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Original Article

Health Management and Policy Section

Factors Affecting Medication Errors from the Perspective of Nursing Staff

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ABSTRACT

Introduction: Medication administration is a key responsibility of nurses. If this duty is not properly accomplished, it can cause serious threats to the health and safety of patients.

Aim: To explore factors affecting the frequency of medication errors from the perspective of nurses in educational hospitals of Ilam, Iran.

Materials and Methods: The present descriptive analytical study was conducted on 120 nurses randomly selected from teaching hospitals of Ilam. A two part standard questionnaire was used. Its first part was on the participants demographic information. The second part consisted of three domains including 11 questions on the factors associated with nursing, seven questions on the factors associated with wards, and four questions on the factors associated with nursing management. Data analysis was performed using the SPSS software, version 19.0. The significant p-value was considered less than 0.05. A total of 120 completely filled questionnaires were obtained and this formed the study data.

Results: The participants included 50 (42%) males and 70 (58%) females. In all the three domains, the most frequent factors resulting in the incidence of medication errors included: occupational fatigue exhaustion (58.5%), nurses personal neglect (56%), heavy workload in wards (65.6%), and inadequate staffing and high nurse/patient ratios (69.7%), respectively.

Conclusion: Fatigue, personal carelessness, heavy workload, inadequate staffing and high nurse/patient ratios are the important and effective factors causing medication errors. Reducing the number of nurse's shifts during the month and increasing the number of personnel per shift are recommended.

Keywords: Iran, Medicinal errors, Nursing profession

INTRODUCTION

Nurses are considered as one of the most important groups among the medical staff of hospitals. One of the major tasks of nurses is dispensing medications to patients. They must aware of the importance of proper recognition and administration of medications to avoid potential risks and possible complications resulting from medication errors [1].

As the popular saying goes, 'To err is human'; hence, inspite of being skilled and committed, the medical staff may make mistakes [2]. Medication errors in hospitals usually involve 3-6.9% of the hospitalised patients. It has been estimated that medication errors cause at least one death per day in the United States [3]. Traditionally, to avoid medication errors, nurses used five rights of medication administration; the right patient, the right medication, the right dose, the right route, and the right time. Following this principle before giving any medication, can help nurses avoid most of the medication errors [4].

After a medication error occurs, the nurse is usually blamed more than any other health professionals. This is due to the fact that a nurse administers most of the medications and spends 40% of their time on administering medications, in hospitals [5]. Direct effects of a medication error may be life threatening or may lead to an increased financial cost. Moreover, occupational injuries among nurses and mistrust of nursing staff are the indirect effects [6].

In some studies, insufficient drug information and weaknesses in continuous educations have been mentioned as the main causes of medication errors [7-10]. In a retrospective study conducted by Wolf ZR and Hicks R it was noted that human factors are involved in 75% of cases, of which 45% is due to the lack of skills and knowledge [11]. The results of a study by Tang F et al., on 70 nurses show that the majority of nurses (79%) believe that factors such as nurse's personal neglect and heavy workload affect the incidences of medication errors [12]. In Iran, knowing the amount of reports on medication errors is very difficult due to lack of a proper recording and reporting system and lack of information based on research studies, so it is considered as a major problem for the therapeutic system [13]. Because of the effects of medication errors on the mortality and morbidity rates and hospital costs, conducting studies on such errors is of prime importance. Accordingly, the present researchers decided to investigate the factors affecting medication errors from the perspective of nurses in the hospitals of Ilam in 2015.

MATERIALS AND METHODS

This cross-sectional research included all male and female nurses working in educational hospitals in Ilam, Iran (Imam Khomeini and Shahid Mostafa Khomeini Hospitals). Of the total 360, 128 nurses were selected randomly. It should be noted that the sample size was based on a previous study and the number of employed personnel in the hospital [10].

In this research, random stratified sampling method was used in order to select the research samples. The inclusion criteria were; consent to participate in the research, having at least diploma in nursing and at least one year of clinical experience. Those who did not respond to questionnaire completely and nurses not having at least one year of work experience were excluded.

The Questionnaires were distributed and collected by the researcher during April 2014. The questionnaire consisted of two parts. The first part included demographic information of the participants including age, sex, marital status, work experience, education and working department. The second part of the questionnaire evaluated the factors influencing drug misconduct which was designed by

Mrayyan MT [14]. It consists of 22 questions in three portions (factors related to nurses with 11 questions, factors related to the ward with seven questions and factors related to nursing management with four questions). Face validity and content validity of the tool were obtained with the opinion of 10 nursing faculty members. Also, in order to calculate the reliability, the questionnaire was given to 10 personnel that were not included in the sample and the Cronbach's alpha coefficient evaluated was 0.79. In the questionnaire, each question with very low, low, moderate and high options was ranked 1-4 according to the importance, so that score 1 allocated to the least important, and score 4, to the most important. The scores range from 88 to 22 points.

STATISTICAL ANALYSIS

Data analysis was carried out using the SPSS software, version 19.0. To analyse the data, descriptive statistics, pearson's correlation coefficient, one-way ANOVA, and t-test were calculated. The significant p-value was considered less than 0.05. A total of 120 completely filled questionnaires were obtained and this formed the study data.

RESULTS

In [Table/Fig-1], the demographic information of the study participants is depicted. It shows that 50 (42%) participants were males and 70 (58%) participants were females. In [Table/Fig-2], the importance of different factors affecting medication errors, which are associated with nursing, wards, and nursing management domains, is represented; it is indicated that nurse's personal neglect (56%) and illegible medication orders (55.8%) are the most causes of medication errors and the psychological problems factor (19.2%) is the least cause of medication errors in the domain of nurses. Regarding the ward domain, heavy workload in the wards (65.8%) is observed as the most cause of errors and the similar names of patients (10.2%) are seen as the least cause of errors. Concerning the nursing management domain, inadequate staffing and high nurse/patient ratios (69.7%) is the most cause of errors and the way of monitoring and managing wards (12.1%) is the least cause of errors.

Demographic Information	Sub-Categories	Number
Age	<25 Year	50 (42%)
	25-35 Year	40 (33%)
	35-45 Year	30 (25%)
Gender	Male	50 (42%)
	Female	70 (58%)
Marital Status	Unmarried	56 (47%)
	Married	64 (53%)
Work Experience	<5 Year	50 (42%)
	5-15 Year	40 (33%)
	15-25 Year	30 (25%)
Degree of Education	Diploma in health care	10 (8%)
	Bachelor of nursing	110 (92%)

[Table/Fig-1]: Demographic characteristics of nurses and health care workers participated in this study based on separation of sub-categories.

To investigate statistical relationships among the factors affecting medication errors and demographic variables, one-way ANOVA and t-test are used ($p<0.05$). The [Table/Fig-3] shows the statistical relationships among the domains affecting medication errors and demographic variables (i.e., age, work experience and gender). There were statistically significant relationships between all the factors affecting medication errors and gender (p-value=0.047). Furthermore, there are statistically significant relationships between all the factors affecting medication errors and work experience (p-value=0.010); however, there were no statistically significant relationships between the factors affecting medication errors and marital status, age and education ($p>0.05$).

Importance of factors in caused medication errors		High (4 score)	Medium (3 score)	Low (2 score)	Very low (1 score)	Mean±SD	
Nurse area Mean±SD= 2.87±0.818	1. Carelessness of nurse	67 (55.8%)	38 (31.6%)	12 (10%)	3 (2.6%)	3.42	0.58
	2. Lack of motivation	38 (31.6%)	53 (44.2%)	17 (14.2%)	12 (10%)	3.10	0.62
	3. Lack of awareness of drugs	55 (45.8%)	33 (27.5%)	29 (24.2%)	3 (2.6%)	3.175	0.83
	4. Psychological problems	23 (19.2%)	34 (28.3%)	27 (22.5%)	36 (30%)	2.37	0.12
	5. Lack of enough time	56 (46.6%)	40 (33.4%)	16 (13.4%)	8 (6.7%)	3.2	0.79
	6. Fatigue related to work	70 (58.3%)	34 (28.3%)	10 (8.4%)	6 (5%)	3.41	1.1
	7. Novice nurse	51 (42.5%)	37 (30.8%)	24 (20%)	8 (6.7%)	3.15	1.15
	8. Morning shift	27 (22.5%)	22 (18.3%)	28 (23.4%)	43 (35.8%)	2.28	0.91
	9. Evening shift	34 (28.3%)	26 (21.7%)	20 (16.7%)	40 (33.3%)	2.45	0.87
	10. Night shift	40 (33.3%)	37 (30.7%)	21 (17.5%)	22 (18.5%)	2.79	0.68
	11. Illegible drug cards	67 (55.8%)	19 (15.8%)	19 (15.8%)	15 (12.6%)	3.23	1.35
Ward area Mean±SD= 2.67±0.748	12. The noises of ward	33 (27.5%)	37 (30.8%)	33 (27.5%)	17 (14.2%)	2.72	0.98
	13. Drug room environment (insufficient light)	30 (25%)	35 (29.2%)	18 (15%)	37 (30.8%)	2.51	0.64
	14. Type of ward	40 (33.3%)	33 (27.5%)	25 (20.8%)	22 (18.5%)	2.76	0.71
	15. High load of works in ward	79 (65.8%)	29 (24.2%)	5 (4.2%)	7 (5.8%)	3.5	1.34
	16. Type of drug arrangement on the shelf	33 (27.5%)	40 (33.4%)	33 (27.5%)	14 (11.6%)	2.78	0.62
	17. Drug protocol of ward (not having a drug card)	40 (33.4%)	37 (30.8%)	30 (25%)	13 (10.2%)	2.85	0.73
	18. Patients with similar name	13 (10.2%)	25 (20.8%)	12 (10%)	70 (58.2%)	1.58	0.22
Nursing management Mean±SD= 2.55±0.987	19. Insufficient numbers of nurses to attend to patients	84 (70%)	25 (20.8%)	10 (8.3%)	1 (0.07%)	3.48	1.25
	20. Head nurse supervision methods	15 (12.5%)	24 (20%)	20 (16.7%)	61 (50.8%)	1.73	0.84
	21. The lack of facilities for injection (pump serum)	30 (25%)	29 (24.2%)	25 (20.8%)	36 (30%)	2.24	0.99
	22. Lack of training classes	56 (46.7%)	21 (17.5%)	23 (19.2%)	20 (16.6%)	2.77	0.87

[Table/Fig-2]: Importance of factors from the perspective of the nurses leading to medication errors.

Statistical relationship between demographic variables with areas	Nurse area		Ward area		Nursing management area		Effective factors in medication errors	
	Correlation	p-value	Correlation	p-value	Correlation	p-value	Correlation	p-value
Age	0.188	0.67	0.338	0.33	0.221	0.56	0.282	0.41
Gender	0.536	0.10	0.712	0.03	0.576	0.08	0.674	0.04
Work experience	0.838	0.007	0.095	0.88	0.872	0.005	0.812	0.01
Marital status	0.172	0.63	0.408	0.42	0.526	0.12	0.337	0.32
Education	0.840	0.006	0.540	0.09	0.321	0.21	0.541	0.09

[Table/Fig-3]: Statistical relationship between effective factors in caused medication errors and demographic variables.

DISCUSSION

In this study, researchers investigated the factors affecting medication errors caused by nurses. The results manifested that nurses carelessness and card illegibility were the most common causes of nursing errors. Illegibility of prescribing drugs and medication cards and consequently, carelessness of the nurse in the choice of prescription of drug to the patient is important factors in occurrence of drug errors, that other studies have also referred to. In the study of Mrayyan MT, the important factors are fatigue due to work, nursing carelessness, and illegibility of the card respectively, which is consistent with the results of the present study [14]. Fang CM and Thong KL also found 42.5% of drug errors occur due to illegibility of drug cards [15]. Ulanimo VM et al., and Soozani A et al., reported 28% and 42.5%, respectively, as the major causes of drug errors to illegibility of the doctor's handwriting [16,17]. Enguidanos SM and Brumley RD also found card illegibility, drug orders and the use of medical abbreviations to be the most important factors of these drug errors [18]. The results of the studies show that despite the importance of the drug's readability, the nurse's precision in choosing and prescribing the drug is important for preventing an error.

According to the results of this study, the high workload was the most effective factor in the occurrence of drug errors, this is consistent with other studies [1,12,14]. Tang F et al., have come up with similar results in this regard, and asserted the high work load as a second cause of drug errors [12]. Several other studies have also highlighted the high workload as an important factor in nursing drug errors [1,19-21]. The results of this study indicate that in the area of nursing management, the most effective factor was the number of nurses to the number of patients. Researchers have referred to this in various studies [1,17,21]. Harding I and Petrick T and Cramer H et al., refer high workloads, low staffing, and physical or mental fatigue as the three leading causes of drug errors [19,21]. Tang F et al., and Karen M et al., studies also consider the shortage of nursing staff as the main factor in increasing drug errors [12,20]. The results of studies by Soozani A et al., and Anacleto TA et al., showed that lack of nursing staff and inappropriate distribution of patients are effective in drug errors among nursing staff as a result by obeying the nursing law, depending on the type of section, this problem can be prevented [17,22].

On the statistical relationship among demographic variables in the incidence of medication errors, the following results emerged: a statistically significant relationship between gender and work experience with medication errors, but there were no statistically significant relationships between other demographic variables and medication errors [23-26].

At all stages of prescribing, preparing, and administrating drugs, medication errors may be considered in the medication administration process. Therefore, the managers of health care systems should focus on the factors affecting medication errors such as the nursing staff perspective to reduce medication errors and using different methods to proper training of them. Holding retraining courses on the fundamental techniques of medication administration and encouraging nurses by nurse managers to motivate them are amongst the strategies that can have a significant positive impact on the reduction of medication errors in clinical settings according to the available capabilities and limitations.

LIMITATION

Self report form and nurse's fatigue in answering the questionnaire are the limitations of this study. Using of observation method in data collection is recommended.

CONCLUSION

On the nursing domain, it can be pointed out that since the nurse's personal carelessness, occupational fatigue exhaustion, and illegible medication orders were the factors that mostly led to medication errors, more benefits of nurses and reducing their shifts during the month can significantly diminish their negligence and work related exhaustion. Heavy workload in wards and inadequate staffing and high nurse/patient ratios in the domain of nursing management were two factors mostly resulted in medication errors; thus, these factors can be lessened by increasing nurses per shift.

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