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Original Article

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Missed dose error among nurses working at tertiary care hospitals, Karachi

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ABSTRACT

BACKGROUND & OBJECTIVE: Medication administration error (MAE) has been recognized as a serious health related issue that can lead to surge mortality and morbidity. In addition, it may rise hospitalization that will increase the ratio of the patient. This study was accomplished to determine the missed dose error among nurses working at tertiary care hospitals, Karachi.

METHODOLOGY: This analytical cross-sectional study was accomplished at Dr. Ruth K.M. Pfau Civil Hospital and Dow University Hospital, Karachi for the period of six months from February to July 2018. The calculated sample was 204 nurses of both genders. Nurses having one year of working experience and licensed with Pakistan Nursing Council had been invited for the study. The participants were approached by a non-probability convenient sampling method. The adopted and validated questionnaire was utilized to gather the data. The data was entered and analyzed by using SPSS version 21.0.

RESULTS: Out of 204 subjects, 106 (52%) were male. With respect to age, 168 (82.3%) of respondents had age below 35 years. The percentage of missed medication doses was reported to be 12.3%. In this study, nurses to patients ratio, and timing of medication administration were found statistically significant with missed dose errors p-value≤0.05.

CONCLUSION: The study finding showed a small frequency of missed dose errors among nurses working in a tertiary care public sector hospitals, Karachi. The majority of missed doses were recorded in the morning shift, and nurses who had more patients ratio.

KEYWORDS: Missed dose, Nurses, Tertiary Care Hospitals.

INTRODUCTION

Medication administration error (MAE) is a leading issue in the hospitals all around the globe. There are various types of MAE such as wrong dose, wrong route, wrong time, wrong medicine and administration of medication to the wrong patient. Amongst, a single error may cause unusual harm to the patients. Patient safety is a significant task of healthcare organizations.

Proper medication administration improves the patient's outcome which ultimately leads to the decrease in the length of stay in the hospital and also reduces the cost. On the other hand, missed medication doses increase the risk of mortality and morbidity among hospitalized patients. Proper medication administration and patient's safety is crucial for speedy recovery of the patients [1]. The vital role of nurses is to ensure the safety of patient, in spite of the fact that patients are repeatedly harmed due to medication errors by healthcare workers [2].

12.9% of missed dose errors documented in Egypt [3]. There are certain factors responsible for MAE including overburden, shortage of nurses, limited knowledge, inexperience, interruption while working, nurse-patient ratio, and improper work distribution [4-5]. It is affirmed that, one error occurs on hospitalized patients every day [6].

Therefore, the medication administration process should be improved in health care delivery system. Missed dose error has been recognized as the most prevalent medication error globally, which is 42% and followed by wrong time error. The frequency of medication administration error is 50% as reported by "National Patient Safety Agency" (NPSA). Moreover, wrong timing of medication administration error has consequences[4]. The average of MAEs has been recorded from 9.4% to 80% in United kingdom, Middle East and East African countries [7-8]. The study conducted in Pakistan revealed 7.5% of missing doses error, while 17% wrong time error in a private healthcare setting [6] and 27.45% in public sectors tertiary care hospital [9].

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Furthermore, another study accomplished in Karachi, Pakistan disclosed 21% medication error rate [10]. Highest prevalence of missed dose error and MAEs i.e 74.4% and 82.1% respectively, has been identified in a study [11,12]. Therefore, the current study aimed to determine the missed dose error among nurses working at tertiary care hospitals in Karachi.

METHODOLOGY

Present analytical cross-sectional study was conducted at two major tertiary care public sector hospitals of Karachi. Registered Nurses having one year and above clinical experience were approached to participate in the study. The study was completed in the duration of six months, from February to July 2018. The sample size was calculated through OpenEpi version 3.0, an online sample size calculator. Calculated sample size was 204 nurses of both genders. It was calculated by taking 56.4% of MAE [4] with 95% confidence level and 5% margin of error.

Convenient non-probability sampling technique was used to approached the participants. Participation of the subjects was voluntary. Firstly, all the nurses were invited to attend the introductory session of the present study. The study was conducted after taking the approval from institutional Review Committee (IRB) from Dow University of Health Sciences Karachi [Ref. No: IRB-968/DUHS/Approval/2017/11]. Moreover, the data collection permission was also granted from the Medical superintendent of both data collection sites. Adopted and validated questionnaire was used to collect data. Permission of the tool was also granted from the primary author. Data was entered and analyzed in SPSS version 21.0. All descriptive data like gender, designation, working area and educational status was computed in frequency and percentage. Chi-square test was applied to determine the association between demographic variables and missed dose error. $p \leq 0.05$ was considered as significant.

RESULTS

Demographic information of the study participants:

In this research study, 204 participants were included. Amongst , 98 (48%) were female and 106 (52%) were male. The majority (43.1%) of the study participants had age between 25-30 years old. Only 71 (34.8%) study participants had a bachelor degree in nursing, while, 133 (65.2%) had diploma in general nursing. The ratio method was used to collect the data. Hence, the majority (77%) of the data was collected from Dr. Ruth K.M Pfau Civil Hospital and rest of participants were taken from Dow University Hospital Karachi. Nearly half (47.5%) of the study participants had an experience of less than 5 years. Approximately one-third (34.3%) of the study nurses administered medication up to 10 patients. Figure-I reveals the frequency of missed drug errors among nurses. In this study, 716 medications were administered by 204 nurses. Amongst, 88 (12.3%) medication doses had not been administered to the patients. While 628 (87.7%) nurses had administered medication doses as advised by doctors.

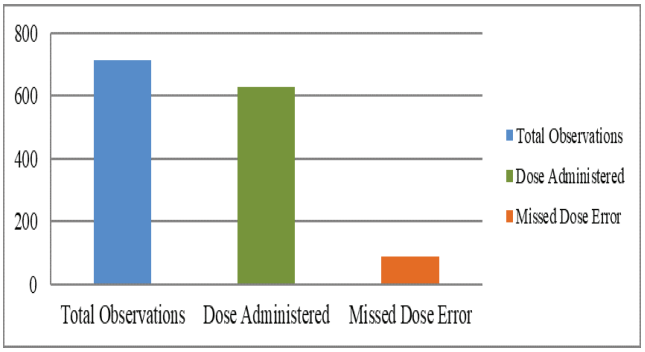

Figure-I: Missed Dose Error.

Figure-II highlights the frequency of missed doses and administered medication doses by individual nurses. It was recorded that almost one-third participants (35.78%) have had not administered medication as advised. In contrast, at night shift 37 (72.54%) of the nurses failed to administer patient's medication. While in evening shift only one-fourth 12 (27.28%) nurses had not administered medication to their patients.

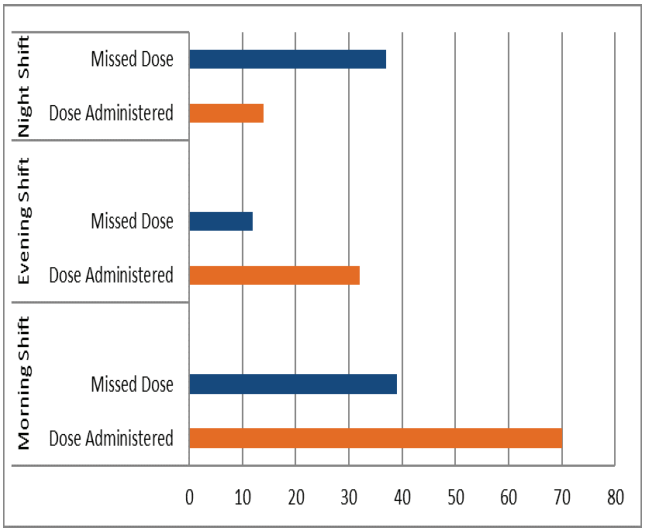

Figure-II: Missed Doses and Doses Administered by Individual Nurses per Shift.

Table-I discloses the association of missed dose errors with socio-demographic characteristics. In present study, no statistical differences were found between age group, gender, experience, and educational status of the participants (p-value >0.05). With respect to hospital, more missed drug errors were recorded in Dr. Ruth K.M Pfau Civil Hospital as compared to Dow University Hospital Karachi, however, this variable was not statistical significant with missed dose error but very near to significant (p-value=0.077). More errors were recorded by those nurses who administered the medication to more than 15 patients. Hence, nurses to patients ratio was also statistically significant with missed drug errors (p-value≤0.001).

Similarly, the timing of medication administration was also found statistically significant with missed drug errors (p≤0.001).

Table-I: Association of Missed Dose Error with Socio-demographic Characteristics of the Participants (n= 204).

	Missed Dose Error			
	No Error	Error	Chi-Square	p-value
	n(%)	n(%)		
Age (year)				
25-30	44 (50)	44 (50)		
31-35	47 (58.75)	33 (41.25)	4.12	0.127
≥36	25 (69.44)	11 (30.60)		
Gender				
Male	55 (51.89)	51 (48.11)		
Female	61 (62.24)	37 (37.76)	2.22	0.136
Education				
Diploma in Nursing	73 (54.89)	60 (45.11)	0.608	0.436
BS. Nursing	43 (60.57)	28(33.43)		
Hospital				
Dow University Hospital	32 (68.08)	15 (31.92)	3.136	0.077
Dr. Ruth K.M. Pfau Civil Hospital	84(53.50)	73 (46.50)		
Experience				
1- 5 years	53 (54.63)	44 (45.37)		
6- 10 years	26 (53.06)	23 (46.94)	1.620	0.445
> 10 years	37 (63.80)	21 (36.20)		
Working Area (wards)				
Surgical ward	69 (59.5)	52 (59.1)	0.003	0.955
Medical ward	47 (40.5)	36(40.9)		
Patients Ratio				
1 - 10 patients	50 (71.42)	20 (28.58)		
11 - 15 Patients	36 (66.67)	18(33.33)	20.398	<0.001*
>15 patients	30(37.50)	50(62.50)		
Time of Medication Administered				
10 am	70 (64.22)	39 (35.78)		
2 pm	32 (72.72)	12 (27.28)	24.906	<0.001*
10 pm	14 (27.46)	37 (72.54)		

*Statistical Significant

DISCUSSION

Medications hold an important significance in the delivery of healthcare, from the prescription to administration, it is the key aspect in saving patients' lives. Similarly, error in the medication use process may lead to lethal consequences to the patients. However, medication error is a preventable issue, and if controlled can lead to tangible improvements in the delivery of health. Missing medication doses can be detrimental to the hospitalized patients therefore, missed dose errors should be avoided to the maximum [13]. In order to control the prevalence of missed dose errors, this study aimed to find out the sociodemographic factors that are associated with missed dose errors.

In this study, the number of male participants was greater 106 (52%) than females.

However, this study could not highlight any significant relationship between gender, age and educational status of the study subjects with missed dose error (p-value>0.05). Similarly, a study conducted in Iran to find the causes of medication errors did not find a correlation between gender variable and medication errors. Conversely, research study conducted in this regard, have disclosed the importance of nursing education in the improvement of the medication process; and the familiarity of the medical staff to the new techniques and strategies such as electronic cards for patients can assist with error reduction [14].

In current study, a significant relationship was found between the nurse-patients ratio (p<0.001). Likewise, study

was conducted to analyze the effect of nurse staffing on the probability of medication errors; the study pointed many influencing factors such as extra work burden, fatigue, patient load, incomplete medication orders that are either damaged or sometimes unreadable, writing of doctors may cause medication errors [15]. In addition, another research study revealed that an adequate nurse-patient ratio in a clinical setting significantly decreased the mortality rate by 14%, and adverse events were less likely to happen in the wards [16].

Reducing error, related to missed doses, is an issue that needs to be tackled. There has been several studies conducted on this matter. Research studies have shown several factors which may help to reduce the medication errors such as proper documentation, higher education, self-reporting system, surveillance system and improving medicine distribution system [17, 18].

An Iranian study also affirmed that such factors are the common contributors in the phenomenon of medication errors [19]. Moreover, communication among the health care personnels is a factor that needs improvement [20].

An Australian study reported a significant improvement of approximately 29% in the probability of medication errors reduction due to effective and improved communication between the health care workers in the hospital[21]. Furthermore, a study of New Zealand demonstrated that nurses' with advanced education led to a decrease in missed dose error by 26.7% [22] and one more interventional study investigated the impact of nurse education on the incidence of omitted medication doses among hospitalized patients and found a significant reduction of missed doses error after intervention [23]. Electronic prescribing can also be an efficient way to decrease missed dose errors [24]. In UK, a study explored 8.8% of improvement in the reduction of missed dose upon the introduction of automation in their prescribing system [25]. Hence, health care systems need to take steps to reduce the work burden on nursing practitioner in order to facilitate the smooth and efficient work flow.

CONCLUSION

Medication administration is a complex process, and missed dose error is a major area to focus on for improving the accuracy of medication administration. The study revealed the frequency of missed dose error and provides opportunities for improvement in nursing practices by elaborating multiple reasons for such types of errors.

limitations:

Current study has a small sample size so, the research findings cannot be generalized for the whole region. But the concerns regarding missed dose errors and the factors influencing them have been verified and there is indeed the need of other studies to be conducted on this subject in large sample size and on multiple settings.

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