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Evaluation of Medication Safety Practices Among Pharmacists in A Teaching Hospital in South-East Nigeria

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ABSTRACT

The study evaluated the practice of Medication Safety and assesses the knowledge of medication safety practices among hospital pharmacists in a teaching hospital in southeast Nigeria. It was a quantitative study divided broadly into two phases. Phase one involved the collection of the medication error forms filled by pharmacists in the hospital over 3 months; January – March 2021. The second phase was the administration of self-completed questionnaires. The data was collected and analyzed. The medication errors encountered were assessed, classified, and the prevalence determined. Descriptive statistics were used to summarise the data. Overall, 68 medication error forms were collected over the 3-month data collection period. The top category of prescribing error was dose/frequency omitted (24.65%), followed by duration/stop date omitted and dose inappropriate (over), both were 17.81%. The medication safety domain to which pharmacists demonstrated the highest positive response rate (PRR) was Personal Influence Over Safety with 63.33% (SD±20.09), and the domain with the lowest positive response rate was Facilitators and Barriers at the Workplace with 46.25% (SD±25.67). Most of the pharmacists answered yes to having filled out the hospital's medication error form at least once. 3 of the 4 medication safety domains had above-average positive response rates (PRR). The medication safety domain with the lowest PRR was the facilitators and barriers at the workplace domain with 46.25%. There were no significant differences in associations between pharmacists of different ages, years of experience, and different genders in their attitudes toward medication safety; after applying Pearson's correlation test.

INTRODUCTION

Patient safety is a serious global public health concern. Industries with perceived higher risk, such as the aviation and nuclear industries, have a much better safety record than health care does, (Rigamonti and Rigamonti, 2021). Recent evidence suggests that 134 million adverse events occur each year due to unsafe care in hospitals in low- and middle-income countries (LMIC), resulting in 2.6 million deaths annually (National Academies of Science, Engineering, and Medicine, 2018).

A core component of patient safety is medication safety. However, several terms are used to define medication safety. For the purpose of this study we wish to use that of the American Hospital Association (AHA), Health Research & Educational Trust (HRET), and the Institute for Safe Medication Practices (ISMP) Pathways for medication safety, which defined medication safety as "freedom from accidental injury during the course of medication use; activities to avoid, prevent, or correct adverse drug events which may result from the use of medications" (Committee of Experts on Management of Safety and Quality in Health Care (SP-SQS). The cost of prevention is typically much lower than the cost of treatment due to harm, (Slawomirski, Auraaen, and Klazinga, 2017). As an example, in the United States alone, focused safety improvements led to an estimated US$ 28 billion in savings in Medicare hospitals between 2010 and

2015, (Agency for Healthcare Research, and Quality, 2015). Unsafe medication practices and errors – such as incorrect dosages or infusions, unclear instructions, use of unofficial abbreviations, and inappropriate prescriptions – are leading causes of avoidable harm in health care around the world. Medication error is evolving even across many countries eg the middle east and Africa with its attendant consequences (Alsulami, Conroy, and Choonara, 2013; Donaldson, 2017). A landmark report into patient safety was published in 1999, 'To Err Is Human: Building a Safer Health System'. This seminal work brought focus to bear on patient safety globally and set the tone for research into patient safety practices. In this work death rates from medical errors were compared to death rates from other well-known events like motor vehicle accidents, breast cancer, and HIV/AIDS. This brought into stark relief the seriousness of the problem; especially since those deaths were preventable. Since then, patient safety has increasingly been recognized as an important discipline in healthcare, and research in improving patient safety has increased globally.

In March 2017, the World Health Organization (WHO), launched the third Global Patient Safety Challenge with the theme of medication safety. The goal of the third Global Patient Safety Challenge (GPSC) on Medication Safety is to gain worldwide commitment and action to reduce severe, avoidable medication-related harm by 50% in the next five years (starting from 2017), specifically by addressing harm resulting from errors or unsafe practices due to weaknesses in health systems (WHO: Medication Without Harm, 2017). Several toolkits emerged from all this work, for example, *5* Moments for Medication Safety, (Medication Without Harm, 2017). The global healthcare community involved in patient safety received a great boost through this initiative.

One of the major gains of the patient safety movement was the decision reached by the 72nd World Health Assembly (WHA) ON 22nd May 2018 to endorse World Patient Safety Day (WPSD) on 17 September as an annual event (72nd WHA Global Action on Patient Safety, 2019). The first WPSD was celebrated on the 17th of September 2019 and is now an annual event. On the 20th of June 2019, the WHO published 3 technical reports on medication safety namely; Medication Safety in High-risk Situations, Medication Safety in Polypharmacy, and Medication Safety in Transitions of Care.

The great challenge for the global community involved in healthcare research is the implementation of these guidelines across the world, especially in low- and middle-income countries (LMIC), where most of the consequences of poor patient safety indices are felt. Challenges in the implementation of patient safety goals are many, as safety encompasses cultural, behavioral, technical, clinical, and psychological domains (Srima, Lua, Mathumalar, 2015). The World Health Organization (WHO) has sought to establish agreement on research priorities for medication safety, (Sheikh, et. al. 2019). Pharmacists are the custodians of medications - amongst other roles – and their involvement in medication safety practices is vital to the overall success of patient safety.

The attitudes of doctors, nurses, and midwives to reporting errors in health care have been extensively studied, but there is very limited literature considering pharmacists' attitudes to medication error reporting schemes, in hospitals, (Williams, Phipps, and Ashcroft, 2013). The most recent initiatives and recommendations have continued to emphasize the importance of a safety culture and implementing reporting systems. According to (WHO Patient Safety Incident Reporting, and Learning Systems, 2020), reporting is central to patient safety. It goes further to say that reporting systems must fulfill one or more of five main functions: public accountability, response to the patients and families involved, communications alert route, the barometer of risk within health care, and foundation for learning and improvement. A common problem is that reporting systems create fear and apprehension amongst staff that patient safety incidents could be punished. It is thus important that a 'no-blame culture' is fostered in all healthcare establishments. It is vital that reporting of medication errors by healthcare professionals be encouraged. The impediments to medication error reporting systems are increasingly being studied across the world.

Pharmacists play a vital role in the safety net that protects patients; they are the custodians of the drugs which are the single most important medical intervention. Pharmacists played pivotal roles in the WHO's 'Medication Without Harm', and their expanding role is gradually being accepted both by

other healthcare professionals and the public. The role of the pharmacist in Nigeria has rapidly expanded in the last 10 years or so with an emphasis on the concepts of pharmaceutical care and clinical pharmacy. The degree Doctor of Pharmacy (PharmD), with an emphasis on clinical pharmacy, has been introduced into the country. According to the principles of pharmaceutical care, pharmacists are expected to ensure the quality and safety of medication in patient care, at all levels of care, through collaborative care and patient interaction. Thus, pharmaceutical care introduced the principles of prospective risk management to medication processes, (International Pharmaceutical Federation (FIP). Patient safety. 'Pharmacists' role in medication without harm', (2020).

Also, the West African Post-Graduate College of Pharmacists has a residency/fellowship program that trains pharmacists in the various disciplines of clinical pharmacy, amongst other areas of pharmacy. This has received different levels of support from the national government, and various state governments across the country. This study aimed to evaluate what pharmacists in a teaching hospital know about medication safety, their levels of practicing it (especially by reporting and documenting medication errors), and their perceptions of the facilitators and barriers to achieving the 2019 WHO global patient safety guidelines in their day-to-day work. We evaluated the practice of Medication Safety among hospital pharmacists and assess their knowledge of medication safety practices in a teaching hospital in southeast Nigeria.

METHODS

Study Design

This was a cross-sectional study carried out in the pharmacy department of a teaching hospital in the southeast of Nigeria. Only pharmacists; both registered and intern pharmacists were involved in the study. The medication error forms of the hospital filled during this period, by the participating pharmacists, were collected and analyzed, to assist in evaluating their medication safety practices. A self-administered questionnaire incorporating 4 patient safety domains was also used. Ethical approval for this study was granted by the ethical approval committee of Chukwuemeka Odumegwu Ojukwu University Teaching Hospital (COOUTH), Amaku, Awka, Nigeria.

Study Setting

The study was undertaken at Chukwuemeka Odumegwu Ojukwu University Teaching Hospital (COOUTH), Amaku, Awka, a 148-bed teaching hospital in the southeast of Nigeria. The hospital employs a medication error/intervention data form which pharmacists use to document their pharmaceutical care interventions. When a physician prescribes medications using the hospital's prescription sheets, a pharmacist checks the prescription for medication errors (dosage, drug-drug interactions, dosage form, etcetera). If none is found the pharmacist proceeds to dispense the medication(s) and counsel accordingly. If, however, there are any medication errors, the pharmacist intervenes and documents his/her interventions as to the description, severity of the error, and time and date. The pharmacist also documents whether the physician, patient, or patient carer was informed of the error and if the error had caused harm, and or if the intervention was accepted by the physician.

Population/Sample

The total number of pharmacists in the hospital is 38; this is made up of 20 registered pharmacists and 18 intern pharmacists. The data collection period was 3 months (January – March 2021). At the beginning of the study the principal researcher UA, delivered a clinical presentation on patient safety at the weekly clinical meeting of pharmacists in the hospital. Topics covered in his presentation included the 3rd Global Patient Safety Challenge of the World Health Organization (WHO); "Medication Without Harm", along with the principles of the three WHO technical reports on patient safety; "Medication Safety in High-risk Situations", "Medication Safety in Polypharmacy", and "Medication Safety in Transitions of Care". Another key topic discussed within the 90 minutes interval was the correct use of the hospital's medication error/data intervention forms; this included tips on how to approach physicians to correct a medication error. Convenience sampling was used to distribute the questionnaires as all the pharmacists who had been employed in the hospital for at least one month were given questionnaires. 35 of the 38 pharmacists employed by the hospital qualified for the study and were thus issued with questionnaires.

Data Collection Instruments

Medication Error Forms

The hospital employs a medication error/ intervention data form as a method of intervention to prevent the harm of a prescription error from reaching the patient. This form is distributed across the hospital's different pharmacy units where prescriptions are handled, namely; the general outpatient, pediatric, Adult and Children's Accident & Emergency, National Health Insurance Scheme, In-patient, and Specialist Clinics, units respectively. The form is divided into different categories, namely, severity level, intervention taken, type of error, cause of the error, date of the error, description of the error, patient information (hospital id number, age, and gender), drug information, and pharmacist's name and date of intervention. The forms were returned to the principal investigator and reviewed and classified by him.

Grading of Errors

The method of grading of errors developed by some researchers was used as a guide to clinical severity in this study. This method groups the errors into 4 different categories, namely, minor, significant, serious, and potentially lethal, errors. The grouping was done by UA, and confirmed by OB.

Questionnaire

The questionnaire had six sections and 35 questions in total, (4 single-sided pages taking 15 minutes to fill). Section A covered *Demographics*, section B covered Information on Medication Safety, section C covered Error and Patient Safety, section D was on Safety of the Healthcare System, section E was on Personal Influence Over Safety, and section F covered Facilitators and Barriers at the Workplace. Four of these sections of the questionnaire were adapted from a questionnaire; What is Patient Safety? developed by (University of Aberdeen) and incorporated a 5-point Likert scale. For example, 5 individual items, when taken together, gave a respondent's impression of the Error and Patient Safety domain. The questionnaire was adapted to fit the situation in a typical Nigerian Teaching hospital and to keep it relatively short to improve response rates.

The questionnaire had four patient safety domains containing 24 questions in total. All items in this section were presented in a 5-point Likert scale ranging from "low" to "high" and "strongly disagree" to "strongly agree". Ethical approval was obtained for the study from the hospital's ethical approval committee. At the beginning of the study written consent of all the study participants was sought for and obtained; participants were informed regarding the aim of the study, and that their participation was voluntary and that their responses were anonymized. A cover letter was also attached to the questionnaire, which included details on informed voluntary consent as well as instructions for completing and returning the sheets. The questionnaires and consent forms were delivered to pharmacists at a weekly departmental clinical meeting. A presentation on patient safety in general, incorporating the WHO's 3 technical reports on medication safety namely, Medication Safety in High-risk Situations, Medication Safety in Polypharmacy, and Medication Safety in Transitions of Care, was given by the principal investigator, UA.

Data Analysis

The medication error/intervention data forms were used to extract information as regards the distribution of drug therapy problems and their severity. It also was useful in accessing the medication error intervention practices of the pharmacists. Nominal variables were analyzed using descriptive statistics which consisted of frequency distribution and percentages. Here the outcome of primary interest was to assess the quality of the filling of the medication error forms and grade the drug therapy problems according to severity. The percentages of the different types of prescribing errors were also determined. The response rate was calculated as the number of completed questionnaires returned divided by the number of eligible pharmacists who were given a questionnaire to complete. The completed questionnaires were also assessed for missing responses, and the percentage of missing responses was calculated across variables, cases, and values. An independent sample t-test (Little's test) was run to check if the data were missing completely at random (MCAR), the p-value was calculated, and missing data were replaced using the Expectation Maximization (EM) method (Kang, 2013). Descriptive statistics were used to calculate the mean, standard deviation, range, minimum, and maximum values.

The percentage of respondents who gave a positive response (≥75; agree slightly and agree strongly) was calculated; the percentage mean positive score for each of the 4 domains was calculated using the AHRQ (Agency for Healthcare Research and Quality) formula—total number of positive responses to the items in the dimension divided by the total number of items in each dimension (multiplied by 100), (Famolaro *et. al*., 2018). All patient safety domain scores were converted to a 100-point scale: 1=0, 2=25, 3=50, 4=75, 5=100 (5-point Likert scale) (Srima, Lua, Mathumalar, 2015). All the analyses were two-sided and the statistical significance level was set at α=0.05 with 95% CI (p-value <0.05). The Shapiro-Wilk test was used to check the normality of data, and Pearson's correlation test was used to check different hypotheses of associations (negative or positive) between different variables. All statistical analysis was performed using IBM SPSS Statistics version 28.0.0.0.

RESULTS AND DISCUSSION

A total of 35 pharmacists met the criteria for inclusion in the study. 30 out of 35 pharmacists completed and returned the questionnaires, resulting in an overall response rate of 85.71%.

Demographic Characteristics of Respondents

The demographic characteristics of the study population are listed in Table 1. Women represented 56.7% of the population; 56.7% of the respondents were aged between 21 – 30 years, 66.7% of the respondents had practiced pharmacy for 0 – 5 years, and 86.7% qualified as Bachelor of Pharmacy (alone).

Table 1. Demographic Characteristics of Respondents

Demographic Characteristics	Respondents (n=30)	Frequency (%)
Gender		
Male	13	43.3
Female	17	56.7
Age Range (years)		
21-30	17	56.7
31-40	9	30.0
41-50	3	10.0
50-60	1	3.3
Years of Practice (years)		
0-5	20	66.7
6-14	6	20.0
15-30	4	13.3
Qualifications		
B. Pharm	26	86.7
PharmD	1	3.3
B. Pharm & M. Pharm	2	6.7
B. Pharm & Others	1	3.3

The categories of prescribing errors are described in Table 2. Most of the prescription errors were classed as *minor errors* (69.9%), whilst *serious errors* (5.5%) were the least common.

Table 2. Categories of Prescribing Errors

Category	N	%
Minor Errors	51	69.9
Significant Errors	13	17.8
Serious Errors	4	5.5
Potentially Lethal Errors	5	6.8
Total	73	100

Below is the classification of the results obtained in the study based on four simple classifications for the clinical severity of the identified prescribing errors.

Table 3. Lists some examples of the clinical severity of the identified prescribing errors.

Variables	Description
Minor Error	Tablet ACT: the prescription did not specify the type of artemisinin-based combination therapy (ACT), nor state the dose or dosage regimen
Significant Error	Tablet Loratadine 10 mg twice daily: the maximum dose of loratadine is 10 mg once daily
Serious Error	Tablet Diclofenac 50 mg 3 times daily: this was prescribed for a peptic ulcer patient without a proton pump inhibitor cover
Potentially Lethal Error	Tablet Sertraline 500 mg twice daily for 3 weeks: the initial dose of sertraline is 50 mg once daily, which can be increased in steps of 1-week intervals to a maximum of 200 mg daily

Table 4 lists the types of identified prescribing errors. The most frequently occurring prescription error was where the dose/frequency of the drug was omitted (24.65%); this is a type of dosing error. The least common type of prescribing error was serious drug-drug interaction, irrational prescription, and illegible handwriting, these were all detected only once (1.37%), respectively.

Table 4. Types and Rates of Prescribing Errors

Error description	N	%
Incomplete Information		
Duration/stop date omitted	13	17.81
The route of administration omitted	2	2.74
Drug name omitted	7	9.59
Dosing		
Dose/frequency omitted	18	24.65
Dose inappropriate (under)	4	5.48
Dose inappropriate (over)	13	17.81
Interaction		
Serious drug-drug interaction	1	1.37
Abbreviation		
Unofficial abbreviation	3	4.11
Others		
Wrong formulation	3	4.11
Extended duration	5	6.85
Wrong drug name	2	2.74
Irrational prescription	1	1.37
Illegible handwriting	1	1.37
Total	73	100

Pharmacists' Perception of Medication Safety in the Hospital

Table 5 lists pharmacists' perceptions of medication safety according to the 4 patient safety domains used. The medication safety domain with the highest mean score was *Error and Patient Safety* with 67.42% (standard deviation of 14.83), and the lowest mean score was that of *Facilitators and Barriers at the Workplace* with 54.07% (standard deviation of 13.03). Table 5 also incorporates the percentage of pharmacists who held positive attitudes towards each domain; the positive response rates (PRR) which are computed as the percent of pharmacists who answered 'agree' or 'agree strongly' on each of the items within a scale (i.e., 4 or 5 on the original 5-point Likert scale). All patient safety domain scores were converted to a 100-point scale: 1=0, 2=25, 3=50, 4=75, 5=100 (5-point Likert scale) (Srima, Lua, and Mathumalar, 2015). The medication safety domain to which pharmacists demonstrated the most positive attitudes was *Personal Influence Over Safety* with 63.33% (standard deviation of 20.09), and the domain with the least positive attitude was *Facilitators and Barriers at the Workplace* with 46.25% (SD±25.67).

Table 5. Pharmacists' Perception of Medication Safety

Medication safety domains	Min %	Max %	Mean %	SD	PRR %	SD
Error and Patient Safety	37.50	100.00	67.42	14.83	60.67	36.57
Safety of the Healthcare System	0.00	87.50	60.83	16.89	62.50	23.44
Personal Influence over Safety	42.86	85.71	65.37	10.87	63.33	20.09
Facilitators and Barriers at The Workplace	25.00	81.25	54.07	13.03	46.25	25.67

PRR: Positive Response Rates

The demographic data is similar to that seen generally across Nigeria, for example in (Funsho and Titilayo, 2015). That most of the pharmacists have a B. Pharm degree is not a surprise, as this is the qualification offered by most Universities in Nigeria, the PharmD degree is not yet widespread. However, the percentage with only a B. Pharm shows a lack of specialization among the pharmacists in the hospital. This places an increased emphasis on the need for in-house training by the hospital management in the principles and practice of patient safety and the principles and practice of pharmaceutical care in general. There is also a need for pharmacists to take up the opportunities for additional training in the provision of pharmaceutical care usually offered at the PharmD, MSc, M. Pharm degree programs and the West African Postgraduate Fellowship (FPCPharm), if

they must develop or acquire the competences and skills to effectively provide pharmaceutical care, (Eniojukan & Onedo, 2015).

The response rate to the questionnaire (83.33%) is high. It compares favorably with 83.6% of the (Srima, Lua, and Mathumalar, 2015) study. In accessing the "safety attitudes questionnaire", the response rates were 66 –72% (Sexton, et al., 2006). We are thus confident that the high response rate of the pharmacists is representative of the views of the entire population of pharmacists in this teaching hospital. It has been said that medication errors are preventable causes of patient harm with significant contributions to adverse drug events, but they remain understudied in Nigeria (Ogunleye et al., 2016).

This study is to add to the growing body of work investigating patient safety in general and medication safety. Pharmacists were chosen exclusively as the role of clinical pharmacists' services are increasingly being recognized as contributing to improvements in medication safety and patient safety, for example, by medication reviews and medicines reconciliation, (Royal, et.al., 2006). In this study, most of the hospital pharmacists had filled out a medication error/ intervention form at least once. This compares favorably to (Ogunleye et al., 2016); where less than half of the respondents had ever reported a medication error, and only slightly more than half of the respondents thought reporting was necessary. In this study when the pharmacists are asked to respond to "I believe that filling medication error forms will help improve safety" (in the section Personal Influence over Safety), 86.7% of them tick "agree" and "agree strongly". This indicates most of them believe that the hospital's medication error reporting system is an efficient one. These values were compared favorably to the (Ogunleye et al., 2016) study. However, some caution must be used in comparing the results of both studies as the respondents in the later study were healthcare professionals in general, and pharmacists made up only 8.8% of the population.

In another study done in Qatar, (Stewart *et. al*., 2018), where pharmacists made up 12.9% and 18.5% of the respondents, respectively; 66.8% stated that they had not reported any errors in the preceding 12 months. In a study in Malaysia (Srima, Lua, and Mathumalar, 2015) where all the respondents were pharmacists, 22.2% of the pharmacists did not report any medication error in the preceding 12 months. In this study, 16.7% of pharmacists have never reported a medication error. The reporting rates of pharmacists seem to be higher than that of other healthcare professionals. The challenge then will be to improve medication error reporting across multidisciplinary teams and in the different healthcare professions. The lack of a good error reporting system acts as a barrier to a positive safety culture (Mekonnen et al., 2018).

Overall, 73 medication errors were detected in 68 individual patients over 3 months. This is a rate of 24.33 reported medication errors a month. This is higher than that found by (Ajemigbitse, Omole, Osi-Ogbu, and Erhun, 2013), which was 90 medication errors over 6 months; 15 a month. This is probably because a limitation of the Ajemigbtise study was that the doctors presented the accounts themselves, whereas, in this study, the data is presented by the hospital pharmacists who vetted the prescriptions. Also, the study by Ajemigbitse concerned only junior doctors in the medical and pediatric specialties only. It might have been higher if more widespread. In a study in a hospital of similar size in the United States of America (a 159-bed hospital), pharmacists and nurses collectively reported 14 medication errors a month (Force et al., 2006). The decent rate of detection of medication errors over the 3 months of the study was probably helped by the presentation on medication safety by the principal researcher at the beginning of the study.

The types of prescribing error data in this study have one similarity to that of (Dornan et al., 2009), using the same classes as defined in their study. For instance, the rate of serious errors in this study is 5.5%, whereas, in the (Dornan et al., 2009) study it is 5.48%. In the other categories, the differences are more marked. In the study by (Ajemigbitse, Omole, and Erhun, 2013), the same method of categorizing the clinical severity of the errors was also used, but with a difference. In the later study, significant, serious, and potentially lethal errors were classed as serious errors, whilst minor errors were classed as non-serious errors. This gave a value of 17% for serious errors in the reported cases. If the same aggregation is done in this study, the rate of serious errors will be 30.1%. If the same aggregation into serious and non-serious

cases is done in Dornan, et. al. (2009), the figures for serious are 60.03%.

This study used an almost identical classification with (Ajemigbitse, Omole, and Erhun, 2013) to describe the types and rates of prescribing errors, however, whilst the types of errors are very similar, the rates differ widely. In this study, for instance, the most common error is "dose/frequency omitted" (24.65%), whilst, in the (Ajemigbitse, Omole, and Erhun, 2013) study, the most common error is "duration/stop date omitted" (71.3%). The differences seen can be explained by the multi-factorial nature of prescribing errors. However, the rate of dosage problems (dose/frequency omitted, under dosage, and overdosage), in this study of 47.94% is consistent with the findings of (Alanazi et al., 2016) which discovered a range of 31 – 91% in hospitals in the United Kingdom. Their rate of drug-drug interactions was 1 – 2% and in this study, it is 1.37%. In a study of hospital pharmacists in Japan, (Tasaka et al., 2018), the most common medication error was overdosage (25.6%), in this study overdosage is the equal second most common medication error (17.81%).

For the questionnaire, both mean percentage and positive response rates (the sum of those who "agree" and those who "agree strongly") were calculated. The pharmacists demonstrated broadly similar mean percentages and positive attitudes towards all the domains of medication safety except that of "facilitators and barriers at the workplace". Part of the questionnaire evaluated the knowledge of the pharmacists on "information on medication safety" and "error and patient safety".

The pharmacists performed admirably in the "information on medication safety" section; this section had 6 questions in total, and no pharmacist scored less than 50%. However, on closer examination of the data, only 43.3% (13) of the pharmacists got the definition of medicines reconciliation right (question number 3). This indicates that many of them might not be familiar with medicines reconciliation. Most patients admitted for inpatient hospital care will experience at least one medication discrepancy at one or more transition points, which may result in harm, (Kirke, 2019). A systematic review of hospital-based medication reconciliation on 26 controlled studies identified that performing medication reconciliation consistently reduced: 1) medication discrepancies (17 of 17 studies), 2) potential adverse drug events (5 of 6 studies), and 3) adverse drug events (2 of 3 studies) (Kirke, 2019). Medicines reconciliation is a key medication safety tool. The practice of medicines reconciliation to produce the Best Possible Medication History (BPMH) has to be taught and practiced in this hospital.

The domain with the lowest positive response rates, as mentioned earlier, was the facilitators and barriers at the workplace with 54.07% and 46.25% respectively. Only 46.25% of the pharmacists had a positive attitude towards this domain; in other words, they felt that the barriers were more than the facilitators. For example, item 7 in this domain states, "It is easy to share information and organize coordination between pharmacists, physicians, nurses, and patients". It is only natural that patients should expect that the health care professionals responsible for their care will communicate directly with them as well as with each other, forming what (Routledge, 2012) describes as the "prescribing partnership", with the patient in the center. This presents a substantial barrier to the implementation of the WHO patient safety guidelines (2019). It must be addressed in this hospital.

Another possible barrier to the implementation of the WHO patient safety guidelines is pharmacists' response to item 3 of the same domain; "Healthcare professionals in this hospital recognize and appreciate each other's competencies and knowledge". This points to a lack of teamwork amongst the healthcare professionals in the hospital. According to (Mair, 2019), healthcare professionals working in multidisciplinary teams deliver optimum outcomes for patients. Difficulties in sharing information and organizing coordination between pharmacists, doctors, nurses, and the patient is recognized by (Linden-lahti, Holstrom, Pennanen, and Airaksinen, 2019) as a barrier in the implementation of medication safety practices.

In an implementation study of seven selected medication safety practices in 55 volunteering hospitals of 11 European Union (EU) member states, (Linden-lahti, Holstrom, Pennanen, and Airaksinen, 2019), one of the facilitators to medication safety was a hospital having its own safety policies that encourage medication safety. Item 2 of the facilitators and barriers at the workplace domain states, "The hospital has its own safety policies that encourage medication safety".

Of the respondents, only 15 (50%) of them agreed with this statement, perhaps the hospital's safety policies are not widely known; this can be improved on. The European study, (Linden-lahti, Holstrom, Pennanen, and Airaksinen, 2019), also identified already existing clinical pharmacist services being available in the wards, as a facilitator of medication safety practices This was put to the respondents in item 6 of the facilitators and barriers at the workplace domain which states, "Clinical pharmacist services are available in the wards". This gets a mixed response from the pharmacists, 15 (50%) of them agree with this statement, 10 (33.3%) disagree with this. The reason could be that only partial clinical pharmacist services are provided; for example, medication reviews might be done for selected patients, but medicines reconciliation across transitions of care might be absent. This is another area of possible improvement by the hospital's management.

Another barrier to the implementation of medication safety practices as identified by (Linden-lahti, Holstrom, Pennanen, and Airaksinen, 2019) is the need for staff training. Item 4 of the safety of the healthcare system domain, states, "Healthcare staff in this hospital receive training in patient safety". Only 10 (33.3%) of the respondents agreed with this. This indicates staff training in patient safety is unavailable or insufficient. This should also be addressed by the hospital's management. Another possible barrier to the implementation of medication safety practices is the lack of space for counseling by pharmacists. Only 43.3% (13) of pharmacists agreed with item 8 of the medication safety domain, facilitators, and barriers at the workplace; "There is enough space for counseling". Also, only 46.7% (14) agreed with item 4 of the medication safety dimension, facilitators, and barriers at the Workplace, which states, "Electronic patient health records and e-prescriptions are available in this hospital". In the study by (Linden-lahti, Holstrom, Pennanen, and Airaksinen, 2019). One of the identified barriers was the 'Working Environment', under this heading is "lack of space for new devices and patient conversations, no electronic health record and or IT tool needed, electronic prescription in use or only partly". This should be addressed as far as the hospital's resources can. Pharmacists showed an overwhelmingly negative response in having the ability to speak up about their own errors; item 1 of the personal influence over safety domain states, "Telling others about an error I made would be easy", only 8 (26.7%) of the respondents agreed with this statement. Item 2 of the same domain states, "It is easier to find someone to blame than focus on the causes of error".

Only 15 (50%) of the respondents disagreed with this statement. These two responses put together would seem to indicate that a "blame culture" exists in this hospital. It encourages serious underestimation of the extent to which problems are due not to individuals but to the systems in which they operate". Sometimes a 'blame culture' is subliminal and thus easy to miss in an organization, however, if found to exist it must be expunged as it is detrimental to patient safety.

This study, however, has several strengths to it, and can contribute to the growing body of work on patient safety in Nigeria in particular, and Low and Middle-income Countries (LMIC) in general. For example, the response rate to the questionnaire (83.3%) is high. This discovery of an excellent and widely accepted method of medication error reporting, amongst pharmacists is encouraging. Some of its findings like the rate of medication error reporting, and the rates and types of medication errors are consistent with international benchmarks. Other healthcare professionals like medical doctors and nurses could be encouraged to become part of medication error reporting.

The hospital has a medication safety practice (medication error/intervention data form Appendix A) that is acceptable to most of pharmacists. The importance of this cannot be overstated, as it will encourage the reporting of medication safety incidents; including near misses. The 'near miss' can provide valuable information to help prevent adverse events and is regarded in many other sectors as an important free lesson. Moreover, research suggests that for every full-blown incident, there are likely to be several hundred near-misses, ('An Organisation with a Memory', 2000). On the downside, more training in clinical pharmacist services like medicines reconciliation is needed, and an expansion of clinical services in the ward. There is also not enough teamwork between pharmacists and other healthcare professionals, namely doctors and nurses. This compares favorably with the findings of (Mekonnen, et al., 2018); which found

that, although hospital pharmacists were very much enthusiastic for new roles, these were in fact, influenced by the lack of acceptance of their role by other members of the health care team and a lack of managerial support in implementing clinical pharmacy services. Other studies in Nigeria indicated poor knowledge and non-implementation of pharmaceutical care services in hospitals as the leading causes of medication therapy problems in hospitals (Abubakar, 2022; UNODC, 2019). However, a study by Lainer et al (2013); Abdulrahman et al., (2016), and (the Institute of Health International, 2017) suggested that low utilization of information technology and poor medication reconciliation practices as major causes of medication errors. A study by Tiwary et al (2019) indicated that poor communication among health workers is a contributing factor.

The pharmacists in the hospital are interested in patient safety, however, they need more training in clinical pharmacy competencies like the ability to carry out independent medication reviews and medicines reconciliation across transitions of care. More space should be found within the hospitals, where pharmacists can comfortably carry out counseling. In many hospitals in Nigeria, not enough thought is given to incorporating spaces for the pharmacy department in the design of hospitals; as clinical pharmacist services have grown, space for counseling is often a problem. We are hopeful that this study will add to the growing body of evidence about medication-related harm in low- and middle-income countries (LMIC). Most studies that have quantified medication discrepancies or harm associated with medication use have been undertaken in high-income countries, with the majority performed at admission to or discharge from the hospital. Less evidence is available about medication safety at transitions of care in low- and middle-income countries (LMIC) or in other points of transition of care. This study assesses the rate of involvement of pharmacists in detecting medication errors and categorizing them. It also helped assess the amount of positivity of pharmacists towards patient safety in general, and the possible facilitators and barriers to the implementation of the 2019 WHO Patient Safety Guidelines. The WHO's "Multi-professional patient safety curriculum guide" may help ensure pharmacists across the world have enough exposure to these critical principles, (WHO patient safety curriculum guide: multi-professional edition).

CONCLUSION

The study showed that the pharmacists in the hospital showed considerable enthusiasm about patient safety and were willing to report patient safety incidents. However, substantial work needs to be done to improve the facilitators to implementing patient safety guidelines, for example, establishing the services of clinical pharmacists in the ward, and improving interprofessional cooperation among healthcare professionals in the hospital (they should recognize and appreciate each other's competencies). Work is also needed to reduce some of the barriers to the successful implementation of patient safety guidelines, for example, creating more space for patient counseling, and instituting training in medication safety practices like medicines reconciliation across all transitions of care.

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