

Medication Errors among Pharmacists and Nurses working at the University of Port Harcourt Teaching Hospital.

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Abstract: This cross-sectional study was conducted in 2016. A total of 42 pharmacists participated in the survey while a total of 270 Registered Nurses were selected from nurses working at the study centre using consecutive sampling method (n=312). Reliability coefficient was 0.84; Kruskal-Wallis test and T-Test were applied to test hypothesis at $\alpha = 0.05$ level of significance.

Results showed that about 33 (90.5%) of pharmacists and 178 (68.7%) of nurses were previously involved in Medication Errors (MEs). The extent of perceived barriers to reporting MEs varied among the respondents. Nevertheless, the most common perceived barriers noted among them was concern of being blamed if something happens to the patient due to the error (Pmean= 3.56 and Nmean= 4.09) and fear of reprimand by the hospital management (Pmean= 3.56 and Nmean= 4.11). There was significant difference between pharmacists and nurses in the rate of occurrence of medication errors ($p=0.000$) and there was significant difference between pharmacists and nurses in their perceived barriers to reporting medication errors ($p=0.001$).

Key words: medication errors, pharmacists, nurses, dispensing error, administration error

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I. Introduction

Medication errors do occur in health care settings. Healthcare professionals make efforts in their daily healthcare practice to offer optimal quality care for patients and clients. This they do ensuring that care provision do not result to any harm. While most health workers transcribe medication, medication prescription is done by the physician, dispensing by the pharmacists, medication administration is the duty of the nurse irrespective of the place of practice/ environment. Medication handling requires prompt and continuous assessment from prescription, transcription, dispensing and administration. In the course of medication handling, an error may occur such as medication error.

1.1 Purpose of the study

To find out the proportions of respondents that has been involved in medication errors and to identify the extent of perceived barriers to reporting of medication errors among Pharmacists and Nurses working at the University of Port Harcourt Teaching Hospital (UPTH), Rivers State, Nigeria.

1.2 Statement of the problem

Safety issues are important aspect of healthcare provision and practice. The rate of medication errors in our everyday practice is an important aspect of healthcare audit. This is because there have been case reports of drug dispensing and administration errors by pharmacists and nurses respectively that are kept away from the general public, as well as limited/unpublished information regarding medication errors in pharmaceutical and nursing practice in Nigeria. Around 106 medication errors are believed to occur in every 1000 patients. ^[1] Approximately 1.3 million people are injured annually in the United States following so-called "medication errors". ^[2] In addition, 7,000 deaths each year are related to medications. ^[3] The consequences of medication errors may include death or severe patient harm which must be averted in order to achieve quality health care goals. ^[4]

1.3 Significance of the study

In many parts of the world, the issue of medication errors has been at the fore, although some countries, for instance Nigeria, lack the basic medication error monitoring system and are unaware of the challenges caused by them. The results of this survey will provide information to patient, caregivers, hospital management

boards, pharmacists and nurses on the proportion of pharmacists and nurses that has been involved in medication errors in the study centre and the perceived barriers to reporting incidence of medication errors. Findings from the study would prompt the desire to redesign the healthcare system to one that supports tracking of medication errors and eliminating existing barriers to reporting medication errors thereby ameliorating the quality of client care.

II. Literature review

Maintaining patient safety is a crucial goal of nursing care. Patients' safety is given lots of attention in the healthcare setting. The safety of patient is an important indicator of quality health care delivery system. One of the major challenges to patient safety is medication errors. Patient safety should be ensured when handling medication.

When drugs are prescribed for a patient, added that the intent is to improve the patient's quality of life by curing a disease, reducing or eliminating the symptoms of a disease, arresting or slowing a disease process, or preventing a disease or its symptoms from appearing in the first place.^[5] Medicines cure infectious diseases, prevent problems from chronic diseases, and ease pain. But medicines can also cause harmful reactions if not used correctly. Errors can happen in the hospital, at the doctor's office, at the pharmacy, or at home.^[6] Errors such as Medication Administration Errors (MAE) are prevalent everywhere.^[7]

2.1 What are medication errors?

Medication error is defined as any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health care professional, patient, or consumer.^[8] Errors in prescription in medical practice are a source of adverse events that can be prevented.^[5] Execution of medical orders is an important part of healing process and patient care. It is also the main component of nursing performance and has a prominent role in patient safety.^[9]

Medication administration is a complex multistep process that encompasses prescribing, transcribing, dispensing, and administering drugs and monitoring patient response. Although many errors arise at the prescribing stage, some are intercepted by pharmacists, nurses, or other staff.^[10] Medication errors may be related to professional practice, health care products, procedures and systems, including prescribing; order communication; product labeling, packaging and nomenclature; compounding; dispensing; distribution; administration; education; monitoring and use.^[8]

Medication error is a failure in the treatment process that leads to, or has the potential to lead to, harm to the patient. Medication errors can occur in deciding which medicine and dosage regimen to use (prescribing faults—irrational, inappropriate, and ineffective prescribing, underprescribing, overprescribing); writing the prescription (prescription errors); manufacturing the formulation (wrong strength, contaminants or adulterants, wrong or misleading packaging); dispensing the formulation (wrong drug, wrong formulation, wrong label); administering or taking the medicine (wrong dose, wrong route, wrong frequency, wrong duration); monitoring therapy (failing to alter therapy when required, erroneous alteration). Although medication errors can occasionally be serious, they are not commonly so and are often trivial. However, it is important to detect them, since system failures that result in minor errors can later lead to serious errors.^[11] Medication error has been defined as an act or omission involving medications with potential or actual negative consequences for a patient that, based on standard of care, is considered to be an incorrect course of action.^[12]

Rate of occurrence of medication errors

The rates of nursing medication errors are high in both developed and developing countries.^[9] Medication errors are often times a concern in chronically ill patients most likely because of the increased likelihood for poly-pharmacy and longer durations of therapy.^[13] Failure to administer or incorrect dosages were the most common events reported.^[14] Medication errors happen. In today's complex patient care environments, medication errors can occur in the practice of even the most diligent nurses.^[15] 7,000 deaths and 1.3 million injuries occur each year because of medication errors in American hospitals (August 31, 2011). USA Today reported that medication errors are among the most common medical errors, harming at least 1.5 million people every year (July 21, 2006).^[16] Majority of nurses committing an error had discussed the error with a senior nurse because the incident had been reported through the Australian Incident Monitoring System (AIMS).^[17] Administration errors account for 26% to 32% of total medication errors—and nurses administer most medications. Unfortunately, most administration errors aren't intercepted.^[10]

Proportion of health workers that have been involved in medication errors

A study on "factors associated with medication errors among health workers in University College Hospital, Nigeria" reported that 9 (15.2%) of pharmacists and 181 (66%) of nurses were previously involved in medication errors while 52.5% of pharmacists and 63.5% of the nurses make medication errors 1-2 times in a month.^[16]

However, a study documented that medication errors had been made by 64.55% of the nurses while 31.37% reported medication errors on the verge of occurrence. A research conducted in Jordan revealed that 42.1% of the nurses had made at least one medication error in their career. Huge healthcare expenditures could be saved and many deaths due to medication errors per year could be prevented if health workers were more fully utilized in health care settings.^[9]

Consequences of medication errors

The relevance of medication and drug administration errors in our everyday practice cannot be understated. Drug errors during anesthesia remain a serious cause of iatrogenic harm.^[18] Medication errors can significantly affect patient safety and treatment costs and result in hazards for patients and their families. Giving medicine is probably one of the most critical duties of nurses since the resulting errors may have unintended, serious consequences for the patient. Medication errors can lead to adverse outcomes such as increased mortality, increased duration of hospitalization, and increased medical expenses.^[9] Medication errors are common throughout healthcare and result in significant human and financial cost. In addition, drug errors continue to exact a high cost in modern medical practice in terms of both human suffering and additional costs of healthcare.^[19] Consequently, medication errors can compound a medical crisis, sometimes with tragic results.^[20]

Barriers to reporting of medication errors

A low percent of medication errors are actually reported. Furthermore, since reporting medication errors is fundamental to patient safety, identifying the facilitators and barriers to reporting errors would be an important topic for any investigation of patient safety. Although minimizing medication errors is desirable for health authorities and managers, it should be noted that minimizing the gap between medication errors and reporting rates is also an important indicator of patient safety. Research from all over the world has shown that medication error is one of the most important issues to be addressed in healthcare settings. Most importantly, it is worth mentioning that accurate error reporting is fundamental to error prevention and patient safety.^[4]

Barriers continue to exist and hinder medication administration error reporting because of various factors attributed to operational, institutional and individual intricacies that are involved. Studies indicated that the most cited reason why medication administration errors were not reported was fear which is expressed in various contexts; fear in general; fear of punishment- reprimand- disciplinary action; fear from being blamed; fear from press or media, licensing board/ Nursing Board; fear of losing job; fear of reaction from leadership, peer, patients and their families; fear from being considered as troublemaker. In another study, power hierarchy, face-saving concern and work environment account for more than half of the variances on why medication administration errors were not reported. Based on the foregoing evidences, it appeared that individual, leadership, organizational and environmental factors were cited as reasons why most of medication administration errors were not reported.^[21] Most surveys have placed a high emphasis on the importance of a safe environment for error reporting. Safer environments will increase the rate of medication error reporting.^[4]

III. Objectives

1. Find out the proportions of respondents that have been involved in medication errors.
2. Identify the types of medication errors respondents have been involved in, in the last 10 years.
3. Identify the extent of perceived barriers to reporting of medication errors among respondents.

IV. Methods

4.1. Research design

A cross-sectional design was utilized for this study

4.2. Study setting

The study setting was the University of Port Harcourt Teaching Hospital (UPTH). UPTH commenced operation in 1980 but was established by law in 1985 via Decree No 10 of 1985. It is a centre for tertiary-care and teaching. It is currently the major research facility in Rivers State. The hospital is situated within the Obio/Akpo Local Government Area of Rivers State, Nigeria. It has 8 specialty disciplines. The bed space of the hospital is 500. The University of Port-Harcourt Teaching Hospital is one of the major tertiary health institutions in the Oil-rich Niger Delta Region of Nigeria. It is the apex health institution in Port-Harcourt, which is the headquarters of the oil-industry and the second most industrialized city in Nigeria. As such, it caters for a large cosmopolitan population of indigenous and expatriate oil-sector employees, who are largely in the upper socio-economic strata. The Hospital is managed through a 3-tier structure comprising the Board of Management, the Hospital Management Committee, and the Departments. Nearly 200,000 patients are seen annually in both outpatient and inpatient settings, as well as over 3000 surgical operations a year. The large number of patient

flow makes the health workers to have great tendency for medication errors. The average bed occupancy rate in 12 months has risen above 70%. Besides offering medical services, the hospital tends to provide clinical education and training to medical students, nurses and other healthcare professionals.

4.3. Target Population

The study was intended to use 270 clinical nurses obtained through sample size determination formula. 270 questionnaires were administered to the nurses and 259 (96%) were suitable for analysis while the sum total of 42 questionnaires administered to pharmacists working at the study centre were suitable for analysis.

4.4. Sampling Technique

Consecutive sampling method (a non-probability sampling technique) was adopted for this study to select registered nurses meets the criteria of inclusion due to the fact that respondents run shift duties. Therefore this study utilized the following formula to calculate respondents from the sample frame of the Clinical Nursing Department, UPTH, **Table 1**.

Sample frame (no of nurses in each unit) × sample size

Total population	1
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4.5. Reliability

A pilot study was carried out, within one week duration, among pharmacists and nurses at Braithwaite Memorial Specialist Hospital (BMSH) located at Forces Avenue, Port Harcourt, Rivers State, Nigeria not included in this study but has a similar characteristic with the study population in order to test the instrument and ensure it is reliable. Thereafter, Cronbach alpha was applied to the completed pilot study survey to obtain the consistency of the instrument which showed a moderate reliability value of 0.84.

4.6. Validity

The items in the original instrument underwent rigorous validation and testing. The face validity of the instrument was done by the researcher's supervisor who compared it with similar studies, while the content validity was determined by the judgment of experts in biostatistics, measurement and evaluation (at University of Port Harcourt), nursing and pharmacy departments at UPTH. A content and criterion-related validity test of the instrument was of essence by performing comparison of the instrument for this study, spearman ranking, to the instrument used in other studies with similar questionnaires, objectives and target population using percentage. Suggestions, modifications and corrections were made where necessary so as to improve the quality of the study and instrument. Thereafter, it was approved by the supervisor, to be used in gathering data for this research work.

4.7. Ethical consideration

The researcher obtained an ethical approval of this research study from the ethics review committee of the UPTH, Rivers State, Nigeria after the submission and proper scrutiny of copies of the research instrument, chapter one, two and three of the study by the research ethical committee of the UPTH as a working guide. In addition, administrative approvals from the various participating Departments (Pharmacy and Nursing) were obtained.

4.8. Procedure for Data Collection

One research assistant that is a Registered Nurse and also resides in the area of the study was trained for three days. During the training, she was informed about the modalities for instrument administration and collection. Each unit in the pharmacy and nursing departments of the UPTH were visited by the researcher to obtain response to the questions. Each participating respondent responded to the questionnaire individually and unaided. Data collection spanned period of six weeks. The questionnaire for the pharmacists was given to each pharmacy unit head to distribute to the pharmacists in their various units while questionnaires for nurses were administered during each shift (Morning, Evening and Night). The first set of questionnaires that addressed medication dispensing errors was administered to 42 pharmacists in the entire units of the UPTH and the 42 (100%) completed copies were returned. Furthermore, the second set of questionnaires on medication administration errors was administered to 270 registered nurses in the entire clinical nurses department but 259 questionnaires completely responded to by the nurses were returned resulting to high response rate of 96%.

4.9. Instrument

Data was collected using self-structured/designed questionnaire, developed in English Language in such a way as to elicit pertinent information required for the study. A set of questionnaire containing 35-items was used. The possible barriers to reporting of medication errors were measured with a 5- point Likert's scale. The instrument has four sections. The sections of the questionnaire are as follows:

Section A: Socio-demographic data: sex, age, designation, work experience, and educational qualification -5 items.

Section B: Proportion of respondents who were previously involved in medication errors - 2 items

Section C: Types of medication dispensing and administration errors the health worker may be involved in- 1 item

Section D: Perceived barriers to reporting of medication errors-27 items

4.10. Data analysis

The research questions were analyzed with descriptive statistics such as frequency tables, charts, percentages and means while the research hypothesis were analyzed with Kruskal-Wallis non-parametric test for investigating variability within a variable while t-test and Levene's test statistic were applied to investigate difference between two variables. The responses were scored (1-5) and the best response was assigned the highest score in descending order.

V. Results

The socio-demographic characteristics of the participants showed that 50% of the pharmacists were within 21-30 years while 38.6% of nurses were between 31-40 years old, 66.7% of pharmacists and 92.3% of nurses were females respectively (**Table 2**).

Aim 1: To find out the proportions of respondents that has been involved in medication errors.

The result showed that 38 (90.5%) of pharmacists and 178 (68.7%) of nurses have been involved in medication error while 4 (9.5%) of pharmacists and 81 (31.3%) of nurses have not been involved in medication error.

Aim 2: To identify the types of medication errors respondents have been involved in, in the last 10 years.

The findings showed that the types of medication errors pharmacists have experienced in the last ten years was Wrong patient (52.38%), followed by Giving the wrong medication (47.62%) while 23.94% of nurses had experienced transcribing/documentation error and 20.85% had Given the wrong medication in the last 10 years.

Aim 3: To identify the extent of perceived barriers to reporting of medication errors among respondents.

The most common perceived barrier among pharmacists was concern of being blamed if something happens to the patient due to the error (Pmean= 3.56) and fear of reprimand by the hospital management (Pmean= 3.56) while the commonest barrier perceived by the nurses was fear of reprimand by the hospital management (Nmean= 4.11) followed by concern of being blamed if something happens to the patient due to the error (Nmean= 4.09).

VI. Discussion

The aim of the study was to find out the proportions of respondents that have been involved in medication errors and to identify the extent of perceived barriers to reporting of medication errors among Pharmacists and Nurses working at the University of Port Harcourt Teaching Hospital (UPTH), Rivers State, Nigeria.

The high response rate (100% among the pharmacists and 96% among the nurses) in this survey is noteworthy. It is usually assumed that the higher the response rate, the more likely the results are representative of the population, provided the sampling is appropriate. ^[18] Information obtained from the demographic characteristics of the respondents in the current study revealed that 21 (50%) of pharmacists are between the age of 21-30 years while 100 (38.6%) of nurses are between the age of 31-40 years. Therefore, there are younger pharmacists in the UPTH than the number of young nurses. In addition, the study revealed that 28 (66.7%) pharmacists are females while 239 (92.3%) nurses are females. This suggests that majority of the pharmacists and nurses at UPTH are females who are possibly within their reproductive/baby boom age. This group of people working in the health facilities is faced with the challenge of proper managing of their homes on one hand and provision of quality healthcare services on the other hand.

Based on the rank/designation of the participants, the study revealed that most of the participants are in lower rank (Nursing Officer II, Nursing Officer I, Senior Nursing Officer, Pharmacists and Senior Pharmacists). According to the model of clinical experience "from novice to expert", majority of the pharmacists the current study were at the competent level of clinical experience while a few of them are at the novice and expert level of clinical experience. In addition, majority of the nurses in this study were at proficient level of clinical experience while a few were either at novice, advanced/beginner level, competent or proficient level of clinical experience. Most people expect that medication error should be at its lowest level among health workers whose clinical experience can be categorized under the expert level. On the contrary, few studies have examined the association between nurse experience and intravenous medication errors. ^[22]

Result of proportion of respondents who have been involved in medication error showed that 38 (90.5%) of the pharmacists had actually experienced medication errors compared to 178 (68.7%) nurses. Findings at University College Hospital, Ibadan, Nigeria ^[16] is similar to the findings of the present study because it recorded that out of the total number of nurses who participated in their study, 181 (66%) had

committed Medication Administration Errors previously, but differed to this study's result when compared to 9 (15.2%) pharmacist.^[16] The proportion of nurses who have experienced medication error in the current study is similar to another^[7] among Paediatric Nurses in Lagos Public Hospitals, Nigeria, which reported that 64% of the nurses had committed at least one medication error over the course of their career.

The proportion of medication errors among pharmacists is to be higher compared to that of nurses. Therefore, the result of the present study suggests that the person mostly responsible for occurrence of Medication Errors is the pharmacist. This is contrary to a finding^[16] which reported that the person mostly responsible for the occurrence of Medication Errors is the nurse. Therefore, this present study suggests that it is of necessity to identify the factors that contributed to reduced rate of Medication Errors among nurses and promote the factors as well as identify the contribution of Medication Errors from the pharmacists' perspective.

The responses of the pharmacists and nurses in the current study suggests that the types of medication errors that cuts across all the respondents were wrong patient, giving the wrong medication, wrong dosage and wrong dosage form. The study under discussion reveals that 21 (50%) of pharmacists and 115 (44.4%) of nurses indicated that there are existing medication dispensing error reporting system while 21 (50%) of pharmacists and 144 (55.6%) of nurses indicated that there are no existing medication dispensing error reporting system. Establishing practicable standards/strategies/systems of reporting medication errors and informing the health workers of its existence, e.g. establishing a written protocol regarding medication error and pathway to reporting it and placing it on notice boards of each department, could foster and improve ME reporting rate. Furthermore, responses to the survey revealed that 33 (78.6%) of pharmacists and 195 (75.3%) of nurses report incidents of medication errors.

The two most common perceived barriers to reporting of MEs among the pharmacist and nurses in the current study were the concern of being blamed if something happens to the patient due to the error and fear of reprimand by the hospital management. The findings in a study^[21] titled "barriers in reporting medication administration errors as perceived by nurses in Saudi Arabia" also supported the current study in that it recorded that blaming and focusing on individuals rather than looking at systems as the potential cause of errors were identified where MAEs were not likely to be reported. Similar to the detailed observation from the responses to perceived barriers to reporting of medication errors among the participants in the current study, a study^[7] stated that in the Western world, fear of legal liability, job threat, economic adverse effect, face-saving concern and adverse consequences of reporting have been identified as the most important barriers to error reporting even in the western world. Most health workers will report incidents of medication errors if the work environment is safe enough/supportive.

VII. Conclusion

The quality of care received by the patients is measured by the level of safety experienced by the patient while accessing health care services. This study has indicated the existence of medication errors among pharmacists and nurses. The current study suggests that the person mostly responsible for occurrence of medication errors is the pharmacists. Therefore, this study suggests that it is necessary to identify the factors that contribute to medication errors from the pharmacists' perspective.

Efforts to promote medication error reporting among health care workers must consider several factors that exist in the health care facilities and individual levels. Health workers involved in medication handling are expected to report all cases of medication errors. Though, this is unrealistic but achieving an optimum level of medication error reporting is greatly desired. Medication error prevention can be achieved if the training institution could update the curriculum on pharmacology and the teaching methods used. When medication error is prevented, there would be nothing to report.

7.1. Limitations

- The sensitive nature of the research possibly affected the response rate and the results.
- This study was conducted in a single University Teaching Hospital; therefore, its results could be extrapolated and used as basis for further studies.

7.2. Suggestions/Recommendations

Education, information and communication strategies should be put in place by hospital management to properly train pharmacist and nurses on the concept of pharmacology and medication handling by providing Information, Communication and Technology gadgets and access to internet for current information. As part of medication error prevention program, health care professionals must provide sufficient patient education regarding the use of medication. In addition, a multidisciplinary approach is required in solving the problem of medication errors. Managers and supervisors of departments in the health care facilities should focus on the quality of care rather than emphasizing on punishment by providing adequate staffing and proper relaxation area for staff to reduce stress and to prevent fatigue among health workers. Thus reducing fear among pharmacist and

nurses and promoting optimum medication error reporting. A study to determine the association between health workers' (doctors, nurses and pharmacists) work environment with medication errors is also important to be further investigated.

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Table 1: The Sample Frame and the Respondents

Specialties	Units	Number of Nurses	Respondents
Medical	Male medical ward	22	22/596 x 270/1=9.9=10
	Female medical ward	18	18/596 x 270/1=8.2=8
	Male mental health ward	10	10/596 x 270/1=4.5=4
	Female mental health ward	7	7/596 x 270/1=3.2=3
	Children medical ward	10	10/596 x 270/1=4.5=5
Surgical	Male surgical ward	18	18/596 x 270/1=8.2=8
	Female surgical ward	20	20/596 x 270/1=9.1=9
	Male orthopaedic ward	17	17/596 x 270/1=7.7=8
	Female orthopaedic ward	15	15/596 x 270/1=6.8=7
	ENT ward	13	13/596 x 270/1=5.9=6
	Urology	20	20/596 x 270/1=9.1=9
	Theatre	55	55/596x270/1=24.9=25
	Anaesthesia	72	72/596x270/1=32.6=33
Obsterics and gynaecology	Gynaecological ward	13	13/596 x 270/1=5.9=6
	Labour Ward Complex	12	12/596 x 270/1=5.4=5
	Family planning	10	10/596 x 270/1=4.5=4
	Antenatal clinic	15	15/596 x 270/1=6.8=7
Ophthalmology	Eye ward	16	16/596 x 270/1=7.2=7
	DTU	6	6/596 x 270/1=2.7=3
General Paediatrics	Special Care Baby Unit, Paediatric Surgical Ward, NEUOEMER, CHER	75	75/596x270/1=33.9=34
General	Accident and Emergency	31	31/596x270/1=14.0=14
	Intensive Care Unit	18	18/596 x 270/1=8.2=8
	In-service education and training unit	11	11/596 x 270/1=4.9=5
	General Out-patient department	22	22/596 x 270/1=9.9=10
	Family medicine		
	Dentistry	18	18/596 x 270/1=8.2=8
	Haemodialysis	4	4/596 x 270/1=1.8=2
	Internal medicine	8	8/596 x 270/1=3.6=4
	CSSD	35	35/596x270/1=15.8=16
		5	5/596 x 270/1=2.3=2
	Total		596

Table 2: Percentage and frequency distribution of respondents' socio-demographic variables by age, work experience and educational qualification.

Demographic data	Options	Pharmacy (%) n= 42	Nurses (%) n=259
Age range	<21years	1 (2.4)	5 (1.9)
	21 – 30 years	21 (50)	32 (12.4)
	31 – 40 years	11 (26.2)	100 (38.6)
	41 – 50 years	4 (9.5)	92 (35.5)
	51 – 60 years	5 (11.9)	30 (11.6)
	Total	42 (100)	259 (100)
Gender	Male	14 (33.3)	20 (7.7)
	Female	28 (66.7)	239 (92.3)
	Total	42 (100)	259 (100)
Designation/Rank	Nursing Officer II	0 (0)	10 (3.9)
	Pharmacist/NO I	25 (59.5)	90 (34.7)
	Senior Pharmacist/NO	7 (16.7)	63 (24.3)
	Principal Pharmacist/NO	1 (2.4)	22 (8.5)
	ACP/ACNO	7 (16.7)	39 (15.1)
	CP/CNO	0 (0)	35 (13.5)
	ADP/ADNS	2 (4.8)	0 (0)
	DP/DNS	0 (0)	0 (0)
	Total	42 (100)	259 (100)
	Years of Work Experience	< 1 year	8 (19)
1 - 5 years		16 (38.1)	35 (13.5)
6 - 10 years		5 (11.9)	58 (22.4)
11-15 years		4 (9.5)	72 (28.2)
16-20 years		3 (7.1)	33 (12.7)
21-25 years		3 (7.1)	31 (12)
26-30 years		2 (4.8)	20 (7.7)
31years and above		1 (2.4)	4 (1.5)
Total		42 (100)	259 (100)
Educational Qualification	Diploma in Nursing	0 (0)	116 (44.8)
	Associate Degree	0 (0)	64 (24.7)
	B. Sc (Pharm)/B. NSc	32 (76.2)	71 (27.4)
	M. Sc	6 (14.3)	8 (3.1)
	Ph. D	4 (9.5)	0 (0)
	Post-doctoral	0 (0)	0 (0)
	Total	42 (100)	259 (100)

Table 3.0.Types of medication errors the respondents have been involved in, in the last 10 years

Variables	Pharmacy (%) n= 42	Nurses (%) n=259
Giving the wrong medication	20 (47.62)	54 (20.85)
Wrong patient	22 (52.38)	28 (10.81)
Wrong dosage	13 (30.95)	10 (3.86)
Wrong dosage form	12 (28.57)	12 (4.63)
Wrong route	0 (0)	20 (7.72)
Wrong time	0 (0)	13 (5.02)
Transcribing/documentation error	3 (7.14)	8 (3.09)
Wrong labeling of patient name	8 (19.05)	0 (0)
Not dispensing/administering a prescribed medication	6 (14.29)	22 (8.49)
Omission errors	7 (16.67)	0 (0)
Incorrect drug combination	4 (9.52)	43 (16.60)
Wrong rate error	0 (0)	20 (3.86)
Wrong drug preparation	0 (0)	3 (1.16)
Incorrect administration technique	0 (0)	2 (0.77)
Others	0 (0)	0 (0)

Table 4.1. The extent of perceived barriers to reporting of medication dispensing errors among pharmacists

Parameters	SA (%)	AG (%)	UD (%)	DA (%)	SD (%)	Mean	STD	Decision
Non recognition of the error	2 (22.2)	2 (22.2)	0 (0.0)	3 (33.3)	2 (22.2)	2.8889	1.61589	Rejected
Patient or family might develop a negative attitude towards me or may sue me if ME is reported	1 (11.1)	4 (44.4)	1 (11.1)	1 (11.1)	2 (22.2)	3.1111	1.45297	Accepted
Fear of consequences that may result if ME is reported	1 (11.1)	3 (33.3)	1 (11.1)	3 (33.3)	1 (11.1)	3.0000	1.32288	Accepted
Concerned of being blamed if something happens to the patient due to error	2 (22.2)	4 (44.4)	0 (0.0)	3 (33.3)	0 (0.0)	3.5556	1.23603	Accepted
Fear of reprimand by the hospital management	2 (22.2)	4 (44.4)	0 (0.0)	3 (33.3)	0 (0.0)	3.5556	1.23603	Accepted
Professional cultures of punishing individuals who commit ME	1 (11.1)	0 (0.0)	2 (22.2)	3 (33.3)	3 (33.3)	2.2222	1.30171	Rejected
Power hierarchy	1 (11.1)	3 (33.3)	0 (0.0)	4 (44.4)	1 (11.1)	2.8889	1.36423	Rejected
Working experience	1 (11.1)	2 (22.2)	1 (11.1)	4 (44.4)	1 (11.1)	2.7778	1.30171	Rejected
I will be blamed rather than the healthcare system as a potential cause of the error	1 (11.1)	2 (22.2)	0 (0.0)	3 (33.3)	3 (33.3)	2.4444	1.50923	Rejected
Reporting is too detailed and time consuming	2 (22.2)	1 (11.1)	0 (0.0)	5 (55.5)	1 (11.1)	2.7778	1.48137	Rejected
Others will think I am incompetent	0 (0.0)	1 (11.1)	3 (33.3)	2 (22.2)	3 (33.3)	2.2222	1.09291	Rejected
I think most errors are not important enough to report if no patient is harmed	1 (11.1)	3 (33.3)	2 (22.2)	2 (22.2)	1 (11.1)	3.1111	1.26930	Accepted
Face-saving concern	1 (11.1)	3 (33.3)	3 (33.3)	1 (11.1)	1 (11.1)	3.2222	1.20185	Accepted

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Past experience of having made ME	2 (22.2)	1 (11.1)	1 (11.1)	3 (33.3)	2 (22.2)	2.7778	1.56347	Rejected
Did not know whom to inform	2 (22.2)	2 (22.2)	1 (11.1)	2 (22.2)	2 (22.2)	3.0000	1.58114	Accepted
Litigation								
Medication error is a normal occurrence	2 (22.2)	2 (22.2)	1 (11.1)	3 (33.3)	1(11.1)	3.1111	1.45297	Accepted
Total	1 (11.1)	1 (11.1)	2 (22.2)	3 (33.3)	2 (22.2)			Rejected
						2.5556	1.33333	
	23(15.0)	38(24.8)	18(11.8)	48(31.4)	26(17.0)			Rejected
						2.8954	1.35803	

Table 4.2. The extent of perceived barriers to reporting of medication administration errors among nurses

Parameters	SA (%)	AG (%)	UD (%)	DA (%)	SD (%)	Mean	STD	Decision
Non recognition of the error.	24 (37.5)	13 (20.3)	4 (6.2)	15 (23.4)	8 (12.5)	3.4688	1.50099	Accepted
Patient or family might develop a negative attitude towards me or may sue me if ME is reported.	31 (48.4)	14 (21.9)	6(9.4)	10 (15.6)	3 (4.7)	3.9375	1.28329	Accepted
Fear of consequences that may result if ME is reported.	28 (43.8)	13 (20.3)	9 (14.1)	6 (9.4)	8 (12.5)	3.7344	1.42809	Accepted
Concerned of being blamed if something happens to the patient due to error.	30 (46.9)	18 (28.1)	10 (15.6)	4 (6.2)	2 (3.1)	4.0938	1.07966	Accepted
Fear of reprimand by the hospital management	40 (62.5)	10 (15.6)	2 (3.1)	5 (7.8)	7 (10.9)	4.1094	1.40427	Accepted
Professional cultures of punishing individuals who commit ME.	20 (31.2)	24 (37.5)	8 (12.5)	7 (10.9)	5 (7.8)	3.7344	1.23754	Accepted
Power hierarchy.	18 (28.1)	19 (29.7)	14 (21.9)	5 (7.8)	8 (12.5)	3.5313	1.32100	Accepted
Working experience.	2 (3.1)	0 (0.0)	11 (17.2)	13 (20.3)	38 (59.4)	1.6719	1.7679	Rejected
I will be blamed rather than the healthcare system as a potential cause of the error.	15 (23.4)	15 (23.4)	1 (1.6)	15 (23.4)	18 (28.1)	2.9063	1.60078	Rejected
Reporting is too detailed and time								

consuming.	22 (34.4)	18 (28.1)	11 (17.2)	4 (6.2)	9 (14.1)			Accepted
						3.6250	1.38587 1.24682	
Others will think I am incompetent.	33 (51.6)	13 (20.3)	9 (14.1)	5 (7.8)	4 (6.2)	4.0313		Accepted
I think most errors are not important enough to report if no patient is harmed.	18 (28.1)	24 (37.5)	10 (15.6)	11 (17.2)	1 (1.6)	3.7344	1.10183	Accepted
Face-saving concern.	20 (31.2)	22 (34.4)	4 (6.2)	8 (12.5)	1 (11.1)	3.5313	1.44715	Accepted
Past experience of having made ME.	27 (42.2)	21 (32.8)	9 (14.1)	2 (3.1)	5 (7.8)	3.9844	1.18847	Accepted
Did not know whom to inform.	23 (35.9)	18 (28.1)	8 (12.5)	11 (17.2)	4 (6.2)			
Litigation						3.7031	1.29320	Accepted
Medication error is a normal occurrence.	9 (14.1) 40 (62.5)	11 (17.2) 3 (4.7)	26 (40.6) 0 (0.0)	8 (12.5) 10 (15.6)	10 (15.6) 11 (17.2)	3.0156	1.22788	Accepted
If an error is corrected before it reaches the patient (near miss) it is not necessary to report.	20 (31.2)	31 (48.4)	0 (0.0)	3 (4.7)	10 (15.6)	3.7969	1.67313	Accepted
						3.7500	1.36858	Accepted
My age	10 (15.6)	13 (20.3)	3 (4.7)	31 (48.4)	7 (10.9)			
Educational background.	13 (20.3) 443(34.6)	5 (7.8) 305(23.8)	9 (14.1) 154 (12.0)	16 (25.0) 189 (14.8)	21 (32.8) 189(14.8)	2.8125	1.31987	Rejected
Total						2.5781	1.52028	Rejected
						3.4875	1.45772	Accepted

Table 5.0. T-test analysis of the difference between pharmacists and nurses in the rate of occurrence of medication errors at UPTH.

Variables	Mean (Rate)	F	T	Df	Mean difference	P-value sig	Decision
Pharmacist	1.9048	70.4	4.015	77.99	0.2175	0.000*	Significant Null Hypothesis Rejected
Nurses	1.6873						

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