

## Magnitude of medication administration errors and their types

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**Objective:** To determine the magnitude of medication administration errors and their types among nurses working at tertiary care public sector hospital, Karachi, Pakistan.

**Methodology:** An analytical cross-sectional study was performed at Dr. Ruth K.M. Pfau Civil Hospital and Dow University Hospital, Karachi from January to October 2018. It included 204 nurses of both genders having one year working experience and registered with Pakistan Nursing Council. Non-probability purposive sampling method was used. The data were obtained by adopted and validated questionnaire and was analyzed using SPSS version 21.

**Results:** Out of 204 subjects, 106 (52%) were male and 168 (82.3%) had age below 35 years. The frequency of medication administration error was

found in 167 (81.9%). Wrong time medication administration error was seen in 56 (27.5%) nurses, missed dose in (43.1%) and in 103 (50.5%) medications were administered with improper technique. Nurse who was assigned more than 15 patients committed [AOR = 1.59, 95% CI (0.65, 3.90)] more errors and those working in night shift committed [AOR = 2.32, 95% CI (0.82, 6.54)] more errors.

**Conclusion:** There was high frequency of medication administration errors among nurses working at our institution. The most prominent type of medication administration errors were technique error followed by missed drug.

**Keywords:** Medication administration error, types of error, wrong time medication.

## INTRODUCTION

Medication administration error (MAE) has been identified as a grave health problem that can result in mortality and morbidity.<sup>1</sup> The main difference between what patients getting and what really recommended is called MAE. There are various types of MAE, which includes wrong medicine, wrong route, wrong dose, wrong patient, wrong time, wrong site, wrong dosage form, wrong infusion rate, wrong contraindication medicine and expired medicine.<sup>2,3</sup> MAE has high prevalence and such errors can be prevented.<sup>4</sup> Furthermore, the MAE may have dire consequences like it increases hospitalization which causes increase in economic burden, distress, disability and even threat to life may also occur.<sup>5-8</sup>

In hospitalized patients, per day one medication error occurs.<sup>9</sup> According to health agency of United Kingdom (UK) "National Patient Safety Agency" (NPSA), MAE occurs in 50% of all the cases in health care setting.<sup>2</sup> Wrong timing was secondary prevailed error which caused serious and fatal outcomes, as reported by NPSA.<sup>2</sup> Range of MAEs is reported from 9.4 – 80% by many nations like UK, USA, Middle East and East African countries<sup>10</sup> and figures are under reported worldwide particularly developing nations.<sup>11</sup>

A study from Karachi which reported 7.5% of missing

doses and 17% administered at wrong time.<sup>9</sup> Another study from Karachi, highlighted 21% medication errors.<sup>12</sup> In Quetta, Pakistan one study reported missed dose error in 74.4%<sup>13</sup> and another has prevalence of MAE of 82.1%.<sup>14</sup> Therefore, this study aim was to identify the magnitude of MAE and its types among nurses working at tertiary care public sector hospitals Karachi, Pakistan.

## METHODOLOGY

This analytical cross-sectional study was accomplished at Dr. Ruth K.M. Pfau Civil Hospital (CHK), and Dow University Hospital (DUH), Karachi from 1<sup>st</sup> January to 31<sup>st</sup> October 2018. It included 204 nurses of both genders having one year clinical working experience with being Pakistan Nursing Council (PNC) licensed-practitioners. Nurses having less than one year clinical working experience were excluded. Study was approved by Institutional Review Board (IRB) of Dow University of Health Sciences, and written informed consent was obtained from all the subjects.

Approach to subjects was made possible by non-probability purposive sampling method. Adapted and validated questionnaire and checklist published in previous research<sup>2</sup> was used. Initially, the questionnaire was clarified extensively and followed by the

observation of the participants while they were administering the medication to their patients. The recorded data was likened and validated along with the order of doctor for recognizing errors.

**Statistical Analysis:** Data were analyzed using SPSS version 22. Logistic regression was carried out to analysis the result with demographic variables.

## RESULTS

Out of 204 study participants, 98 (48%) were females

and 168 (82.3%) were below 35 years. Only eight (3.9%) had age of 41 years and above. In respective of educational status, 133 (65.2%) of had general nursing diploma and remaining were bachelor or above degree of nursing. We noted that 97 (47.5%) subjects had experience of  $\leq 5$  years, 109 (53.4%) were performing their duties in morning and 95 (46.6%) were working in evening or night shift. Eighty (39.2%) participants had nurse to patient ratio were  $> 15$  during medication administration.

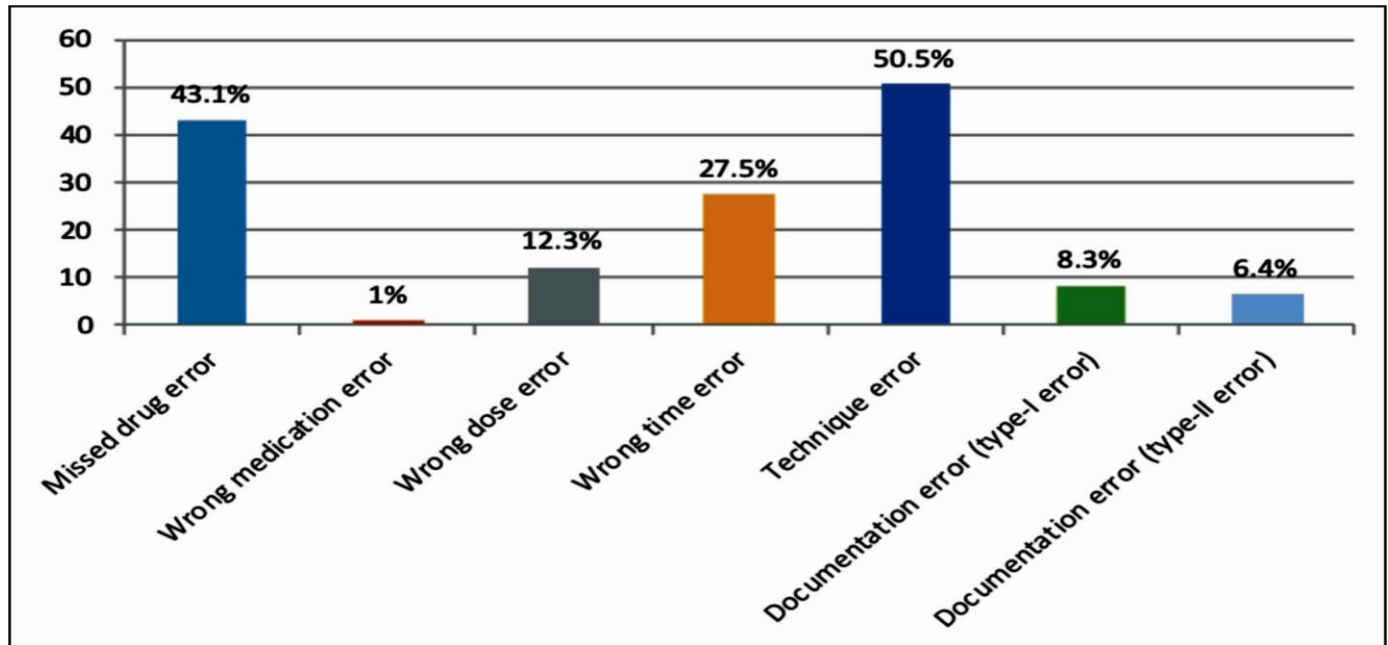


Fig. 1: Types of medication administration errors.

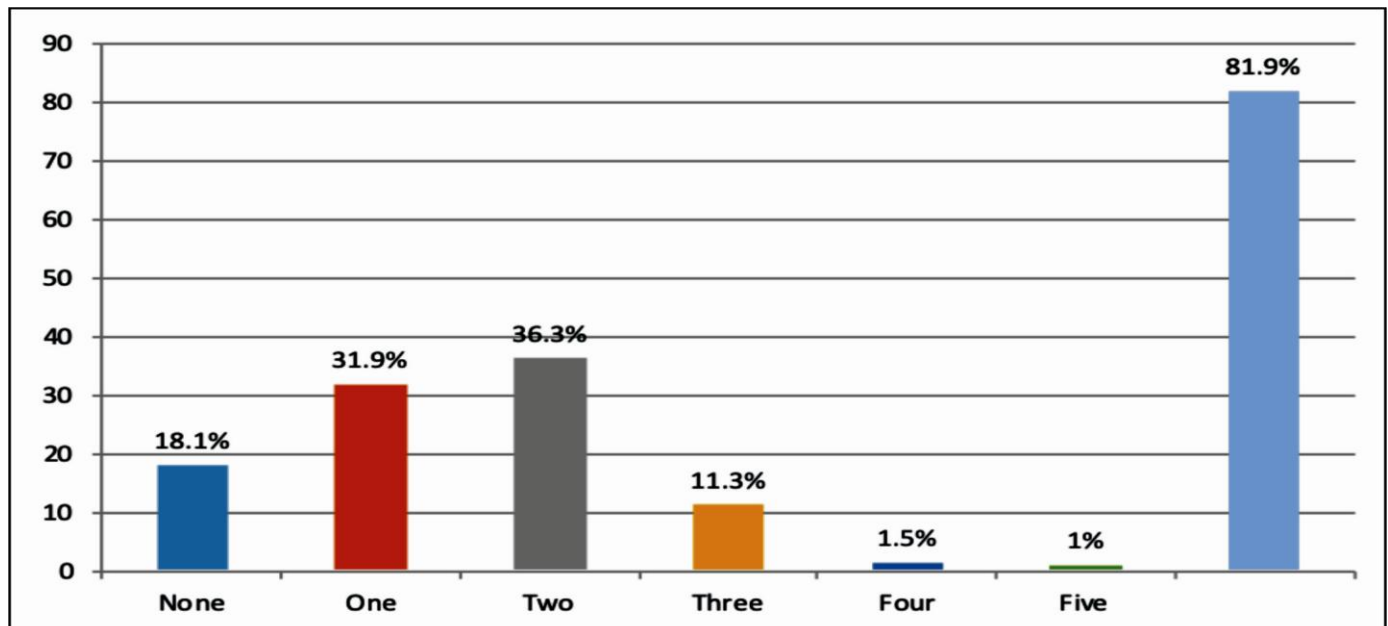


Fig. 2: Number of medication administration errors by individual nurse.

**Table 1: Univariate logistic regression of medication administration errors with socio-demographic factors.**

	B	S.E.	Wald	df	P-value	OR	95% C.I OR	
							Lower	Upper
<b>Age</b>								
25 – 30	.251	.487	.266	1	.606	1.286	.495	3.339
31 – 35	.387	.503	.593	1	.441	1.473	.550	3.943
36 – 40						Reference		
<b>Gender</b>								
Male	.701	.373	3.530	1	.060	2.015	.970	4.186
Female						Reference		
<b>Education</b>								
Diploma in Nursing						Reference		
BS. Nursing	.282	.394	.511	1	.475	1.325	.612	2.870
<b>Hospital</b>								
Dow University Hospital						Reference		
Civil Hospital Karachi	.263	.414	.404	1	.525	1.301	.578	2.932
<b>Experience</b>								
1 – 5 years						Reference		
6 – 10 years	-.459	.443	1.074	1	.300	.632	.265	1.505
> 10 years	-.246	.437	.318	1	.573	.782	.332	1.841
<b>Patients Ratio</b>								
1 – 10 patients						Reference		
11 – 15 Patients	-.428	.437	.961	1	.327	.652	.277	1.534
> 15 patients	.468	.457	1.048	1	.306	1.596	.652	3.909
<b>Shift</b>								
Morning shift						Reference		
Evening shift	-.151	.432	.122	1	.726	.860	.369	2.004
Night shift	.844	.528	2.558	1	.110	2.326	.827	6.547
<b>Interruption</b>								
No						Reference		
Yes	1.802	.390	21.347	1	.000	6.059	2.822	13.011
<b>Patients Gender</b>								
Male						Reference		
Female	.734	.370	3.936	1	.047	2.083	1.009	4.301

Commonest MAE were technique error and missed dose (Fig. 1). The frequency of MAE was 81.9% (Fig. 2).

Male nurses were twice more into committing MAEs than their female nurses (OR: 2.015). Moreover, nurses

working in night shifts 2.32 times more errors than of day-light shift nurses (Table 1). It was also found in this study participants who were interrupted during medication administration carried out 6 times fold errors greater than those nurses of who were not interrupted. Feminine patients encountered 2.08 times more than masculine in MAEs from the study nurses.

## DISCUSSION

The important goal present study was once to identify the magnitude of administration errors and its types. It is evident that MAEs are truly avoidable.<sup>15</sup> The present study found frequency of MAE to be 81.9%. Technique error and missed drug error was the most preminent types of MAEs. This study frequency of MAEs of 81.9% is much higher than reported from Paris pediatric unit (31.3%), instructing health facility in Paris (27.6%), Netherland (21.2%) and Morocco Intensive care unit (ICU) (15.5%).<sup>16,19</sup>

This change may be due to wide variety of clinical devices measured. It was found in another study performed at ICU of Jimma University Hospital (JUH), in which the medication errors' magnitude was 51.8%, which is not as much as our findings.<sup>20</sup> The probable purpose for that the ICU may have been provided with infrequent attention by the hospital's staff, additionally, the nurse to patient ratio may also be reduced as compared to other units of the hospital.

A study from Taiwan disclosed the occurrence of MAE as 70%, somehow close to our findings.<sup>21</sup> Our study result is also in line the study accomplished at Pediatric Unit of JUH that had 89.9% prevalence of MAEs,<sup>20</sup> and nearer 68.7% to the studies from Pediatric wards in India.<sup>22,23</sup>

Present study was carried out in various wards like medical, surgical, ENT, Gynae, Orthopedic and pediatric, however, Indian and Ethiopian studies accomplished only in the pediatric units.

Our 81.9% prevalence is closer to the studies from in Australia<sup>24</sup> and Bahir Dar, Ethiopia.<sup>2</sup> This was also found that female patients involved 2.08 instances more as in contrast to male in MAEs from the nurses.

## CONCLUSION

Medication administration errors remained extremely predominant in our tertiary care hospital settings of the Karachi. Technique error after that missed drug error was prominent types of errors.

### Author Contributions:

Conception and design: Raja.

Collection and assembly of data: Badil.

Analysis and interpretation of the data: Pawan Kumar.

Drafting of the article: Sajid Ali.

Critical revision of the article for important intellectual content: Sajid Ali, Pawan Kumar.

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Final approval and guarantor of the article: Raja

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