick progress in medical technology, inadequacies in nursing education, and the high expectations from the nurses are among the causes of medication errors by nurses that end in imposing great stress on nurses^[13, 14]. TaheriHabibabadi has reported the causes of medication errors to be high workload, new employees and staff negligence^[11]. Panjuyi considers more than half of the medication errors as preventable, although medication errors are sometimes inevitable due to human errors^[15]. To prevent the incidence of errors, attention to eight proper patient principles, correct medication, correct time, correct consumption, correct consumption dose, correct recording, correct administration, and proper patient response to medicine should be carefully observed^[16]. Nowadays, the wide range of medication and the presence of patients with various medicinal prescriptions have increased the number of medication error. Furthermore, given the importance of patient safety and the relatively high level of medication error, and that the identification and reporting medication error is vital, the present study was done aimed at determining the rate and type of medication error of nurses and their related factors in ShahidMohammadi Hospital in Bandar Abbas.

Materials and Methodology

This descriptive cross-sectional study with the analytical design was conducted to determine the rate of medication errors among the nurses of ShahidMohammadi Hospital of Bandar Abbas who were 257 in 2017. The inclusion criteria were having a bachelor's degree and one year of work history and the exclusion criteria were the nurses with management posts, head nurses, and those unwilling to participate in the study. Data collection tool was a researcher-made checklist with their validity and reliability evaluated. Data were analyzed in SPSS 18 and descriptive and analytical tests.

This descriptive, cross-sectional and analytical study was conducted to determine the extent of medication errors in the nurses working in the hospital wards of ShahidMohammadi Hospital in Bandar Abbas, which had a total of 257 patients in 2017. The samples were selected using convenience sampling and were the nurses working in the internal, surgery, emergency, and special wards who worked directly at the clinic

with at least one year of work experience. The exclusion criteria were the nurses with management posts, head nurses, and those unwilling to participate in the study. Data collection tool was a researcher-made checklist and a demographic questionnaire. Content validity and face validity were used to determine the validity of the questionnaires. The contents of the checklist were prepared based on reading the books, papers, guidelines, and standards and reviewed and examined by the ten faculty members of nursing in terms of clarity and simplicity of the contents. The comments were applied after summing up in the questionnaire and checklist. Cronbach's alpha was used to determine the reliability of the tool. The performance of 20 qualified nurses was selected randomly and examined and the index for each part of the checklist was calculated separately observed by two observers (the researcher and a nursing expert). The value of this coefficient for the medication errors questionnaire was 0.75. The researcher started to complete the questionnaires after obtaining the license from Hormozgan University of Medical Sciences and presenting it to the head of the hospital, security, and the relevant wards, providing a complete description of the objectives of the study and its method, and preserving the confidentiality of the information and obtaining written consent.

In the checklist of demographic information had the variables age, marital status, type of employment, level of education, service sector, work experience, type of shift, employment in another hospital, employment other than nursing, hours of work in the month, and passing a course on drug administration completed by the subjects. The checklist of how nurses administer drug law rules had 20 questions. They were six correct rules for drug prescription, where six questions related to the correct drug law, two questions about the correct patient law, two questions related to the correct dose rule, two questions related to the law of the correct method, and two questions are about the right time law and six questions about the correct recording rule. The checklist consists of two parts in terms of criteria. Part one was "Yes," scored at the time of the correct implementation of the care and the second part is scored when the desired care is not taken correctly. For each question in the checklist, the maximum score for the yes part was one and the minimum score for no part was zero, and finally, the scores were classified into three levels: good, average and weak. Thus, for the correct drug law and the correct recording, the scores 0-2 was poor, 3-4 average, and 5-6 good. For the correct patient rule, the correct dose, and the correct method, zero was poor, on average, and two was good. Finally, to reach the purpose, the points of all the questions were summed together and the resulting interval (0-20) was divided into three equal parts so that a score of 0-6 was weak, 7-13 was average, and 14-20 was good. Data was analyzed in SPSS18 using descriptive (frequency and percentage) and analytical statistics (T-test).

Results

Two hundred fifty-seven nurses participated in the study. Most of them were females 241 (93.8%), married 209 (81.3%), bachelor's degree 230 (89.5%) and 182 (70.8%) did not participate in the training classes (Table 1).

The results indicated a significant relationship between medication errors and the degree of education, participation in administration classes, and working in other hospitals (P=0.001). This means that with increase in the level of education and participation in re-training administration classes and employment in other hospitals, decreased and increased medication errors, respectively. T-test results showed no relationship between medication error with gender, marital status and type of employment (P>0.05) (Table 1).

Table 1: Demographic characteristics of the subjects

Variables	Frequency(percent)	p- value
Gender		0.23
Males	16 (6.2)	
Females	241 (93.8)	
Marital status		0.06
Single	48 (18.7)	
Married	(81.3) 209	
Education		0.001
bachelor's	(89.5) 230	
Master's	27 (10.5)	
Employment type		0.184
Official	18 (7)	
Agreement	(61.6) 157	
Contractual	40 (15.6)	
Case	42 (16.3)	
Employment in other hospitals		0.001
Yes	49 (19.1)	
No	(80.9)208	
Participation in class		0.001
Yes	75 (29.2)	
No	(70.8) 182	

The mean age of nurses was 31.92±4.78 years and the average work experience was 7.52 ± 4.6 years (Table 2).

Table 2: Distribution of relative frequency of demographic characteristics of the subjects

Variables	Mean± SD
Mean age (years)	31.92±4.78
Work history mean (years)	7.52 ± 4.6
Work hours in month (hours)	174.64±7.68
Number of patients assigned per shift	8±5.69

The most common types of medication errors were wrong patient (34.65%), drug dosage (20%), type of drug (19.98%), drug registration (19.5%) and the lowest of them was correct method (3.3%) (Figure 1).

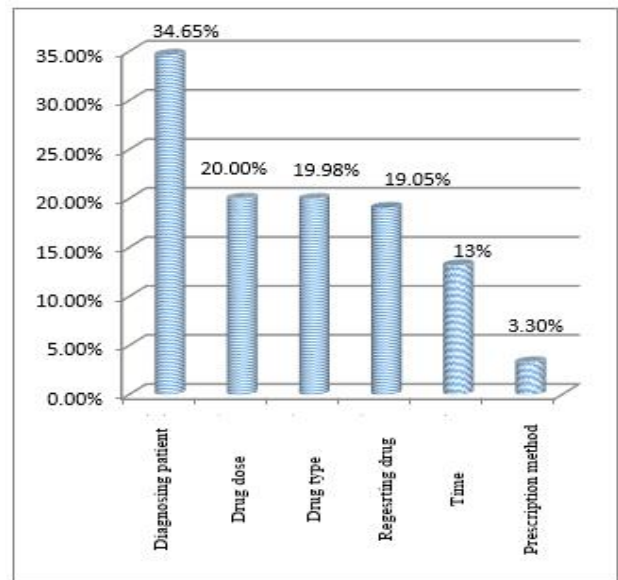


Figure 1: Most frequent types of medication errors among the subjects

The results indicated that the most frequent medication errors according to the correct drug law are, respectively, lack of inquiry from the history of drug sensitivity 65%, the lack of examination of the label of the drug over in clinic before administering the drug 23%, and lack of compliance with the instructions of the physician before the drug prescription 22.3% (Table 3).

The highest number of medication errors according to the patient's correct rule was related to the lack of checking the patient's diagnostic bracelet with 44.4% and the lowest was asking the patient's name before the drug with 24.9%(Table 3).

The highest medication errors according to the correct time of drug administration were 20.6% (Table 3).

The highest medication errors according to the correct registration law were the lack of registration of the medication prescribed in the medical file with 73.5% and the lack of registration of the drug immediately after its implementation 36.2% (Table 3).

Table 3: Frequency of distribution of the subjects according to drug administration law

Questions	Yes frequency (percent)	No frequency (percent)
The correct drug		
Matching of the drug with the physician's order before administering the medication	(77.8) 200	57 (22.30)
Matching of the drug before taking the medicine dish from the medicine cabinet	257 (100)	0
Matching of the drug sticker when taking the medicine from the appropriate container	257 (100)	0
Matching of the drug label at clinic before taking it	198 (77)	59 (23)

The drug administration nurse is the same nurse who prepares the medication	(90.3) 232	25 (9.7)
Questioning about the history of drug allergy	95 (35)	167 (65)
The correct patient		
Identifying the patient's name before giving the drug by asking his name	(75.1) 93	64 (29.3)
Identifying the patient's profile before giving a bracelet	153 (55.6)	114 (44.4)
The correct dose		
Paying attention to the dosage cited	257 (100)	0
Preparing the drug in accordance with the prescribed dose	(99.6) 256	1 (0.4)
The proper way		
Matching the method of prescribing in accordance with the physician's instructions and the method prescribed on the medicine prior to administering the medicine.	(94.2) 242	15 (5.8)
Drug administration according to the instructions given	(99.6) 256	1 (0.4)
Correct time		
Preparing the drug immediately before giving it to the patient	(94.2) 242	15 (5.8)
Drug administration according to the time given to the patient	(79.4) 204	53 (20.6)
Correct registration law		
Registration of the drug in the patient's case immediately after the administration of the drug	(63.8) 164	93 (36.2)
Registration of the generic drug prescribed in the medical records of the patient	(98.1) 252	5 (1.9)
Recording the dosage of the prescribed drug in the patient's medical records	257 (100)	0
Registering the timing of the prescribed medication in the patient's medical records	(97.7) 251	6 (2.3)
Recording the prescribed drug method in the patient's medical records	(99.6) 256	1 (0.4)
Recording the efficacy of the prescribed medication in the patient's medical records	68 (26.5)	189 (73.5)

Discussion and Conclusion

A significant part of medical errors is the ones made by nurses during the medical care, which has become s in recent years given the increased mortality rate and hospital costs. DavariDolatabadi et al have reported the incidence of medication errors among nurses by 40%, which was higher than that of this study ^[17], the type of ward the nurses working in effects this difference. In DavariDolatabadi (2017), where the population was the ICU nurses and in our study all the nurses from the relevant sections were included in the study. The

results indicated that the most frequent types of medication errors were The most commonly reported medication errors were the wrong patients (34.65%), drug dosage (20%), drug type (19.98%), and drug registration (19.5%), and the least errors were related to the administration method (3.3%) ^[17]. The results of Ehsani et al. (2013) on 94 nurses working in the emergency showed that the most common medication error was the wrong dosage ^[18], which was consistent with the results of the current study. In addition, the result of Salmani and Hasanwand (2015) showed that the most common medication error about oral drugs was in calculations and dosage ^[19]. In their study in Sanandaj, AhangarzadehRezaei et al. stated the wrong dose, wrong time, and wrong patient as the most common nursing medication error ^[20]. Furthermore, Zahmatkeshan et al. (2010) and Nikpeima and Gholamnejad (2009) reported the most commonly reported medication errors in doses and wrong drugs (16 and 7). The study by PellicciottiJda et al. (2010) in ICU in Brazil stated the most reported errors in drug administration and time errors, inconsistent with the present study ^[8], which is probably because of the number of nurses in each ward and division of forces in each shift. Furthermore, Nawwar (2015) reported the most frequent error to be in the drug administration technique that is inconsistent with the current study ^[9]. The reasons behind these differences are the different policies of different hospitals about nurse-patient ratio and duration of each shift. Among the other results of the study were the significant relationship between work shift and medication errors so that the medication errors among the nurses with changing shifts was significantly higher than the nurses of the fixed morning shift. This was consistent with the study of Farajzadeh et al. (2018) ^[21] and Salmani and Hassanvand (2015) ^[19], which considered changing shifts as one of the reasons of medication errors. Sleeping is one of the basic human needs, deprivation from which may reduce individual performance, so the errors in the night shifts are inevitable. Examining the relationship between the type of medication errors and the demographic characteristics of nurses showed no significant relationship between age, gender, marital status, and type of employment, in line with Ramezani. The results showed that a significant relationship between the education and work shift, whereas Taheri et al. (2013) the education had no relationships with the medication error ^[11]. In this study, the type of employment was not significantly related to the occurrence of medication errors, in line with Zahmatkeshan et al ^[7]. Work experience has a significant relationship with medication errors that is inconsistent with the study of Zahmatkeshan ^[7], but consistent with Ito et al. (2003) in Japan, showing that more working experience reduces medication errors ^[22]. The number of patients in each shift had a significant relationship with the incidence of medication errors. In other words, the increase in workload has a role in the occurrence of medication error, which is consistent with the results of the Pajavini ^[16]. Among the reasons for differences in the results of different studies can be the differences in the sample population, the type of ward

where the nurses work and different distribution of forces and facilities in different wards.

Conclusion

Based on the results, it is necessary for educational managers and nursing and hospital education units to provide necessary standards like nurse-to-patient ratio, adequate recruitment, reduction of overtime hours, Continuous monitoring by clinical experts at the hospital in the 24-hour period to prevent drug problems to be addressed. According to the World Health Organization (WHO), medication errors in medical centers are classified among the never-repeating errors, all of which have to be dealt with by proper planning and the ongoing efforts of the nursing staff.

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