# **Research Article**

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# Nursing perceptions of medication administration practices, reasons for errors and reporting of errors in a tertiary care hospital, Bangalore

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### **ABSTRACT**

**Background:** Nurses administer drugs directly to patients and they are the last link in the safe medication administration chain. Due to the increased acuity of patients they serve, and decrease in the resources available to ensure safe practice, there are more chances of errors to occur. The study was thus taken up to describe their perspectives towards medication administration practices, sources and reporting of errors.

**Methods:** Study was conducted on nursing staff of Vydehi Hospital, Bangalore, India. The study was cross sectional type of study which has taken one month duration to complete. By simple random sampling, 199 nurses were selected and interviewed. They were administered a semi structured questionnaire after obtaining oral consent and assuring complete anonymity. The data was analyzed using Chi-square, Annova and principal component analysis, SPSS version 21.

**Results:** Among the nurses, 97% always checked the patient's file for medication details before administration, 45.7% never prepared medications for more than 2 patients at a time and 78.4% always checked the expiry date before administering the drug. 83.9% nurses always practice sterile conditions for administering intramuscular and intravenous medicines.

**Conclusions:** The common causes of errors were mislabelled drugs and names/labels of medicines which look alike. 66.3% of nurses always reported the errors. There was a significant association between the years of experience and the lack of cross checking with another nurse before administering of heparin and insulin and checking composition of medicines.

**Keywords:** Nursing perceptions, Medication safety, Reasons for errors, Reporting errors

## INTRODUCTION

Patient safety practices have been defined as "those that reduce the risk of adverse events related to exposure to medical care across a range of diagnoses or conditions". Many patient safety practices, such as use of simulators, bar coding, computerized physician order entry, and crew resource management, have been considered as possible strategies to avoid patient safety errors and improve health care processes; ongoing research has been exploring these areas, but there remains innumerable opportunities for further research.

Patient safety is a vital component of quality care. Nurses administer drugs directly to patients and they are the last link in the safe medication administration chain. Due to the increased acuity of patients they serve, and decrease in the resources available to ensure safe practice, there are more chances of errors to occur.<sup>2</sup> Although patient safety is a shared responsibility amongst doctors, nurses, caregivers, the government etc., nursing has clearly been concerned with defining and measuring quality long before the current National and State-level emphasis on quality improvement. Florence Nightingale analyzed mortality data among British troops in 1855 and

accomplished significant reduction in mortality through organizational and hygienic practices.<sup>3</sup> Execution of medical orders is an important part of the healing process and patient care. It is also the main component of nursing performance and has a prominent role in patient safety.<sup>4-7</sup> Medication errors can lead to adverse outcomes such as increased mortality, increased duration of hospitalization, and increased medical expenses.<sup>8,9</sup>

The purpose of this study was to:

- To describe the nurses' perspectives towards medication administration practices, sources of errors and reporting of errors.
- To describe the relationship between current practice of drug administration and work experience.

#### **METHODS**

- Study area: Vydehi Hospital, Bangalore, India
- Study population: Nursing staff working at various wards of Vydehi Hospital
- Study duration: 1 month (Aug-Sept 2015)
- Study type: Cross Sectional Study
- Sample size calculation: Assuming the least estimated difference of means between the different medication practices as 0.2, a sample size of around 150 was calculated at a significance level of 5%.
- Materials and methods: Total nursing staff working in Critical Care, Emergency department, Intensive Care Units and General Wards were 540 out of which, by simple random sampling, 199 nurses were selected and interviewed in a tertiary care hospital, by administering a semi structured questionnaire (Figure 1) after obtaining oral consent and assuring complete anonymity.

The data collected was grouped into various categories for statistical purposes. The medical practices were categorized into 2 - Processing practices (4 components) and Administering practices (6 components). All the departments were grouped into 6 broad categories-critical care, emergency, medicine, mother and child health, surgery and others. For Principal Component analysis, the items in the questionnaire were divided into 4 subscales- dosage care, right patient, preparing/ carrying medication and reporting of errors.

Analysis was done by using SPSS Version 21. ANOVA and Chi-Square tests were used at 95% confidence interval. Inferences were drawn and the conclusions were derived.

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Figure 1: The semi structured questionnaire.

#### **RESULTS**

19.6% nurses were found to have an experience of below one year, 56.8% had 1 to 3 years and 23.6% had more than 3 years' experience. 48.7% of the nurses were general nursing graduates and 49.7% were B.Sc. Nursing graduates. Among the processing practices, 97% nurses

always checked the patient's file for medication details before medication administration and 89.9% always brought the medication sheet during drug administration. 79.9% nurses always double checked with another nurse before administering heparin and insulin and 60.8% always maintained storage prerequisites for the drugs (Table 1).

Table 1: Distribution of study population according to the processing practices.

	Checking patient's file before each administration		Bringing m sheet along administrat	while	another hitre hetare		Maintenance of storage perquisites for drugs	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Always	193	97	179	89.9	149	74.9	121	60.8
Frequently	5	2.5	13	6.5	31	15.6	56	28.1
Half the times	0	0	2	1	8	4	16	8
Rarely	1	0.5	1	0.5	10	5	6	3
Never	0	0	4	2	1	0.5	0	0
Total	199	100	199	100	199	100	199	100

Table 2: Distribution of study population according to the administering practices.

	Prepare/carry medications for more than 2 patients at a time		Labeling syrir medication ba patient's name	gs with	Administering medicines prepared by another nurse	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Always	27	13.6	161	80.9	12	6
Frequently	16	8	16	8	10	5
Half the times	14	7	14	7	9	4.5
Rarely	51	25.6	5	2.5	51	25.6
Never	91	45.8	3	1.5	117	58.8
Total	199	100	199	100	199	100

Table 3: Distribution of study population according to the administering practices.

	Checking the composition of medicines before administration		Checking the omedicines before administration	ore	Maintenance of sterile conditions for I.V and I.M injections		
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	
Always	156	78.4	182	91.5	167	83.9	
Frequently	32	16.1	16	8	27	13.6	
Half the times	8	4	0	0	4	2	
Rarely	3	1.5	0	0	1	0.5	
Never	0	0	1	0.5	0	0	
Total	199	100	199	100	199	100	

Table 4: Medication processing and administering practices in different departments.

Department		Processing practices			Administering practices		
Overall(N)-199	N	Mean (SD)	P value	N	Mean (SD)	P value	
Critical Care	57	1.23 (0.346)		57	1.38 (0.352)		
Emergency	20	1.08 (0.261)		20	1.51 (0.609)		
Medicine	14	1.55 (0.297)		14	1.78 (0.499)		
Mother and child health	26	1.14 (0.246)	< 0.001	26	1.44 (0.294)	=0.001	
Surgery	14	1.53 (0.425)		14	1.82 (0.542)		
Others	68	1.34 (0.348)		68	1.42 (0.416)		
Total	199		_	199			

Table 5: Association between experience and the components of current practice.

Experience	Heparin/Insulin Administration						Danilar
(Years)	Always	Frequently	Half the times	Rarely	Never	Total	P value
. 1	24	7	4	4	0	39	
< 1	61.50%	17.90%	10.30%	10.30%	0.00%	100.00%	
1-3	84	19	4	6	0	113	
1-3	74.30%	16.80%	3.50%	5.30%	0.00%	100.00%	0.003
>3	41	5	0	0	1	47	0.003
/3	87.20%	10.60%	0.00%	0.00%	2.10%	100.00%	
Total	149	31	8	10	1	199	
Total	74.90%	15.60%	4.00%	5.00%	0.50%	100.00%	
		e composition of 1	nedicines before a	dministratio			
<1	26	7	4	2	0	39	<u></u>
	66.70%	17.90%	10.30%	5.10%	0.00%	100.00%	
1-3	88	20	4	1	0	113	<u></u>
1-3	77.90%	17.70%	3.50%	0.90%	0.00%	100.00%	0.001
>3	42	5	0	0	0	47	
	89.40%	10.60%	0.00%	0.00%	0.00%	100.00%	
Total	156	32	8	3	0	199	<u></u>
10111	78.40%	16.10%	4.00%	1.50%	0.00%	100.00%	
		e of sterile conditi	ons for I.V and I.I	M drug adm	inistration		
<1	29	7	2	1	0	39	_
<b>\1</b>	74.40%	17.90%	5.10%	2.60%	0.00%	100.00%	
1-3	94	17	2	0	0	113	_
1 3	83.20%	15.00%	1.80%	0.00%	0.00%	100.00%	0.003
>3	44	3	0	0	0	47	- 0.005
	93.60%	6.40%	0.00%	0.00%	0.00%	100.00%	
Total	167	27	4	1	0	199	_
1000	83.90%	13.60%	2.00%	0.50%	0.00%	100.00%	
	Reporting of						
<1	24	7	2	5	1	39	_
	61.50%	17.90%	5.10%	12.80%	2.60%	100.00%	_
1-3	71	26	2	10	4	113	_
	62.80%	23.00%	1.80%	8.80%	3.50%	100.00%	0.174
>3	37	2	2	5	1	47	
_	78.70%	4.30%	4.30%	10.60%	2.10%	100.00%	
Total	132	35	6	20	6	199	
- 0441	66.30%	17.60%	3.00%	10.10%	3.00%	100.00%	

Table 6: Results of principal component analysis and internal consistency.

Items for medication questionnaire by sub-scale	Factor loading	Cronbach coefficient alpha (Standardized)						
Subscale 1: Dosage care								
Administering medicines prepared by another nurse	0.88	0.691						
Double checking heparin/insulin doses	0.52	0.091						
Subscale 2: Right patient								
Checking patient's file prior to administering	0.72							
Labelling of syringes/medication bags with patient details	0.81	0.613						
Bringing medication sheet while administering	0.55							
Subscale 3: Preparing/ carr	ying medic	ation						
Prepare and carry medications for more than 2 patients at a time	0.73	0.71						
Subscale 4: Reporting of errors								
Are the errors being reported	0.81	0.51						

Among the Administering Practices - 45.7% nurses never prepared medications for more than 2 patients at a time. 80.9% always labeled the syringes and medication bag with the patient's name and bed number. 58.8% never administered medications prepared by another nurse. (Table 2) 78.4% of nurses always checked the composition of the medication before administration. 91.5% always checked the expiry date before administering the drug and 83.9% always practice sterile conditions for administering intramuscular and intravenous medicines (Table 3).

66.3% nurses always reported errors without fail (Figure 2). The most common perceptions regarding the causes of errors were found to be mislabeled drugs, names of medicines that looked alike, labels of medicines that looked alike, incorrect prescription, errors in computer entry and Pharmacy error.

A significant difference was observed in both processing and administering practices among nurses from varied departments (Table 4).

There was a significant association between the years of experience and certain practices such as, checking the composition of the medicine before administration, double checking with another nurse before administering heparin/ insulin, maintenance of storage prerequisites of drugs and maintenance of sterile conditions while administration of I.V or I.M drugs. There was no

significant association between experience and reporting of errors (Table 5).

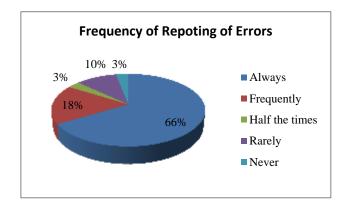


Figure 2: Distribution of study population according to reporting of errors.

#### DISCUSSION

This study was undertaken to identify the aspects of nursing care and medication administration that are most likely affecting the patient safety scenario. Among the Processing practices, checking the patients' file for medication administration was the most favorable and maintaining storage prerequisites for the drugs was least favorable. Almost all nurses checked the expiry date of drugs before administering, but not many checked the composition of the drugs.

In Lefrak's study (2002), insufficient communication with personnel, order of magnitude errors in numbers followed by multiple zeros or with fractional numbers, unreadable handwriting, distraction during preparation or administration of medications, availability of drugs with similar names, dosage assessment, and lack of knowledge were included as the causes of medication errors. Most of the causes correlated with the ones of the present study.

Similar to the previous studies, there was a difference in medication practices across various departments. These are likely explained by differences in the patient population and the types and number of medications used in particular departments. <sup>10</sup> The severity of the disease and the criticality of the patients the department caters to may also have a bearing on the nursing practices. For instance an emergency care nurse maybe more tuned to a heavy patient load and commits lesser errors.

In the literature, age and years of practice were not correlated with medication errors (Osborne et al. 1999, Anderson 2003, Mayo & Duncan 2004) or reporting of errors. Whereas, in the present study, some errors correlated with experience. Thus, relationships between sample's characteristics and medication errors should be studied in depth in future research studies.

It is difficult to eliminate all medication errors. However, the role of nursing administrators in reducing and preventing these errors is vital. Although most medication errors can be minor and may not harm the patients, they need more supervision and planning. Reporting medication errors is an ethical duty to maximize the benefits of patient care. It can thus improve patient safety and health. Therefore, managers should have a positive attitude toward the reporting of medication errors by nurses. <sup>11</sup> More continuous training programs for nurses will help to overcome the errors caused by lack of experience.

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