Understanding Medication Errors as Leading Factors amongst Nursing Staff Working at Basra City Hospitals, Iraq

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Background: Medication errors are one of the most common medical errors that threaten health services and lead to disorder in the treatment process. **Aims:** To determine the main leading factors that contribute to medication errors from the perspective of nurses, to assess the nurses' understanding about the factors related to medication error and to estimate the relationship between nurses' understanding of factors that contribute to medication errors with demographic characteristics. **Methods:** the present study contains descriptive methodology; a structured questionnaire was given to 100 nurses working in various departments in three Basra city hospitals. **Results:** Tiredness resulting from overwork (56%), department environmental noise (60%), insufficient number of nurses in relation to patients (83%) and physicians' illegible handwriting in patient files (55%) are the leading causes for medication errors from the nurses' perspectives. It has been found that 11%, 45%, 44% of respondents had good, medium and poor understanding respectively regarding factors related to medication errors. **Conclusions:** The main factors contributing to medication errors are insufficient numbers of nurses compared to number of patients, environmental department noise, tiredness resulting from overwork and physicians' illegible handwriting in patient files. A considerable percentage of nursing staff have poor awareness about factors leading to medication errors. There is a significant negative correlation between nursing staff awareness age and duration of employment. Furthermore, there is significant correlation between understanding and formal education as well as participating in training courses related to the subject.

Key words: *Understanding, Medication, Error, Nursing, Staff*

Introduction

Medication errors are included amongst the most common medical errors that threaten health and lead to disorders in the treatment process. Recently, medication errors have attracted increased attention due to the potential or actual risk of hazard for patients, higher rate of mortality and health care cost (Akram et. al. 2013).

Medication errors are defined by the National Coordinating Council for Medication Error Reporting and Prevention as "any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health care professional, patient, or consumer" (Savvato et. al. 2014).

The medication process is complex and multi-layered   and medication errors may occur at any step , from manufacturer to patient, including prescribing, transcribing, dispensing, and administering drugs and monitoring patient response. Many steps and a range of people have the responsibility of giving the right dose of medication to the intended patient. Each step or person has the potential to contribute to or prevent a medication error (Nkurunziza et. al. 2011).

In drug therapy, nurses, doctors and pharmacists participate in a system of checks and balances to increase beneficial effects and reduce harm. In this system, nurses are especially important as nurse follow the patient's status most closely. Nurses have an important role as patient advocates to detect and protect the patient against medication errors made by other members of the health care team. They are both ethically and legally responsible for the correct administration of drugs. It is unacceptable for a nurse to administer a drug that causes harm to the patient – even though the medication has been prescribed by a licensed prescriber and dispensed by a licensed pharmacist (Richard et. al. 2011).

According to the American Institute of Medicine, medication errors are one of the five categories of medical errors. Each year, 55 000 medical errors occur, leading to 10 500 deaths and 23 000 physical disabilities (Abrams et. al. 2013). In developing countries, it is difficult to have accurate estimates regarding medication errors due to lack of a proper system for recording and reporting as well as a shortage of research information, but according to experts, the error rate is high , and the number of complaints against health care teams in judicial authorities is increasing (Mohammed et. al. 2016). In drug therapy, nurses participate alongside doctors and pharmacists, in a system of checks and balances to increase benefits and reduce harm. Nurses are especially important in this system, as they closely follow the patient's condition. They play an important role as a patient advocate for the detection and protection of patients from medication errors committed by other members of the health care team. Nurses are ethically and legally responsible for proper administration of the medicines. It is

unacceptable for nurses to administer a drug that causes harm to the patient - although the drug has been prescribed by a licensed pharmacist.

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After a medication error occurs, nurses are usually blamed more than any other health professionals, because nurses administer most medications and 40% of their time is spent managing hospital medications (Nkurunziza et. al. 2013).

Study aims :

1. Determine the leading factors that contribute to medication errors from the perspective of nurses.
2. Assess nurses' understanding about factors related to the causes of medication errors.
3. Estimate the relationship between nurses' understanding about factors that contribute to medication errors with demographic characteristics.

Methodology

Study Design: Descriptive, Cross-Sectional

Setting: Basra city hospitals in Basra governorate, southern Iraq.

Study sample: 100 nurses working in various departments in three Basra city hospitals.

Data Collection: A structured questionnaire was used for data collection; a modified form was used in a previous study in Iran.

The first part of the questionnaire pertained to demographic characteristics, while the second part was related to the evaluation of medication errors. The medication error questionnaire contained twenty items, and assessed medication errors in three areas including nurse- related factors (seven items), department-related factors (six items) and nursing management factors (seven items). The items were scored as (score 0) as disagree and (score 1) to agree with the questionnaire items. Subsequently, scores of questions were calculated. From a total of twenty scores, those who gain scores from (0-6) were considered to have poor understanding , from

(7-13) to have medium understanding and from (14-20) to have good understanding about factors influencing medication errors.

Participation in the study was voluntary and anonymous. Data was collected via face-to-face interviews by two senior nursing students. Data collection was carried out from December 2017 – February 2018.

Statistical analysis: SPSS version 23 was used for data analysis, data were expressed in (frequency and percentage). A correlation test was used to examine the relationship between selected variables and the level of understanding with medication error factors.

Results

Table 1: Socio demographic characteristics of participants (n=100)

Characteristics of participants	Categories /groupings	Frequency	(%)
Gender	Male	46	46
	Female	54	54
Age in years	>30 years	47	47
	30-39	25	25
	40+	28	28
Level of education	Secondary nursing school	35	35
	High health institute	57	57
	Nursing college	8	8
Duration of employment	>5	37	37
	5-9	20	20
	10+	43	43
Participated in training courses on medication errors	Yes	35	35
	No	65	65

Tables 1 shows that (54%) of participants were female, (47%) aged less than 30 years. The majority (57%) were high health institute graduates. Duration of employment was (43%) and participantswere employed for 10 years or more, (35%) participated in training courses about medication errors during their practice.

Table 2: Nursing staff agreement with factors leading to medication errors (n=100)

	Factors leading to medication errors	Agree		Disagree	
		No.	%	No.	%
Nurses related factors	Tiredness resulting from overwork	**56**	56	44	44
	Not having enough time	41	41	59	59
	New nursing staff	30	30	70	70
	Being disinterested in the nursing profession	33	33	67	67
	Nurses' psychological and mental problems	33	33	67	67
	Nurses being unfamiliar with drugs	28	28	72	72
	Nurses' family problems	22	22	78	78
	Nurses' economic problems	10	10	90	90
Department related factors	Department environmental noise	**60**	60	40	40
	High volume of work	55	55	45	45
	Department type	38	38	62	62
	Drug protocols	37	37	63	63
	Drug chamber office space (light, physical space)	34	34	66	66
	The way drugs are arranged on shelves	21	21	79	79
Factors related to nursing managements	Insufficient number of nurses in relation to the number of patients	**83**	83	17	17
	Physicians' illegible handwriting in patient files	55	55	44	44
	Errors occurring mostly during night shifts	44	44	56	56
	Department supervision	39	39	61	61
	Drug prescription method	32	32	68	68
	Errors occurring mostly during evening shifts	25	25	75	75
	Errors occurring mostly during morning shifts	8	8	92	92

Regarding agreement rates with stated factors leading to medication errors, table 2 indicates that amongst nursing-related factors, the highest rate (56%) was for the item "Tiredness resulting from overwork," Department related factors, the highest rate was (60%) for "Department environmental noise." For factors related to nursing management, the highest rate (83% and 55%) pertained to the items "Insufficient number of nurses in relation to patients and physicians' illegible handwriting in patient files" respectively.

Table 3: Level of understanding amongst nursing staff with factors related to medication errors reasons

Level of understanding	Frequency	(%)
Poor (score from 0-6)	44	44
Medium (score from 7-13)	45	45
Good (score from 14-20)	11	11

Amongst participants, 44% showed a low level of knowledge regarding factors leading to medication errors, and only 11% of participants showed a good level of knowledge as shown in table 3.

Table 4: Spearman's rho? correlation between understanding with factors related to causes of medication errors and certain variables

Variables	N	Correlation Co-efficient (r)	Sig. (2-tailed) (p)
Gender	100	-.001	.992
Age	100	-.410	.000
Duration of employment	100	-.390	.000
Education	100	.234	.015
Participating in training courses about medication errors	100	.206	.040

As shown in Table 4, there was no significant correlation between awareness regarding factors related to medication error and gender, while there was a significant negative correlation with age and duration of employment and a significant positive correlation with both education level and participating in training courses about medication errors.

Discussion

To our knowledge, this is the first descriptive, cross-sectional study in Basra city hospitals, Iraq to determine the most common factors which contribute to medication errors from the perspective of nurses.

Our findings suggest that tiredness resulting from overwork (56%), department environmental noise (60%), insufficient number of nurses in relation to patients (83%) and physicians' illegible handwriting in patient files (55%) are the leading causes for medication errors from nurses' perspectives. It has been found that 11%, 45%, 44% of respondents were having good, medium, poor understanding respectively regarding factors related to medication errors.

A similar study completed in Iran in 2016 involving 119 nurses showed almost the same result including tiredness resulting from overwork and insufficient numbers of nurses in relation to

patients as contributing causes for medication errors, however high volume of work for department related factors is the leading cause for medication errors (Zarea et. al. 2018) as well as low nurse-to-patient ratio, high load functions and fatigue caused by extra work were the most important factors affecting medication errors, which were reported from a study in Iran during 2016 based on 225 nurses in various hospitals (Shohani et. al. 2018).

A Californian study also showed similar findings with our study including physicians' illegible handwriting and fatigue, as important contributing factors to medication errors (Shahrokhi et. al. 2004).

A study about 150 nurses working in Qazvin Medical University teaching hospitals considered that nurse-related factors were the most effective and the factors related to managerial and environment least effective (Mayo et. al. 2013). On the other hand, factors related to nursing management are found to be the most effective in our study.

Unlike our findings, a study completed as a systematic review of the literature related to medication errors in Middle Eastern countries revealed that the most common types of prescribing errors reported were incorrect dose, wrong frequency and strength. Understanding medicines was poor, which was identified as a contributing factor to errors made by both by doctors and nurses (Alsulami et. al. 2013).

Contrasting results were reported by three similar studies regarding leading causes of medication errors. The first was completed in Taiwan on female nurses which indicated that the rate of the three main leading factor in medication errors were due to personal neglect, heavy workload and new staff (86.1%, 37.5%, 37.5%) respectively (Tang 2007). The second was completed in Jordan on nurses which indicated that the leading causes of medication errors were due to heavy workload (41.4%) and new staff (20.6%) (Al-Shara, 2011). The third was conducted in Malaysia on 48 nurses and showed that the main factors leading to medication errors were heavy workload and complicated orders 95.8%, followed by percentage of new staff 81.2 %.The level of understanding amongst participants regarding provision of medication was sound. More than half of t nurses (54%) had medium, (46%) high, while none had low scores (Johari et. al. 2013).

The finding of a study completed on 456 health‑care professionals of various institutes of North, East and West India evaluating understanding regarding medication error differed from our findings. Understanding was found to be excellent in 18.45%, good in 39.48%, average in 14.16% and poor in 27.9% of the total respondents. In contrast, in our study the level of understanding was sound in11%, medium or average in 45%, and poor in 44% of total respondents (Sewal et. al. 2014).

Conclusions

1. According to our nursing staff, the main factors which contribute to medication errors are insufficient number of nurses compared to the number of patients, environmental department noise, tiredness resulting from overwork and physician' illegible handwriting in patient files.
2. There is a considerable percentage of nursing staff who have poor understanding about factors leading to medication errors.
3. There is a significant negative correlation between nursing staff knowledge and age, duration of employment, and a significant correlation between knowledge and formal education, as well as participating in training courses related to the subject.

Recommendations

1. Increase the number of nursing staff employed by the General Directorate of Health and Ministry of Health to treat the problem of nursing staff shortage in health institutions.
2. Pay more attention to improving the working environment.
3. Encourage all nursing staff in health institutions to participate in training courses regarding medication errors.

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