



Medication errors and associated factors as perceived by nurses working at the national referral hospital in Bhutan

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ABSTRACT

Introduction: A common patient safety issue is medication error and this has remained a serious problem in hospital settings. Medication error occurs at any point of medication process: prescription, transcription, dispensing, and administration. Administration error is the most common type of error occurring among nurses; although nurses play a vital role in preventing harms of prescription and dispensing errors from reaching the patient. Therefore, this study was aimed at assessing medication errors and associated factors as perceived by nurses. **Methods:** The study was conducted at a tertiary hospital in Bhutan and 225 nurses participated through self-reported questionnaire. Data were double entered and validated in Epidata and analyzed using descriptive commands of statistical software STATA. **Results:** Among total participants of N = 225, 62.7% reported to have experienced medication error in past six months. Common type of error experienced were omission of dose; wrong time; wrong dose, and administering drugs without physician's order. Nurses in intensive care units and those caring for pediatric patients reported experiencing more errors. The perceived factors were look-alike drugs, many patients with similar medicines, more medicines to single patient, and oral instructions and acronyms in prescription. **Conclusions:** The nurses reported to have experienced quite a high rate of medication error. The results may be used by relevant stakeholders in preventing and reducing medication errors, the biggest challenge of patient safety in hospital settings.

Keywords: Experience; Medication error; Nurses; Perceived factors.

INTRODUCTION

Promoting patient safety in healthcare settings has remained a global challenge. A report by the World Health Organization (2017) emphasizes that one in every ten patients is injured because of adverse events during their hospital process; the rate is even higher in developing countries and children are more at risk¹. One of the common issues in patient safety is medication error and this issue has remained a serious problem posing a big challenge in the hospital settings. It has been reported that 672,000 patients are injured and 98,000 patients die due to preventable medication errors every year². Death attributable to medical errors have been estimated to be the third leading cause of mortality in the United States³. A report 'Medication without Harm', calls for action to reduce patient harm which occurs because of unsafe medication practices and medication errors¹. The process of medication, which includes phases of prescription, dispensing, preparation, and administration; involves multiple health care providers and their varied knowledge and skill sets; making it a complex process and thus, prone for medical accidents.

Medication error is any error occurring during the process of medication. There are number of different approaches to classifying medication errors and the most common approach is based on stages of medication process: prescribing, dispensing, preparing, administration including monitoring and documentation⁴. Medication errors commonly committed by nurses include errors during medication preparation or administration phase as these processes are independent nursing tasks. It is estimated that 40% of total nursing work in patient care is related to medication administration⁵. Mistakes in medication administration are considered a significant issue that threatens a patient's safety and may increase their hospital stay, treatment costs, and mortality rate⁶. A study reported improper medication administration as one of the most frequently (56.5%) occurring unsafe patient events⁷. The most common types of medication administration errors occurring among nurses are errors such as wrong time, omission of doses, and wrong doses^{8,9}. Another study reported that confusion over different names of drugs and imbalance in the patient-nurse ratio are the major reasons for medication errors during the administration phase¹⁰.

Nurses are at the front line to intercept and report medication errors, yet the errors are severely under-detected and under-reported in practice¹¹. Evidences on medication errors report that, although nurses understood the importance of reporting MEs to improve patient safety, their perceptions of why errors happened and how it may be implicated to them discouraged

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them from reviewing medication error events as corrective action than the punitive one^{12,13}. Therefore, if this biggest patient safety challenge of preventing and reducing medication errors is to be improved, it is imperative to look into the errors, especially on how one perceived the events of errors including why it happened and how it may be corrected. As per authors' knowledge, there is no published study in Bhutan on medication errors. Thus, this study aims to describe medication errors and perceived factors associated with medication error among nurses.

METHODS

Study design and setting

This descriptive study was conducted at Jigme Dorji Wangchuck National Referral Hospital (JDWRH), Thimphu, Bhutan from August to October, 2021. The JDWRH being a national referral and a tertiary care teaching hospital is at the apex of health care facilities in Bhutan. The 350 bedded hospital has total of 508 nurses at present working in various in-patient and out-patient departments. During the study period, the accessible population was 424 and sample was calculated using an online sample size calculator available at <http://www.openepi.com/SampleSize/SSPropor.htm>, which resulted in a total sample of 225 with a desired level of confidence at 95 % and with margin of error of 5%.

The ethical clearance for this study was sought from Research Ethics Board of Health [REBH] at the Ministry of Health (Ref.No.REBH/Approval/2021/088). Study participation was voluntary and data were interpreted as a group and no individual identifiers were used to maintain anonymity.

Data collection

Data collection questionnaire has two parts: (1) socio-demographic profile; (2) medication errors experienced and factors of its occurrence as perceived by nurses. The second part of the instrument was adopted from Ahmed¹². Permission to use the instrument was sought and few alterations were made to suit our study setting and objectives including adding items on types of medication error from literature reviews. The validity and reliability testing of the revised tool was done with five research subject experts and piloted with 20 samples. The validity of the tool showed content validity index of 0.99 and reliability of 0.85 Cronbach's alpha. Data were collected through self-administered questionnaire.

Data analysis

Data were double entered into Epidata file (version 3.1) and validated. Data were cleaned, coded, and analyzed using STATA version IC/14 Descriptive commands of frequency, percentage, mean, and standard deviations were used in analysis to achieve the study objectives.

RESULTS

Socio-demographic characteristics

The sample consisted of 63.6% female nurses and majority of them belonged to the age group of 20 to 30 years (Table 1). Highest qualification obtained by majority of the nurses in this sample was diploma in nursing and midwifery (56.5%), followed by 34.2% with bachelor degree and 2.2% of had master degree qualification. More than half of the sample had work experience of 0 to 5 years (55.1%), 25% of them were in 6 to 10 years of work experience group, and 11.5% had work experience of more than 15 years.

Description of medication errors as experienced by the nurses

Among the sample of 225 nurses, 62.7% reported that they had experienced a medication error in the last 6 months (Table 2). Looking into the types of medication errors experienced, omission of dose was most commonly experienced error with 43.1% of the sample reporting to have experienced it in last 6 months. Wrong time (25.3%), administering medicine without physicians' orders (19.1%), and wrong dose (18.7%) were other common types of error experienced by the nurses. Errors such as medicine administered through wrong route (3.6%) and noticing allergy after administration of drugs (4%) were the less commonly experienced medication errors as reported by nurses. An assessment of medication errors experienced by

Table 1. Socio-economic characteristics of nurses (n=225)

Characteristics	n	%	M (SD)
Age			
20 to 30 yrs	129	57.3	
31 – 40yrs	71	31.6	31.1 (6.5)
> 40yrs	25	11.1	
Gender			
Female	143	63.6	
Male	82	36.4	
Education			
Certificate	16	7.1	
Diploma	127	56.5	
Bachelor	77	34.2	
Master	5	2.2	
Category of nurses			
Assistant nurse	17	7.6	
Staff nurse	129	57.3	
Clinical nurse	79	35.1	
Work experience (in years)			
0 to 5	124	55.1	
6 to 10	56	25.0	7.0(6.7)
11 to 15	19	8.4	
>15years	26	11.5	

n= sample size, M= Mean, SD= standard deviation

nursing working in different units showed that those working in intensive care units (74.5%) experienced more errors compared to their counterparts in general wards (58.9%). In addition, those working with pediatric patients experienced more medication errors compared to those working with adult patients (Table 3)

Factors associated with occurrence of medication error as perceived by nurses

The questionnaire for perceived factors associated with medication error had 22 items, rated on 1-4 point scale (1-strongly disagree to 4-strongly agree). The items were group into 4 categories as: (1) nurse related factors; (2) prescriber related factors; (3) medicine related factors; and (4) managerial process related factors. Among the four categories, medicine related factor was the commonest perceived factor associated with medical error occurrence with a mean score of 2.9 (min-1.2, max-3.8). Looking into the details of each factor, majority of nurses perceived that different medicine looking alike (84.4%) and many patients receiving similar kind of medicine (82.2%) were factors leading to occurrence of medication error (Table 4). Seventy nine percent of nurses agreed that more number of medicines prescribed to one patient led to medication errors; 72.4% of them agreed that oral instruction in place of written medicine order was the cause; 71.1% perceived that use of acronyms instead of writing full medicine order was

Table 2. Common types of medication errors as experienced by nurses

Have you experienced medication error in last 6 months	fn	%
Yes	141	62.7
No	84	37.3

Types of medication errors as experienced by nurses		
Wrong patient	21	9.3
Wrong drug	19	8.4
Wrong dose	42	18.7
Wrong time	57	25.3
Wrong route	8	3.6
Omission of dose	97	43.1
Noticing allergy after drug administration	9	4.0
Administration of medicine without physician's prescription	43	19.1

Table 3. Medication error experienced by nurses working in different wards

Medication errors experienced	Yes	
	fn	%
Comparison of errors experienced by nurses working in		
General wards (n=178)	105	58.9
Intensive care units (n=47)	35	74.5
Comparison of errors experienced by nurses working with		
Adult patients (n=104)	52	50.0
Pediatric patients (n=44)	24	54.5

Table 4. factors associated with medication errors as perceived by nurses

Perceived factors	Agreement	
	n	%
Nurses related factors		
Preparation and administration of medicine not done by the same nurse	152	67.5
Nurse do not abide by accepted medicine administration (5R)	51	22.6
Medicine orders are not transcribed correctly to the medicine chart	88	39.1
Errors are made in medicine chart	150	66.7
Nurses are unaware of known allergy	98	43.6
Nurses do not communicate about change in medication plans	93	41.3
M(SD) = 2.5(0.41); Min-1, Max-3.5		
Prescriber related factors		
Physician's medicine order is not legible	159	70.7
Physician changes medicine order frequently	144	64.0
Acronyms used instead of writing complete instruction while prescribing	160	71.1
Oral instructions used to prescribe medicine in place of written orders	163	72.4
Frequent substitution of drugs	110	48.9
Physicians do not communicate to nurses about change in medicines	133	59.1
M(SD) = 2.7(0.50); Min-1.2, Max-4		
Medicine related factors		
Name of many medicines are similar	111	49.3
Different medicines look alike	190	84.4
The packaging of many medicines are similar	148	65.8
Many patients are prescribed the same or similar medicine	185	82.2
More number of medicines to one patient	179	79.6
M(SD) = 2.9(0.42); Min-1, Max-3.8		
Managerial process related factors		
Nurses have inadequate information about medicines	105	46.7
While administering medicines, nurses are disturbed to do other duties	173	76.9
Inadequate staff for administration of medicines	131	58.2
Equipment malfunctions are not corrected	126	56.0
There are no readily available references to look for evidence on medicine	157	69.8
M(SD) = 2.7(0.46); Min-1.2, Max-3.8		

associated with error occurrence. Some of the factors that were least perceived to be leading to occurrence of medication error were nurses not following accepted medicine administration standards (22.6%) and nurses not correctly transcribing medicine orders (39.1%).

DISCUSSION

Nurses upon asking if they had experienced any type of medication error in last six months, reported that 62.7% of them had experienced a medication error. The self-reported prevalence rate of medication error among nurses in our study is slightly higher compared to rates reported from other parts of the world. Studies from Ethiopia reported high ranges of medication administration error (56.4% to 57.7%)^{14,15}. Another study from Iran showed a self-reported medication administration error (17.0%) made by nurses working in a teaching hospital⁹. A systematic review from UK reported a pooled mean incidence rate of 101 per 1000 intravenous medicine administration errors¹⁶. The slightly higher rates of medication error reported as experienced by nurses in current study may mean that there really is a high prevalence of medication error in our setting; which deems for further observational studies to explore on the issue, while current data can serve as a baseline. In addition, the study results indicate the need to strengthen the culture of medication error reporting system in our setting; investigating those reports could give better insight and understanding into prevalence and magnitude of the problem. The WHO advocates 50% reduction of harmful medication errors by 2022¹; if the global community is to achieve this and save 1% of total global health expenditure that is associated with medication errors, the preventive and corrective actions towards reducing medication errors needs to be strengthened.

Current study results showed that the most common type of medication error experienced by nurses were omission of prescribed dose; having administered medicine at wrong time; having to provide medicine without physician's order; and committing an error through administration of wrong dose. The existing literature on types of medication error occurrence from other parts of the world showed varied results compared to our study^{8,9,14}. Medication errors types such as omission of dose, wrong time, and wrong dose were commonly occurring errors across countries, similar to results in our study. However, while our study results showed a lower rate of occurrence of error of 3.6% due to wrong route similar to the study from Ethiopia (2.8%)¹⁴, studies from Iran (10.7%)⁹ and Iraq (24.8%)⁸ reported higher rates of occurrence of these errors. In addition, while other study reported higher rates of occurrence of noticing allergy after administration of drugs, our study showed lower rates of occurrence for these errors. An assessment on how the experience of medication error occurrence among nurses differed with their work environment and type of patient that they worked for showed; that, those working in intensive care units and with pediatric patients experienced higher rate of medication error.

This result is similar to other studies which stated that those working in intensive care units and with pediatric patients, especially the neonates reported higher medication errors as their patients are on many medicines at a time; nurses in these setups have lot of dose calculations to do; and higher workload in those units^{17,18,19}.

With regards to factors associated with medication error occurrence as perceived by nurses; factors related to medicine were perceived as commonest among the four categories assessed. Majority of nurses perceived that different medicine that look-alike (84.4%) and many patients receiving similar kind of medicine (82.2%) led to medication errors. In addition, other common factors perceived to be associated with occurrence of error were more number of medicines prescribed to one patient; oral instruction in place of written medicine order; and use of acronyms instead of writing full medicine order. The findings are similar to existing literature which reported that medication error occurrence is mostly due to medicine related factors such as look-alike and sound alike medicines and prescriber related such as illegibility and use of acronyms^{9,12,20}.

CONCLUSIONS

The nurses in our setting reported to have experienced quite a high rate of medication error and the common types of errors that they experienced were omission of dose, wrong time, and having to administer drugs without physician's order and wrong dose. Some of the perceived factors associated with error occurrence were look-alike medicines; many patients receiving similar medicine; more number of medicines to single patient; use of oral instructions in place of written orders; and use of acronyms while writing medicine orders. The data from this study could be used as baseline for observational studies to further explore the magnitude of the problem in our setting. In addition, medication error reporting system in hospital may be strengthened as driving deeper into those reports may yield better insight into the prevalence and magnitude of the problem.

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AUTHORS CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

TD: Concept, design, data collection and analysis, manuscript writing and review.

KZ: Design, data collection and analysis, manuscript writing and review

PD: Design, data collection and analysis, manuscript writing and review

TY: Design, data collection and analysis, manuscript writing and review

KN: Design, data collection and analysis, manuscript writing and review

KW: Design, data collection and analysis, manuscript writing and review

SJ: Design, data collection and analysis, manuscript writing and review

Author agree to be accountable for all respects of the work in ensuring that questions related to the accuracy and integrity of any part of the work are appropriately investigated and resolved.

CONFLICT OF INTEREST

None

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