Factors Contributing to Dispensing Errors among Dispensers in Gulu Regional Referral Hospital, Gulu District. A Cross-sectional Study.

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Abstract

Background:
The purpose of the study is to assess the factors contributing to dispensing errors among dispensers in Gulu Regional Referral Hospital, Gulu District.

Methodology:
The study employed a descriptive cross-sectional design and data was collected from 50 respondents. The respondents were selected using simple random sampling and a semi-structured questionnaire with closed and open-ended was used as a data collection tool. Data were analyzed manually and entered into the computer using Microsoft Excel and the study findings were presented in tables, graphs, and pie charts.

Results:
(72%) had working time of 6-8 hours,(40%) agreed that the number of patients waiting for medicines was at its peak between 9-11 am,(72%) were very often put on pressure by the patient number waiting for medicines while dispensing,(50%) had experienced workload,(64%) agreed that their working environment was conducive,(66%) had never reported dispensing errors,(12%) of the respondents had encountered errors due to similar drug names.

Conclusion:
Generally the researcher concluded that; a large number of patients waiting for medicines increased work pressures among dispensers, high workload, under-reporting of dispensing errors, infrequent continuing professional development since majority less often performed and some never performed CPD, similar drug names which were due to poor shelving methods made dispensers prone to unintentional errors during the dispensing procedure.

Recommendation:
The government of Uganda through the ministry of health should recruit adequate staff, the hospital director should encourage the dispensers to embrace medication error reporting systems, and there should be frequent organizations of CME in the hospital by the pharmacist and pharmacy in-charge, the ministry of health should provide adequate shelves for medicines to avoid medicine mix up while issuing to patients drugs.

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1 Background of the study.

Dispensing is a process that requires a pharmacist to transcribe and check the prescription written by the prescribing health professional and then pick the medication and document the process (WHO). The process of good dispensing involves a series of steps which are; Receiving and validating the prescription, understanding and interpreting the prescription, preparing and labeling medicines to be dispensed to the patient, making a final check, recording action taken, issuing medicine to the patient with clear instruction and advice (MOH 2015).

Dispensing errors refer to the discrepancy between medicines prescribed and medicines received by the patient or as a discrepancy between the written order and the completed prescription (R.A.N. Dilsha, H.M.I.P. Kularathne).

Dispensing errors are defined as "a discrepancy between prescriber's interpretable written order and the filled prescription including written modifications made by the pharmacist under contact with the prescriber or in compliance with pharmacy policy (Yaser, 2018).

The most common error types are; dispensing the wrong drug, dispensing the wrong strength, dispensing the wrong quantity, and omission of items, dispensing the wrong dosage form (Bonifacio Neto, 2013).

The most commonly associated with dispensing errors were high workload, low staffing numbers, mix-up of look-alike drugs and lack of knowledge or experience by dispensary staff, distractions/interruptions, illegible handwriting, a similar package of products, and communication problems within the dispensary team (Aldwaihi 2016).

Medication error is a worldwide issue concerning patient safety and is an important cause of morbidity and mortality (Zayyanu Shitu). The World Health Organization announced the third Global Patient Safety Challenge as "medication without harm" in 2017. The challenge presents the ambitious target to reduce the level of severe avoidable harm related to medication by 50% over 5 years (Peter Gates).

In Sub-Saharan African countries, dispensing error reporting systems have hardly been embraced (Holmstrom AR, 2012). Douglas Defy Vice President of South Africa said that a worrying issue that appears to be occurring more frequently in the health industry is the rise in legal action involving dispensing errors.

In Uganda, according to a survey carried out on medication error disclosure and attitudes of health professionals towards reporting, the response rate was 67%, most Health Care Professionals (HCPS) 91% approved a national medication errors reporting system for Uganda and 58% endorsed integration of dispensing errors and ADR reporting. Two-thirds 65% of Health Care Professionals valued patient involvement in medication error reporting.18% disclosed that they had ever identified possibly harmful medication errors committed by other HCPs.

Most Ugandan Healthcare professionals approved the establishment of a national medication error reporting system. However, as the program is implemented, sensitization and training of healthcare professionals on how to identify and report medication errors will be necessary (Ronald Kiguba). In Uganda dispensing practices in the public facilities are poor and only 24% of medicines dispensed are adequately labeled (Ministry of Health, 2015). The specific objectives of the study were to find out; the facility-centered factors contributing to dispensing errors among dispensers, the dispenser-related factors contributing to dispensing errors among dispensers, and the medicine-related factors contributing to dispensing errors among dispensers in Gulu Regional Referral Hospital, Gulu District.

2 Methodology

Study Area

The study was conducted in Gulu regional referral hospital in Gulu District. Gulu Regional referral Hospital is located in the northern Ugandan city of Gulu. The hospital comprises many departments namely; the ENT department, gynecology and obstetrics department, MCH department, maternity department, psychiatric ward, ART clinic, Diabetes, and hypertensive clinic, ophthalmic department, emergency ward, OPD, Inpatient Department, Ultrasound and X-ray services, laboratory services and so many others.

Study Design

A descriptive cross-sectional study was carried out from December 2021 to January 2022 to identify factors contributing to dispensing errors among pharmacy technicians in GRRH in the Gulu district. Both qualitative and quantitative approaches were used.

Study Population

The study targeted dispensers in Gulu regional referral hospitals in Gulu District.

Sample Size Determination

The sample size was determined using Kish and Leis formula (1965)

N= Z2PQ

d2

Where N= Represents sample size

Z= Standard deviation which is 1.65

P= Represents proportion of the population with attributes and because it's unknown it will be estimated to be 75%.

P=75% =0.75

q= Represents (1-p) where, q=0.25

d= Represents the margin of error which 10%, d= 0.1

$n= (1.65)2 \times 0.75 \times 0.25 /(0.1)^2$

n=51.046875

n=51 respondents

Therefore, a sample size of 51 respondents was to be used but only 50 respondents were available for the study as others were on leave and others had got a festive holiday to leave.

Sampling Technique

A simple random sampling technique was used. It is a technique in which every element in a population has an equal chance of being selected from a sampling frame. It was an appropriate sampling technique because it prevented the researcher from being biased.

Sampling Procedures

In simple random sampling, the researcher got pieces of paper that were corresponding to the number of respondents who were willing to participate in the study and then labelled them with numbers 1 and 2 and placed them in a box. The respondents were requested to randomly pick any piece of paper from the box. The researcher asked the participants to open their papers and those who had number 1 were included in the study and those who number 2 were excluded.

Study Variables

This includes dependent and independent variables.

Dependent variables

Dispensing errors among dispensers in Gulu regional referral hospital.

Independent variables

Facility-centered factors contributing to dispensing errors among dispensers in Gulu regional referral hospital.

Dispenser-related factors contributing to dispensing errors among dispensers in Gulu regional referral hospital.

Medicine-related factors contributing to dispensing errors among dispensers in Gulu regional referral hospital.

Data collection method

The questionnaire method which involved the use of a semi-structured questionnaire consisting of open and closed-ended questions was used to collect data from respondents who were willing to participate in the study.

Data collection tools

A semi-structured questionnaire with open and closed-ended questions was used to acquire information from respondents after informed consent was obtained from the respondents as a sign of acceptance and willingness.

Data collection procedure

An introductory letter was obtained from the principal of Kampala school of health sciences and it was presented to the director of Gulu Regional Referral to seek permission and to carry out the study at the hospital. The respondents met in the out-patient pharmacy department, and the hypertensive and diabetic departments respectively. The purpose of the study was explained to the respondents and each dispenser was requested permission in order to collect data. Questionnaires with opened and closed-ended questions were given to the respondents. The research was conducted for a maximum of one month and each day five respondents were given questionnaires to fill from the out-patient pharmacy department, in the hypertensive and diabetic pharmacy department.

Selection Criteria

Inclusion Criteria

Dispensers who were available at the time of data collection and those who gave consent to participate in the study.

Exclusion Criteria

The study excluded dispensers who were absent and those who were not willing to participate in the study.

3 Data Analysis

The questionnaires were collected and checked for completeness. Manual analysis was done using a scientific calculator, counting and tallying with pen and paper.

Data Presentation

The data analyzed was coded and entered in the excel computer program and presented in the form of tables, graphs, and pie charts.

Ethical Considerations

The researcher obtained an introduction letter from the principal of Kampala School of Health Sciences which was taken to the director of GRRH to get permission to do the study. The researcher

introduced herself to the participants explained the purpose of the study and sought their consent to participate in the study. They were informed that participation was voluntary.

4 Study findings and presentation.

4.1 Demographic data

From the table 1, more than half (54%) of the respondents were males and 46% of the respondents were females.

Based on the level of education, most of the respondents (44%) were diploma holders whereas a few attained other educational levels (6%) like certificate level and BMIS.

Furthermore, in accordance with the religion of the respondents, most of them were Anglicans (40%) while the least number of respondents (6%) were from other religions.

5 Facility centered factors contributing to dispensing errors among dispensers.

From the table 2, the majority (72%) of the respondents reported that their working hours were between 6-8 hours, while about (10%) reported that their working hours were between 4-6 hours. Furthermore, about (18%) reported that their working hours were between 8-10 hours and no respondent had exceeded 10 hours of work.

From the table 3, less than half (40%) of the respondents agreed that the number of patients waiting for medicines was always at its peak from 9 am-11 am, and some agreed that the number of patients waiting for medicines was at its peak from 11 am-1 pm (30%) and from 1 pm-3 pm (26%) while the least (4%) of the respondents reported that the patient number waiting for medicines was at its peak from 3 pm-6 pm.

From the table 4, most (36%) of the respondents reported that they were less often pressured by the number of patients waiting for medicines during the dispensing process while the least (8%) of the respondents reported that they had never been pressured by the number of patients during the dispensing process.

From the figure 1, the majority of the respondents (64%) agreed that their working environment was conducive and the least (36%) disagreed that their working environment was not conducive.

From the figure 2, the majority (64%) of the respondents reported that the dispensing equipment in the hospital pharmacy was not adequate while a minority (36%) reported that the dispensing equipment in the hospital pharmacy was adequate.

6 Dispenser related factors contributing to dispensing errors among dispensers.

From the figure 3, the majority (98%) of the respondents agreed that they had ever heard and were aware of good dispensing practices whereas the least (2%) reported that they had never heard and were not aware of good dispensing practices.

From the table 5 most (45%) of the respondents reported that they very often practiced good dispensing practices in their daily dispensing while the least (2%) of the respondents reported that they had never practiced good dispensing practices in their daily dispensing.

From the figure 4, the majority (96%) of the respondents agreed that they had ever heard of dispensing errors while the minority (4%) reported that they had never heard of dispensing errors.

From the figure 5, the majority (84%) of the respondents reported that they had ever encountered dispensing errors during the dispensing procedure whereas a minority (16%) reported that they had never encountered dispensing errors in the dispensing procedure.

From the table 6, most (36%) of the respondents reported that they had encountered dispensing errors during interpretation and understanding of the prescription, and about 16% of the respondents reported that they had encountered dispensing errors during labelling of medicines.

Furthermore, about 17% and 12% of the respondents had reported that they encountered dispensing errors during the steps of issuing medicines to the patients with clear instructions and preparing the medicines respectively.

About 14% (7% and 7% respectively) of respondents reported that they had encountered dispensing errors during making a final check and recording action taken.

Table 1. 1: Shows the distribution of respondents according to their demographic features.

Variables	Frequency(f)	Percentage (%)
Sex		
Female	23	46
Male	27	54
Total	50	100
Education level		
Diploma	22	44
Bachelors	15	30
Masters	10	20
Others	3	6
Total	50	100
Religion		
Anglican	20	40
Catholic	17	34
Moslem	10	20
Others	2	6
Total	50	100

Table 2. Shows the distribution of respondents according to their daily working hours.

Hours(hrs.)	Frequency(f)	Percentage (%)
4-6	5	10
6-8	36	72
8-10	9	18
Total	50	100

Table 3. Shows the distribution of respondents according to the time of the day where the number of patients waiting for medicines was at its peak.

Time in the day	Frequency(f)	Percentage (%)
9am-11 am	20	40
11am-1 pm	15	30
1pm-3pm	13	26
3pm-6pm	2	4
Total	50	100

Table 4. Shows the distribution of respondents according to how often the number of patients waiting for medicines had put them on pressure while dispensing.

Response	Frequency(f)	Percentage (%)
Often	5	26
Less often	5	20
Very often	36	72
Never	4	8
Total	50	100

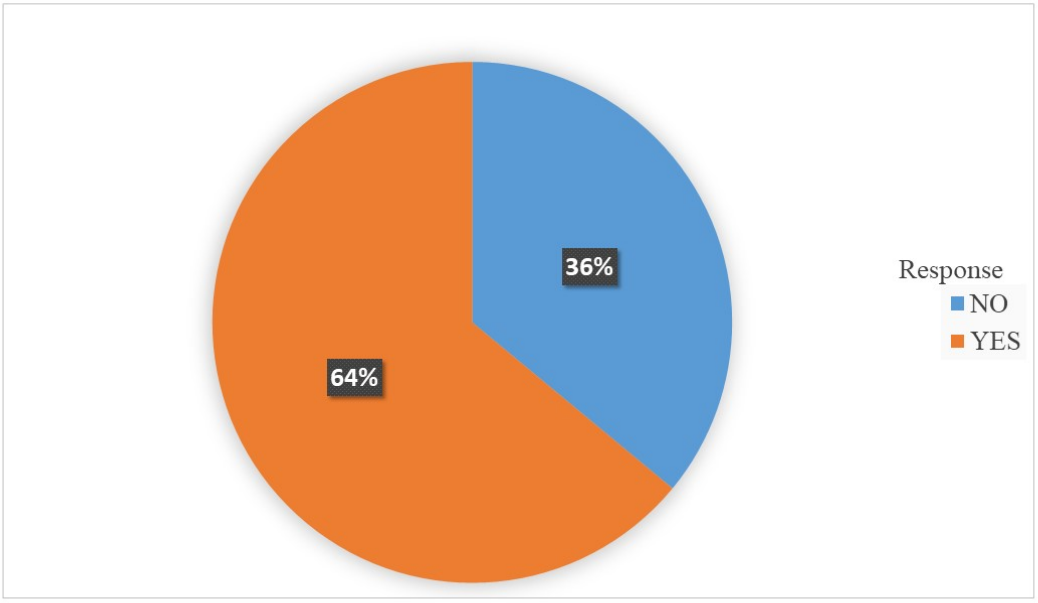

Figure 1. Shows the distribution of respondents according tothe conduciveness of their working environment.

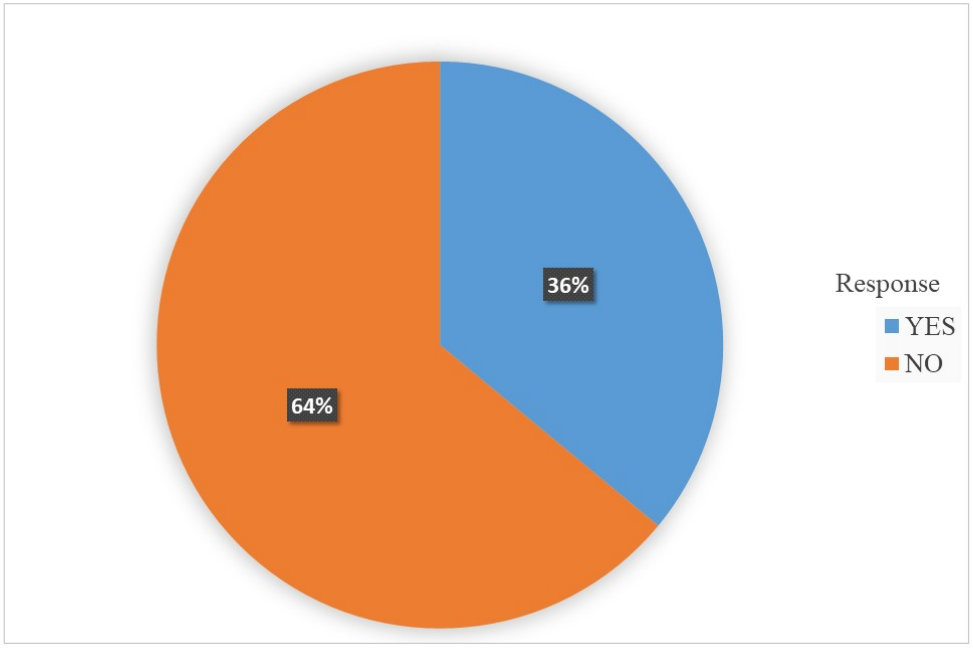

Figure 2. Shows distribution of respondents according to theadequacy of dispensing equipment in the hospital pharmacy.

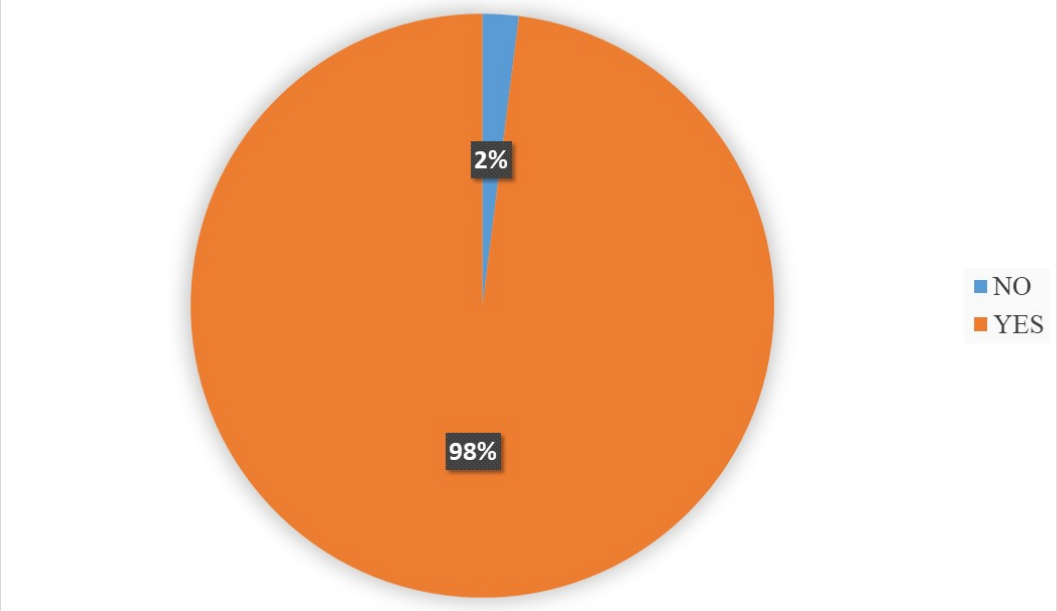

Figure 3. Shows the distribution of respondents according to their awareness about good dispensing practices.

Table 5. Shows the distribution of respondents according to how often they had practiced good dispensing practices in their daily dispensing.

Response	Frequency(f)	Percentage (%)
Often	15	31
Less often	11	22
Very often	22	45
Never	1	2
Total	49	100

Table 6. Shows the distribution of respondents according towhich step of the dispensing process they had encountered a dispensing error.

Dispensing steps	Frequency(f)	Percentage (%)
Receiving and validating of the prescription	2	5
Interpreting and understanding the prescription	15	36
Preparing the medicines	5	12
Labelling the medicines	7	16
Making a final check	3	7
Recording action taken	3	7
Issuing medicines to patients with clear instructions	7	17
Total	42	100

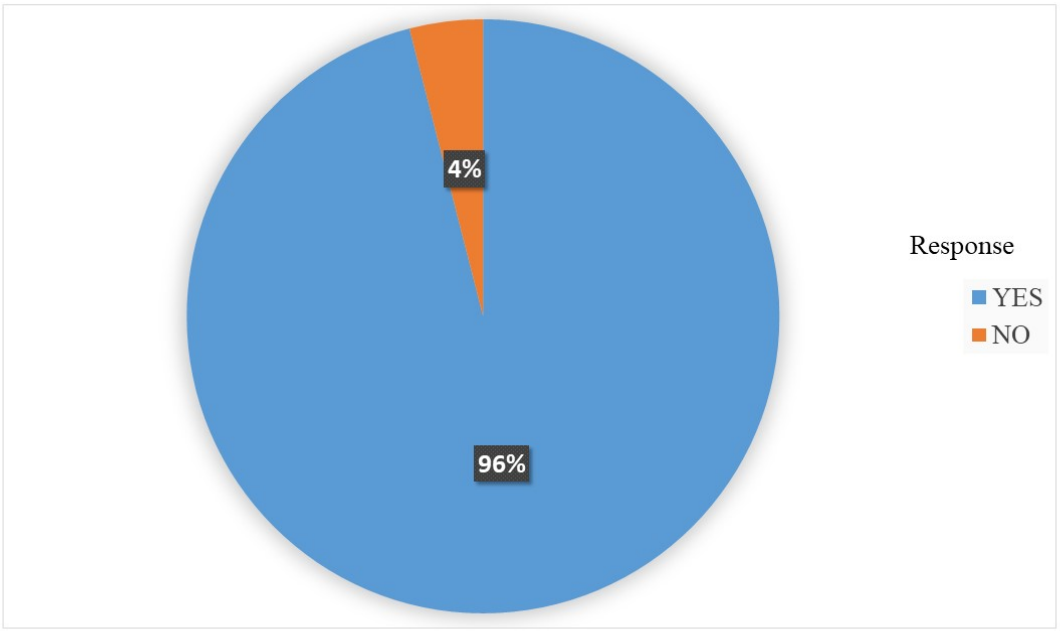

Figure 4. shows the distribution of respondents according to their awareness about dispensing errors.

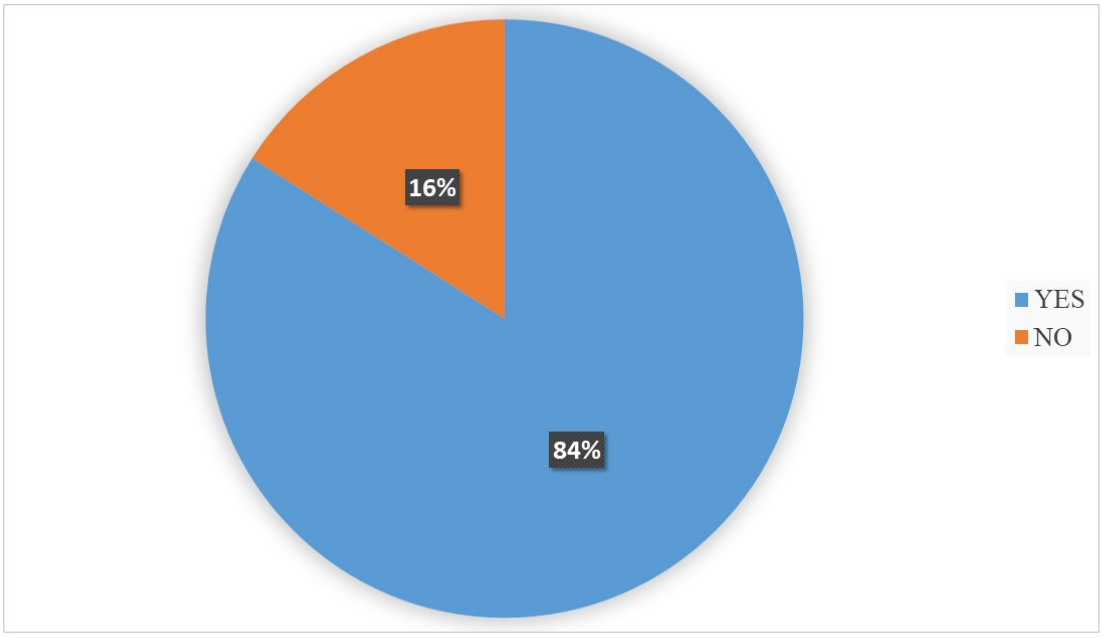

Figure 5. Shows the distribution of respondents according to whether they had encountered any dispensing errors.

The least (5%) of the respondents reported that they had encountered dispensing errors during the step of receiving and validating the prescription.

From the table 7, more than half (60%) of the respondents reported that the cause of the dispensing errors they had encountered was due to the high workload, and about 12% of the respondents reported that the illegible handwriting of the prescribers was the cause of the dispensing error they encountered.

Furthermore, 12% of the respondents also reported that high patient load and pressure were the cause of the error they had encountered during dispensing while 12% of the respondents reported that look-alike medicines were the cause of the dispensing error they had encountered.

The least (4%) of respondents reported that distractions during work hours were the cause of the dispensing errors they had encountered.

From the figure 6, the majority (86%) of the respondents reported that they were aware and had ever heard of continuing professional development whereas the minority (14%) of the respondents reported that they had never heard and were not aware of continuing professional development CPD.

From the figure 7, the majority (76%) of the respondents reported that they had performed CPD whereby (26%) of the respondents had often performed CPD, (28%) of the respondents had very often performed CPD, and (35%) had less often performed CPD, while (12%) of the respondents reported that they had never performed CPD.

From the figure 8, the majority of the respondents (66%) agreed that they had never reported dispensing errors while a minority (34%) of the respondents agreed that they had ever reported dispensing errors.

From the table 8, most (61%) very often reported dispensing errors while the least of the respondents (15%) had often and less often reported dispensing errors.

7 Medicine related factors contributing to dispensing errors among dispensers.

From the figure 9, the majority (74%) of the respondents had encountered counterfeit drugs while the minority (26%) of respondents had never encountered counterfeit drugs.

From the figure 10, the majority (54%) of the respondents reported that they had less often encountered counterfeit products while about (22%) had often encountered counterfeit products.

From the table 9, the majority (75%) reported that they had encountered poorly labelled drugs as counterfeits during dispensing while the least (3%) of the respondents reported that they had encountered a cracked syrup bottle. About 21% of the respondents encountered poorly packaged medicines.

8 Discussions

8.1 Facility centered factors contributing to dispensing errors.

From the study findings, the majority (72%) of the respondents reported that their working hours were between 6-8 hours, and also most (40%) of the respondents reported that the number of patients waiting for medicines was at its peak between 9-11 am. Therefore, majority (72%) of the respondents agreed that they were very often put under pressure by the number of patients waiting for medicines and this was because the number of dispensing staff wasn't adequate compared to the patient population that came for medications on a daily. These findings are in line with the study conducted at the adult and outpatient as well as pediatric dispensaries of Eric Williams Medical Sciences Complex whereby observations were made and the dispensing errors identified during this period were recorded and analyzed. The high workload was evident, especially in the adult outpatient pharmacy which saw an average of 254 patients within 8 hours while a maximum of only 4 pharmacists were involved in the dispensing process at any given time. During 9-1 pm, usually a high number of patients visit doctors' clinics and a high number of patients increases the work pressures on pharmacists while dispensing. The result shows that 40% of the total errors occurred from 11 am to 1 pm, 39% between 9 am to 11 am and 10% between 7 am to 9 am (Sandeep, 2020).

The findings also revealed that half (50%) of the respondents experienced a high workload and this was because of the large number of patients received per day thus resulting in dispensing errors due to fatigue, high patient load, and increased

Table 7. Shows the distribution of respondents according to what had caused the dispensing error they encountered.

Causes	Frequency(f)	Percentage (%)
High work load	25	60
High patient load and pressure	5	12
Illegible handwriting	5	12
Look-alike medicines	5	12
Distractions	2	4
Total	42	100

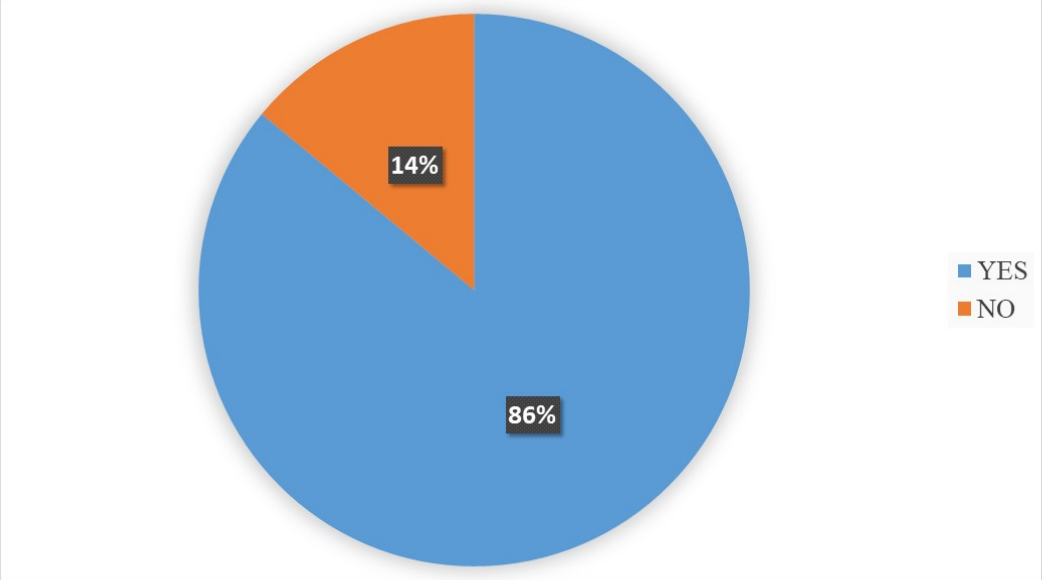

Figure 6. Shows the distribution of respondents according to their awareness about continuing professional development (CPD).

Table 8. Shows the distribution of respondents according to how often they had reported dispensing errors.

Response	Frequency(f)	Percentage (%)
Often	8	24
Less often	20	61
Very often	5	15
Total	33	100

Table 9. Shows the distribution of respondents according to the kind of counter feits they had encountered.

Response	Frequency(f)	Percentage (%)
Poor labelling	28	75
Poor packaging	8	21
Cracked syrup bottle	1	3
Total	37	100

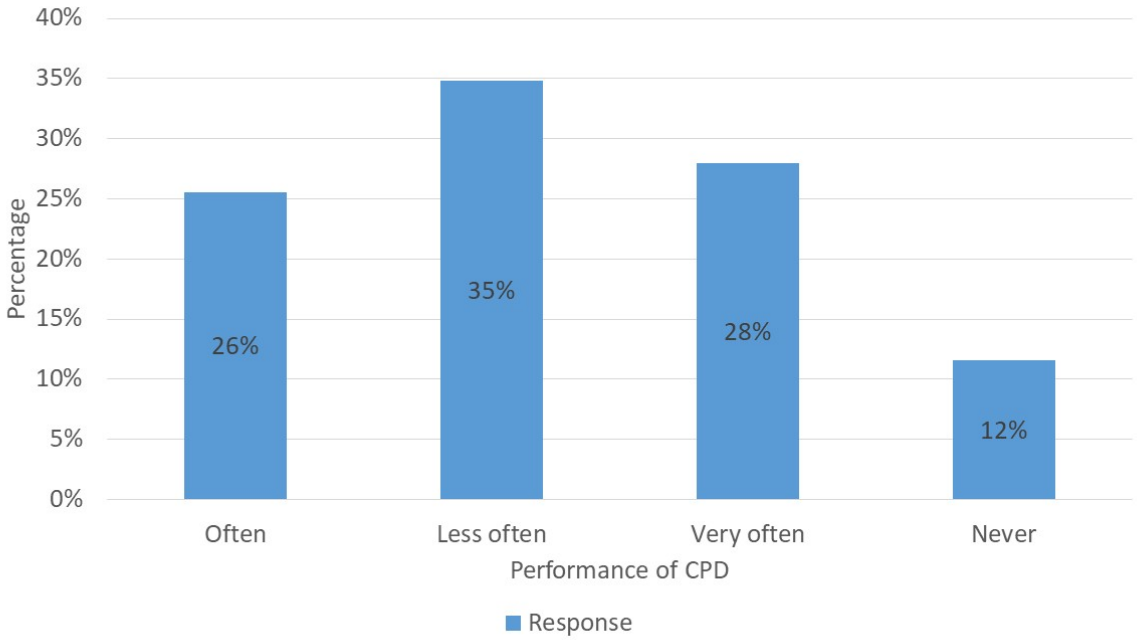

Figure 7. Shows the distribution of respondents according tohow often they had performed CPD.

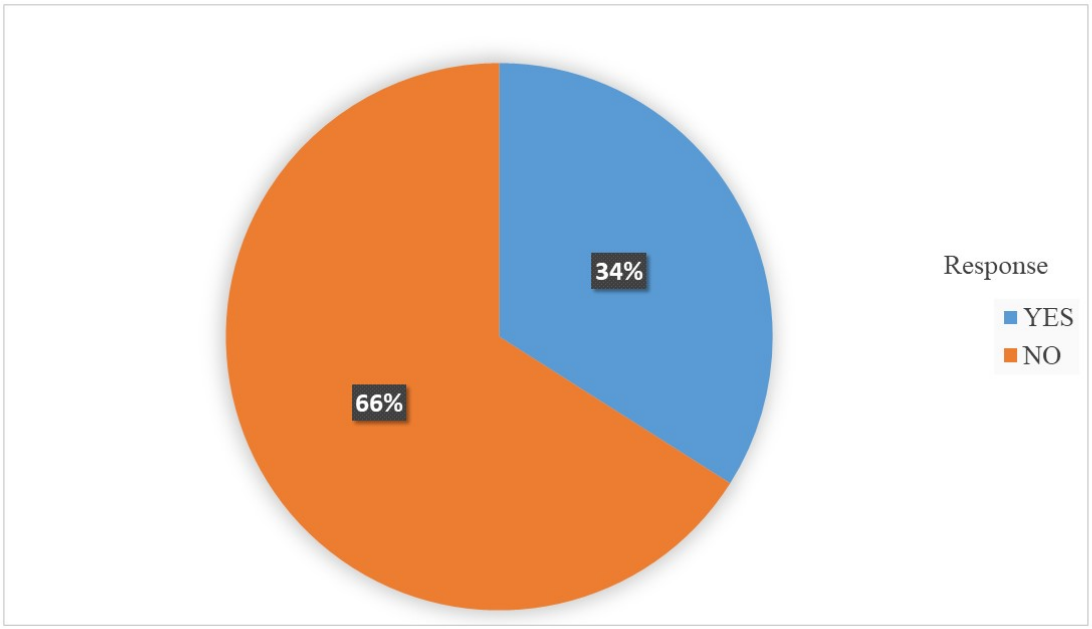

Figure 8. Shows the distribution of respondents according toif they had ever reported dispensing errors.

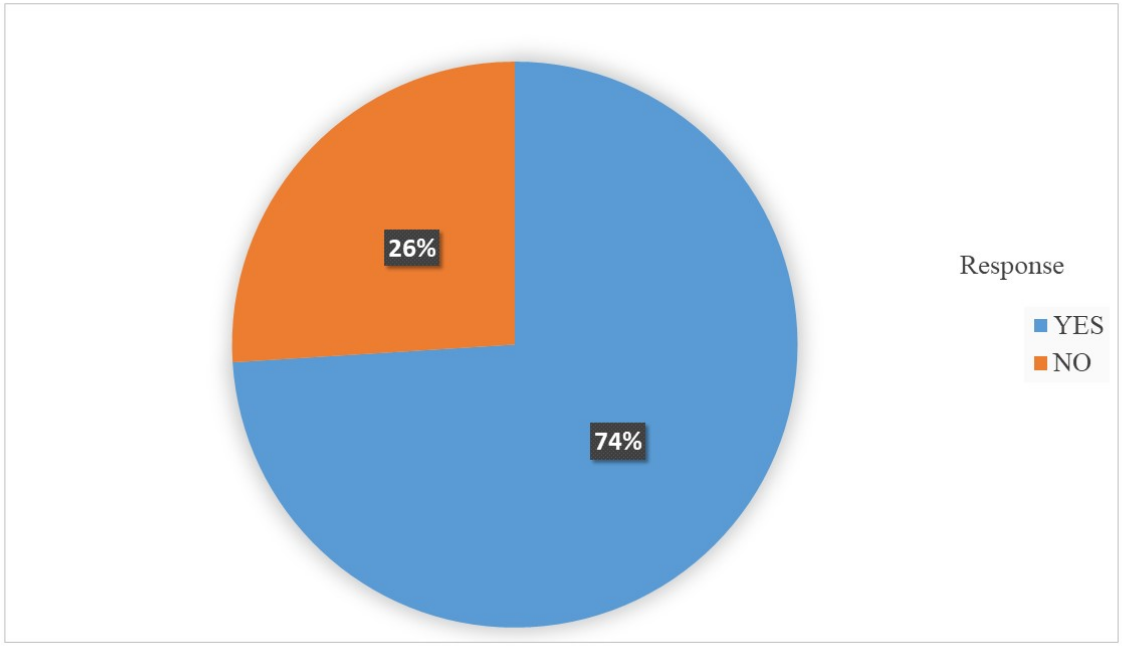

Figure 9. Shows the distribution of respondents according totheir encounter with counterfeit drugs.

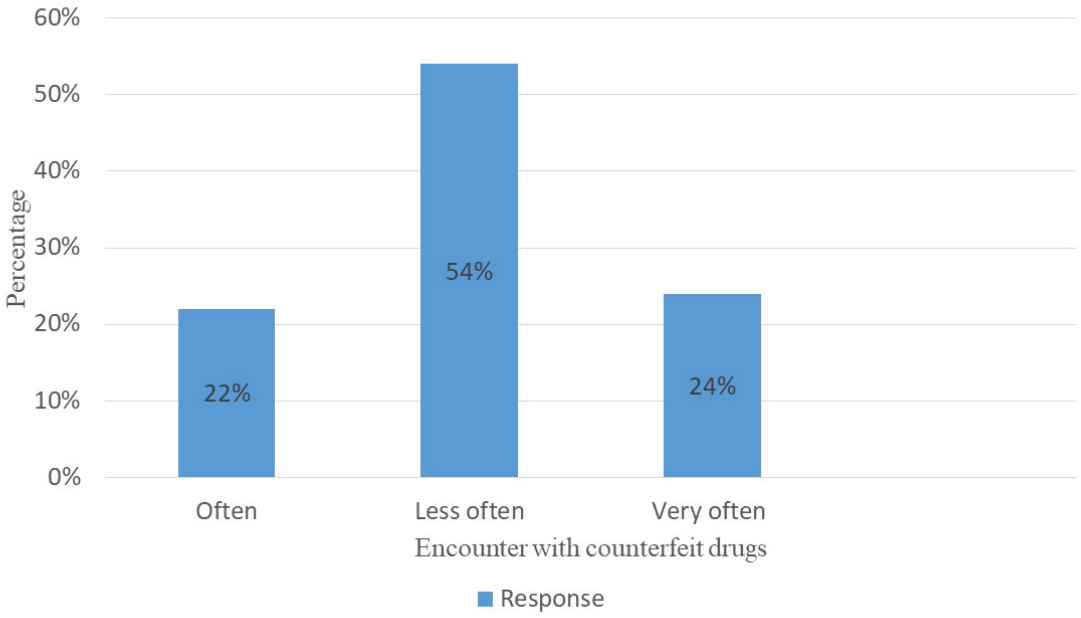

Figure 10. Shows the distribution of respondents according tohow often they had encountered counterfeit drugs.

patient pressure. This is in line with the study conducted in Lebanon, where findings revealed that in 12,860 dispensed medications,376 dispensing errors occurred. Work overloads (55%), illegible (23.13%), distractions/ interruptions (15.15%) were reported as the underlying cause (Lama, 2021).

Furthermore, the study showed that the majority (64%) of the respondents agreed that their working environment was conducive and this was because the pharmacy had adequate space, and good ventilation and is located in a quiet region within the hospital. The study finding is not in agreement with the study conducted in British Columbia where pharmacists perceived their working conditions to be poor. (48%) Pharmacists indicated that they don't have time for lunch break, (26.5%) work in environments that are not conducive to safe and effective primary care, (40%) are not satisfied with the amount of time they have to do their job, and face shortage of staff(shortage of pharmacists: 30.3%, technicians:36.4%, clerk staff:30.3%), high prescription volume, long prescription wait times(Nicole W.Tsao 2020).

Dispenser-related factors contribute to dispensing errors.

Regarding reporting dispensing errors, the majority (66%) of the respondents agreed that they had never reported dispensing errors yet about 96% were aware of dispensing errors. This was because of barriers like fear to report the dispensing errors, negligence and negative attitude toward medication errors reporting, and insufficient knowledge of the advancements and updates on drug information among the respondents since most (35%) of the respondents reported that they less often performed CPD and 12% had never performed CPD yet majority (86%) were aware of CPD. This finding is in line with the survey among health workers in Nigeria which revealed that the most common factors associated with dispensing errors include, under reporting due to perceived factors like fear, work environment factors(e.g. quality management and peer relations)accounted for 54.6% variance in the barriers resulting into a significant decrease in the amount and quality of information that could be used to improve existing patient care systems and prevent future errors, wrong labelling and packaging due to greater frequency of confusion during emergencies and urgencies, communication failures, insufficient knowledge and updates on drug information among dispensers due to the continuous technological development which has led to frequent changes in the form relating to drug use and safety(Abosede Catherine).

Medicine-related factors contributing to dispensing errors.

The study found, that about 12% of the respondents reported that they had encountered dispensing errors due to similar drug names like ergotamine and ergometrine and this was because of poor shelving methods in the dispensaries. This is in line with the survey of pharmacists and pharmacy technicians in the Netherlands, which showed that 41% of all medication incidents in community pharmacies related to IT were about choosing the wrong drug. One-third of the incidents were associated with the confusion of similar drug names e.g. dexamethasone and dexamphetamine, and nearly half were associated with drug strength confusion and this happens when two strengths of the drug look alike e.g. 3.75mg and 0.375mg of pramipexole (Zizi, 2018).

9 Conclusions.

From the overall health facility-related factors that contributed to dispensing errors, the study revealed that less than half (40%) of the respondents agreed that the number of patients waiting for medicines was at its peak between 9-11 am and the majority (72%) of them were very often put on pressure by the number of patients waiting for medicines, (50%) had experienced high workload and (64%) agreed that their working environment was conducive.

Regarding the dispenser-related factors that contributed to dispensing errors, the study established that the majority (66%) of the respondents had never reported dispensing errors yet 86% were aware of dispensing errors,35% less often performed CPD and 12% never performed CPD.

Regarding the medicine-related factors that contributed to dispensing errors, the study revealed that about 12% of the respondents encountered errors due to similar drug names.

Therefore, the researcher concluded that a large number of patients waiting for medicines increased work pressures among dispensers, high workload, under-reporting of dispensing errors, and infrequent continuing professional development since the majority of the respondents had less often and some had never performed CPD, similar drug

names which were due to poor shelving methods made dispensers prone to unintentional errors during the dispensing procedure.

Recommendations

The government of Uganda through the ministry of health should recruit adequate staff that can sufficiently work and provides services with calmness and peace of mind to reduce the workload, avoid mistakes and reduce work pressures during the dispensing process.

The hospital director should encourage the dispensers to embrace medication error reporting systems that are provided by the World Health Organization to reduce and avoid patient harm and also to analyze the cause to prevent it from happening again.

The hospital pharmacist and pharmacy incharges should frequently organize continuing medical education (CME) to maintain the knowledge and skills of dispensers, update the dispensers on new drug information and technological advancements in medicine to keep them competent for quality service delivery to the patients, and promote confidence in the patients about the profession.

The ministry of health should provide adequate shelves and encourage hospitals to properly arrange the available medicines on the shelves to avoid medicine mix up while issuing medicines to patients.

10 Acknowledgement

With heartfelt gratitude, I thank the almighty God who gave me the strength to complete my research project, wisdom, courage, grace, and favor in my entire school life during my course.

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Great appreciation and gratitude to Gulu Regional Referral Hospital which permitted me to conduct my study and special thanks to all the staff who participated and cooperated with the study.

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Finally, I appreciate my friends Arnold, Ronald Muwonge, Edward, Mable, Faith, Mercy, and Monica who guided and supported me during my research study.

11 List of Abbreviations/Acronyms

ADR: Adverse Drug Reaction

EWMSC: Eric Williams Medical Sciences Complex

FDA: Food Drug Authority

HCP: Health Care Professional

IT: Information technology

ME : Medication Error

MOH: Ministry of Health

PIS: Pharmacy Information System

WHO: World Health Organization

CPD: Continuing Professional Development

CME: Continuing Medical Education

12 Definition of Key Term

Adverse Drug Reaction: This is any response that is noxious, unintended or undesired which occurs at doses normally used in humans for prophylaxis, diagnosis, therapy of disease or modification of physiological function.

Adverse Drug Event: Is an injury from a medication or a missed or inappropriately dosed medication.

Medication error: Any preventable event that may cause or lead to inappropriate use.

Morbidity: Morbidity refers to the proportion of people in a specific location that are subject to illness and disease.

Mortality: The number of deaths in a certain group of people in a certain period of time.

CPD: This includes all activities that professionals undertake formally and informally in order to maintain, update, develop and enhance their knowledge, skills and attitudes in response to the needs of their patients.

Counterfeits: According to WHO, counterfeits are medical products that are outside „ of specifications, which includes intentional, reckless or negligent errors, false packaging and those intended to deliberately deceive and imitate a genuine product.

Table 10. References

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