

Knowledge and Perception Regarding Medication Error Among Nurses

Susan Maharjan,¹ Amrita Shrestha,² Vivechana Shakya,¹ Manju Maharjan,³ Bimala Panthee,¹ Rashmi Joshi¹

¹Patan Academy of Health Sciences, School of Nursing and Midwifery, ²Alka Hospital Pvt. Ltd. College, ³Tribhuvan University.

ABSTRACT

Background: Patient safety is the major concern in providing quality care. Medication errors have been identified as the most common type of preventable errors. This study aimed to assess the knowledge and perception regarding medication error among nurses.

Methods: A quantitative cross-sectional research design was used. The study was conducted in four different private hospitals in Lalitpur. A total enumerative sampling technique was used to select 302 nurses from these hospitals. Descriptive statistical methods were used to assess socio-demographic variables and inferential statistics methods such as the chi-squared test was used to analyse the association between knowledge, perception, and its socio-demographic characteristics.

Results: Most of the respondents 244 (80.8%) agreed the cause of medication error occurs due to unclear handwriting and 217 (71.9%) agreed prescribing the wrong route or dose and time. Mostly respondents 126 (41.7%) had inadequate knowledge, 101 (33.4%) had adequate knowledge and 75 (24.8%) had moderate knowledge on medication error. Mostly respondents 273 (90.4%) had positive perception and 26 (8.6 %) had negative perception.

Conclusions: Most of the nurses had inadequate knowledge but has positive perception on medication error. Appropriate strategies for reducing nurses' workload, barriers to reporting, and sensitization workshops in a regular basis by the administrator should be developed to address medication errors and enhance patient safety in hospital settings.

Keywords: Knowledge; medication error; nurses; perception.

INTRODUCTION

Medication Error (ME) is the leading health issue that directly impacts health of people. MEs are defined as any mistake at any stage of the medication use process.¹ MEs may occur at any step of the medication process, from drug prescription by a physician, to drug administration by nurse or patient. Common causes of MEs include incorrect diagnosis, prescription errors, dose miscalculations, poor drug distribution practices, incorrect drug administration, failed communication, and lack of patient education.² Because of medication errors patients are suffering from complications or side effects of drugs which may interfere with patient's quality of life. Nurses are the main person to take care of patients and administer medications during their hospital stay. The nurses must be knowledgeable and competent enough to understand medication process

and administer correctly. Therefore, the researcher is interested in conducting this study to assess knowledge and perception regarding medication errors among nurses of the private hospital of Lalitpur.

METHODS

This was a cross-sectional descriptive study. Non-probability total enumerative sampling technique was used to select the sample from four different private hospitals of Lalitpur. Sample size was calculated by using formula: $n = [(z^2pq) + ME^2] / [ME^2 + z^2pq/N]$,³ where Z= 1.96 for 95% Confidence Interval (CI), p=50% from conventional method, q=1-p, Margin of Error (ME)= 5%, n=sample size and N= Population size. With 10% non-response rate added, the calculated sample was 359 nurses. Because of the turnover of nurses during data

Correspondence: Manju Maharjan, Tribhuvan University. Email: maharjan.manju12@gmail.com, Phone: +9779841252564.

collection, the total data collected was 302.

All registered nurses who were working in different wards in hospitals were included but the nurses who were working as managers and not directly involved in patient care were excluded. Data were collected from 26 June to 29 August 2023 using a self-administered structured questionnaire, developed on the basis of research objectives. Informed written consent was taken from each participant prior to fill up the questionnaires. The questionnaire was divided into three parts:

Part I: Background information

Part II: Questions related to knowledge on medication error. This consists of 7 questions (2 multiple choice and 5 multiple response questions). Each correct answer was scored one (1) and wrong answer was scored zero (0). The total correct answers were converted in to 100 percent and interpreted as^{4,5} <50%=inadequate knowledge, 50-75% = moderately adequate, >75%= adequate knowledge

Part III: Likert scale related to perception on medication error

The Likert scale contained 10 statements, 7 positive (statement no. 1,3,4,7,8,9,10) and 3 negatives (statement no. 2, 5,6). The statements were assessed in 5-points ranged from 1= strongly agree, 2=agree, 3=unsure, 4=disagree and 5= strongly disagree for positive statement and reverse marking was done for negative statements. The total score ranged from 10 to 50. The perception was interpreted as⁶ score below 60%= negative perception, score 60%= neutral perception and score above 60%= positive perception.

The content validity of the instrument was maintained by 2 subjects' experts (one doctor and one nursing In-charge). Pretesting of the instrument was carried out in similar setting and Cronbach's alpha was tested to ensure internal consistency and was 0.70 which was acceptable.

Ethical approval was obtained from the Nepal Health Research Council (Reference no. 1920). Formal permission was taken from the hospital administration of respective hospitals. Anonymity was maintained by not including the name of the participants or any other identity and coding the questionnaires. Confidentiality was maintained by not sharing obtained information with others. Informed written consent was taken from each participant prior to filling up the questionnaires. Data analysis was done by using the Statistical Package

of Social Science (SPSS) software version 16.

Descriptive statistical methods were used to assess sociodemographic variables and the inferential statistics method was used to analyse the association between knowledge, perception and socio-demographic characteristics.

RESULTS

Table 1 illustrated the background information of the respondents which showed 87.4% were of 21-30 years. More than half (67.9%) had PCL level of education and 51.7% were currently working in the wards. A majority (82.5%) had less or equal to five years of working experience.

Table 1. Respondent's background information.

Characteristics (n= 302)	Number (%)
Less or equal to 20	14 (4.6)
21-30 years	264 (87.4)
More than 30 years	24 (7.9)
Age (mean age ± SD: 25.22± 4.04)	
Educational level	
PCL	205 (67.9)
Bachelor in Nursing Science	54 (17.9)
B.Sc. Nursing	43 (14.2)
Currently working ward	
Wards *	156 (51.7)
Critical units **	146 (48.3)
Working experience in years	
Less or equal to five years	249 (82.5)
More than five to 10 years	39 (12.9)
More than 10 years	14 (4.6)

* General ward, maternity, gynae, covid ward, private ward. ** ICU, OT, post-op, Dialysis, ER.

Table 2 showed that respondent's responses regarding knowledge of medication error among nurses, the most of respondents 250 (82.8%) had answered correctly about medication error whereas 226 (74.8%) answered medication error may happen during prescription and during administration, during preparation and during transcribing by 242 (80.1%), 197 (65.2%) and 91 (30.1%) respectively. Regarding the causes of medication error, the most of respondents 244 (80.8%) agreed medication error occurs due to unclear handwriting and 217 (71.9%) agreed prescribing wrong route/ dose and time, lack of

communication between nurse-patient/ nurse-health personnel 190 (62.9%), incomplete writing of dose prescription 213 (70.5%), verbal order (via phone) 187 (61.9%), spelling error 178 (58.9%), wrong medicine dispensed by pharmacist 158 (52.3%) and heavy workload of nurses 163 (54.0%).

Table 2. Respondents' responses regarding knowledge on medication error.

Statement	Number (%)
Medication error is an error in prescribing, dispensing or administering medication	250 (82.8%)
Medication error may happen during	
Prescription	226 (74.8)
Administration	242 (80.1)
Preparation	197 (65.2)
Transcribing	91 (30.1)
The causes of medication error?	
Unclear writing	244 (80.8)
Spelling error	178 (58.9)
Use of abbreviation that is not standard	156 (51.7)
Use of trade name	127 (42.1)
Incomplete writing of drug prescription	213 (70.5)
Prescribing wrong route/ dose/ time	217 (71.9)
Verbal order e.g., by phone	187 (61.9)
Wrong medicine dispensed by pharmacist	158 (52.3)
New drug	109 (36.1)
Being new staff	105 (34.8)
Personal negligence	148 (49.0)
Heavy workload of nurses	163 (54.0)
Distraction	121 (40.1)
Lack of communication between nurse-patient/nurse-health personnel	190 (62.9)

Table 3 showed that respondent's responses regarding the causes ME during administration, majority of respondents 213 (70.5%) agreed that administering medication prepared by another nurse, 212 (70.2%) respondents agreed lack of knowledge and skill on medication, 210 (69.5%) agreed to neglect basic right of medications and more than half of the respondents 185 (61.3%) agreed because of drug product nomenclature (look-alike or sound-alike names of drug). Majority of respondents 273 (90.4%) agreed cross checking the

medicine before administration to prevent ME followed by asking full name of patient before giving medicine 239 (79.1%) and following medication rights 220 (72.8%).

Table 3. Respondent's responses regarding the causes and prevention of medication error during administration.

Statements	Number (%)
The causes of administration medication error	
Neglecting of basic rights of medication	210 (69.5)
Following verbal orders	158 (52.3)
Lack of knowledge and skill on medication	212 (70.2)
Lack of confidence in medication administration	154 (51.0)
Drug product nomenclature (look-alike or sound-alike names of drug)	185 (61.3)
Unfamiliarity with medication	148 (49.0)
Administering medication prepared by another nurse	213 (70.5)
Personal negligence	143 (47.4)
Heavy workload of nurses	148 (49.0)
Prevention of medication error during administration	
Cross checking the medicine before administration	273 (90.4)
Asking the full name of patient before giving medication	239 (79.1)
Following the medication rights	220 (72.8)
Checking the medication thrice to confirm the correct medication before providing medication	167 (55.3)
Getting clear instruction for medication administration	191 (63.2)
Writing order in capital letters	122 (40.4)
Avoiding use of abbreviation of drugs	139 (46.0)
Use of generic name of drugs	149 (49.3)
Prescribing correct route /dose/time	208 (68.9)
Avoiding writing over previous order	140 (46.4)
Write instruction clearly	184 (60.9)
Orientation/training on medication and medication error	178 (58.9)

Regarding the perception of ME, most of the respondents 39.1% agreed medication errors are preventable and 32% disagreed that ME occurs in inpatients. Over the

statement of the prevention of MEs is beneficial to our healthcare system 42.1% and 38.1% agreed and strongly agreed respectively. Likewise, 38.4% respondents agreed and 29.8% respondents strongly agreed ME are an important incident and 48.3% strongly agreed that only nurses are liable for legal punishment in this incident. Most of the respondents 34.1% could not decide whether ME can be considered an accident. Regarding the medication education that reduces medication error, most of the respondents 45% agreed upon it. Likewise, 53% agreed that there should be a system to report medication errors. Upon, the responsibility of every healthcare personnel to report MEs, 42.1% agreed it. Similarly, the most 38.1% agreed that the prevention of MEs is the responsibility of every healthcare personnel (Table 4).

Table 4. Respondent's response regarding the perception of medication error.

Statement (n=302)	SD (%)	D (%)	N (%)	A (%)	SA (%)
Medication errors are preventable	2.0	6.3	12.6	39.1	40.1
Medication errors occur in inpatient	2.0	32.8	30.5	23.2	11.6
Prevention of Medication errors is beneficial to our healthcare system	7.3	8.3	4.3	42.1	38.1
Medication error is an important incident	9.3	10.9	11.6	38.4	29.8
Only nurses are liable for legal punishment in this incident	3.0	5.6	6.3	36.8	48.3
Medication Error can be considered as an accident	5.0	28.8	34.1	25.8	6.3
Medication education reduces medication errors	7.6	2.6	12.6	45.0	32.1
There should be a system to report Medication errors	5.0	2.6	12.9	53.0	26.5

Table 4. Respondent's response regarding the perception of medication error.

Statement (n=302)	SD (%)	D (%)	N (%)	A (%)	SA (%)
It is the responsibility of every healthcare personnel to report Medication errors	7.3	2.0	7.9	42.1	40.7
Prevention of Medication errors is the responsibility of every healthcare personnel	9.6	0	5.0	38.1	47.4

SD: Strongly disagree, D: Disagree, N: Neutral, A: Agree, SA: Strongly agree

Regarding the level of knowledge of ME, the majority of respondents had inadequate knowledge 126 (41.7%), followed by 101 (33.4%) with adequate knowledge. Whereas the majority of the respondents 273 (90.4%) had a positive perception and 26 (8.6%) had negative perception regarding ME (Table 5).

Table 5. Respondent's Level of knowledge and perception regarding medication error.

Level of knowledge	Number (%)
Inadequate knowledge (<50%)	126 (41.7)
Moderate knowledge (51-75%)	75 (24.8)
Adequate knowledge (>75%)	101 (33.4)
Level of perception	
Negative perception (<60%)	26 (8.6)
Neutral perception (60%)	3 (1.0)
Positive perception (>60%)	273 (90.4%)

Table 6 showed that education and current working areas were statistically significant ($p < 0.05$) with the level of knowledge. The level of knowledge was proportionally lower with the level of education (PCL: 34.8% inadequate level of knowledge and 16.9% adequate level of knowledge whereas in Bachelor: 7% inadequate with bachelor and 16.5% adequate). Likewise, the level of knowledge was proportionally lower in working in wards (wards: 25.2% inadequate level of knowledge and 13.9% adequate level of knowledge whereas in critical units working area: 16.5% inadequate level of knowledge and 19.5% adequate level of knowledge).

Table 6. Association of respondents' level of knowledge with socio-demographic characteristics.

Characteristics (n= 302)	Level of knowledge			χ^2 value	p-value
	Inadequate	Moderate	Adequate		
Age					
18-27 years	104 (34.5)	59 (19.5)	81 (26.8)	0.489	0.783
≥28 years	22 (7.3)	16 (5.3)	20 (6.6)		
Education					
PCL	105 (34.8)	49 (16.2)	51 (16.9)	28.025	<0.05
Bachelor	21 (7.0)	26 (8.6)	50 (16.5)		
Current working area					
Wards *	76 (25.2)	38 (12.6)	42 (13.9)	7.917	<0.05
Critical units **	50 (16.5)	37 (12.3)	59 (19.5)		
Work experience					
≤10years	121 (40.1)	69 (22.8)	98 (32.4)	2.447	0.294
>10 years	5 (1.7)	6 (2.0)	3 (1.0)		
Training					
Yes	34 (11.2)	19 (6.3)	38 (12.6)	4.106	0.128
No	92 (30.5)	56 (18.5)	63 (20.9)		
Presence of medication protocol					
Yes	93 (30.8)	50 (16.5)	85 (28.1)	1.608	0.205
No	28 (9.3)	13 (4.3)	13 (4.3)		
Do not know	5 (1.7)	12 (4.0)	3 (1.0)		

* General ward, maternity, gynae, covid ward, private ward **ICU, OT, post-op, Dialysis, ER

Table 7 showed that the level of perception was statistically significant with the current working experiences ($p < 0.05$). The perception towards ME was proportionally higher with nurses who had ≤10years of working experiences.

Table 7. Association of respondents' level of perception with socio-demographic characteristics.

Characteristics (n= 302)	Level of perception			χ^2 value	p-value
	Negative	Neutral	Positive		
Age					
18-27 years	21 (7.0)	2 (0.7)	221 (73.1)	0.39	0.84
≥28 years	5 (1.7)	1 (0.3)	52 (17.2)		
Education					
PCL	19 (6.3)	1 (0.3)	185 (61.3)	1.83	0.40
Bachelor	7 (2.3)	2 (0.7)	88 (29.1)		
Current working area					
Wards *	12 (4.0)	2 (0.7)	142 (47)	0.60	0.73
Critical units **	14 (4.6)	1 (0.3)	131 (43.4)		
Work experience					
≤10years	22 (7.3)	2 (0.7)	264 (87.4)	8.07	<0.05
>10 years	4 (1.4)	1 (0.3)	9 (2.9)		
Training					
Yes	7 (2.3)	1 (0.3)	83 (27.4)	0.15	0.92
No	19 (6.3)	2 (0.7)	190 (63.0)		
Presence of medication protocol					
Yes	22 (7.3)	2 (0.7)	204 (67.5)	1.95	0.16
No	4 (1.4)	1 (0.3)	49 (16.2)		
Do not know	0 (0.0)	0 (0.0)	20 (6.6)		

* General ward, maternity, gynae, covid ward, private ward ** ICU, OT post-op, Dialysis, ER

DISCUSSION

The overall aim of this study was to assess the knowledge and perception regarding ME among nurses. Generally, MEs persist a risk to patient care in health services. Common various types of prescription errors account for approximately 60.2% in Bahrain PHC clinics and 44.3% of errors in prescribed drugs.⁷ In this study the participants agreed that causes of medical error such as prescribing the wrong route and time of medication by 71.9%, incomplete writing of dose prescription (70.5%), lack of communication between nurse-patient/nurse-health personnel (62.9%), phone order (61.9%), spelling error (58.9%), heavy workload of nurses (54.0%) and wrong medicine dispensed by pharmacist (52.3%). These findings were supported by study conducted by Gorgich et al. (2016), Cheragi et al. (2013), Fathi et al. (2017), Sahli et al. (2021) and a systematic review study conducted by Johari et al. (2013).^{8,9,10,11,12} Furthermore, the findings of the study are supported by a study conducted in Malaysia where nurses responded that medication error could be because of heavy workload, types of shift work and complicated orders, new staff, personal neglect, and unfamiliarity with medication.¹³

The study assessed the responses of nurses regarding causes of ME during administration. Some of which were administering medication prepared by other nurse, lack of knowledge and skills on medication, neglect to basic rights of medications and because of drug product nomenclature, heavy workload of nurses. The results were similar to the findings of Kuppaddakkath et al. (2023)¹⁴ and Ayorinde et al. (2019)¹⁵, who revealed that confusion with drug name, increase patient nurse ratio are major contributing factors to ME during administration. This suggests that the most significant factor found to affect in safe medication practices among the respondents was excessive workload which is a direct consequence of inadequate staff strength in the hospital, inadequate nurse-patient ratio, unclear handwriting, and working environment.

According to the findings of the study, prevention of ME during administration could be performed by checking medicine before administration, asking patient full name, following medication rights, getting clear instruction, prescribing correct dose/ route/ time and training on medication and ME. The findings were similar in study conducted by Avorinde et al, (2019)¹⁵.

Further, the findings of the study found that most (39.1%) perceived that ME is preventable. Nearly half strongly agreed that nurses are only liable for legal punishment in incidents but actually all related health personnel

can be equally liable for legal punishment for that reason. More than half of respondents suggested that a system should be established to report medication errors unlike in study conducted by Samundeeswari and Muthamilselvi (2018)¹⁶ where study revealed that nurses had poor knowledge on prevention of medication error.

Furthermore, the findings of this study revealed that majority of respondents (41.7%) have inadequate knowledge whereas majority (90.4%) have positive perception towards medication error. Unlike in the study conducted by Johari et al (2013)¹² where they resulted that majority have good knowledge on medication error. The study revealed that the level of education of nurses was statistically significant with the level of knowledge towards ME and the current working area was statistically significant with the level of perception towards ME.

CONCLUSIONS

The nurses were knowledgeable and positive perception of medication errors. Appropriate strategies for reducing nurse's workload, barriers to reporting, and sensitization workshops on a regular basis by administrators should be developed to address ME and enhance patient safety in hospital settings. Nearly one-fifth had moderate knowledge regarding ME and regarding the level of perception, most of the respondents had positive perception. Major contributing factor to ME during administration could be not following the administration right properly. Checking medicine before administering, getting clear instruction, prescribing correct dose/ route/ time aid in prevention of medication error.

ACKNOWLEDGEMENTS

We would like to thank all the study respondents for their cooperation and support during the study. We thank all the hospital staff for their support.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

REFERENCES

1. Weber RJ. Pharmacotherapy: Medication safety principles and practices. Pharmacotherapy: A pathophysiologic Approach. 10th ed. Mc Graw Hill; 2017.
2. Medication errors [Online]. 2019 July 18 [cited

2023 February 4];

3. Kothari CR. *Research Methodology: Methods and Techniques*. 2nd revised edition. New Delhi: New age international; 2004. [\[Link\]](#)
4. Baig M, Jameel T, Alzahrani SH, Mirza AA, Gazzaz ZJ, Ahmad T, et al. Predictors of misconceptions, knowledge, attitudes, and practices of COVID-19 pandemic among a sample of Saudi population. *PLoS One*. 2020;15(12):1-13. doi: <https://doi.org/10.1371/journal.pone.0243526>
5. Mangalaraj SJ, Mathew B, Pandey A, Jaiswal AK, Anmol, Archana AJ, et al. Perception on occurrence of medication errors and its prevention among nursing officers. *Int J Health Sci Res*. 2021;11(11):286-295. doi: <https://doi.org/10.52403/ijhsr.20211134>
6. Aljasmī F, Almalood F, Ansari AA. Prevalence of medication errors in primary health care at Bahrain Defence Force Hospital: prescription-based study. *Drug Healthc Patient Saf*. 2018;10:1-7. doi: <https://doi.org/10.2147/DHPS.S147994>
7. Kadir A, Subish P, Anil K, Ram B. Pattern of potential medication errors in a tertiary care hospital in Nepal. *Indian J Pharm Pract*. 2010;3(2):16-22. [\[Article\]](#)
8. Gorgich EAC, Barfroshan S, Ghoreishi G, Yaghoobi M. Investigating the causes of medication errors and strategies to prevention of them from nurses and nursing student viewpoint. *Glob J Health Sci*. 2016;8(8):220-227. doi: <https://doi.org/10.5539/gjhs.v8n8p220>
9. Cheragi MA, Manoocheri H, Mohammadnejad E, Ehsani SR. Types and casues of medication errors from nurse's viewpoint. *Iran J Nurs and Midwifery Res*. 2013;18(3):228-231. [\[Article\]](#)
10. Fathi A, Hajizadeh M, Moradi K, Zandian H, Dezkhamēh M, Kazemadēh S, et al. Medication errors among nurses in teaching hospitals in the wet of Iran: what we need to know about prevalence, types and barriers to reporting. *Epidemiol Health*. 2017;39:1-7. doi: <https://doi.org/10.4178/epih.e2017022>
11. Sahli AMH, Ahmed MIO, Alshammer AIM, Hakami MNS, Hazazi IA, Alqasem MSD, Althiyabi FSB, Alharbi FN and Haloosh TA. A systematized review of nurses' perceptions of medication errors contributing factors in developing countries. *E J Med*. 2021;3(1):186-193. doi: <https://doi.org/10.24018/ejmed.2021.3.1.639>
12. Johari H, Shamsuddin F, Idris N, Hussin A. Medication errors among nurses in government hospital. *J Nurs Health Sci*. 2013;1(2):18-23. doi: <https://doi.org/10.9790/1959-0121823>
13. Hayes B. Medical errors - a hospital in Nepal searches for answers. *Trop Doct*. 2008;38:45-48. doi: <https://doi.org/10.1258/td.2007.062830>
14. Kuppadakkath SC, Bhowmik J, Olasoji M, Garvey L. Nurses' perspectives on medication errors and prevention strategies in residential aged care facilities through a national survey. *Int J Older People Nurs*. 2023;18:e12567. doi: <https://doi.org/10.1111/opn.12567>
15. Ayorinde MO, Alabi PI. Perception and contributing factors to medication admnisitration errors among nurses in Nigeria. *Int J Afr Nurs sci*. 2019;11:100153. doi: <https://doi.org/10.1016/j.ijans.2019.100153>
16. Sumundeeswari A, Muthamilselvi G. Nurses knowledge on prevention of medication error. *J Med Sci Clin Res*. 2018;6:269-274. doi: <https://doi.org/10.18535/jmscr/v6i3.45>