ORIGINAL PAPER

https://dx.doi.org/10.4314/njpr.v17i1.11

Nig. J. Pharm. Res. 2021, 17 (1) pp 99-107
ISSN 0189-8434 **e-ISSN 2635-3555** **Available online at http://www.nigjpharmres.com**

Factors Affecting Medication Dispensing and Counselling Practices in Hospital Pharmacy Settings in Northwest Nigeria

S. N. ABDU-AGUYE*[1, A-F], K. S. LABARAN[1, A, C, E-F], N. M. DANJUMA[2, A, C, E-F], S. MOHAMMED[1,3, A,C,E-F]

[1]Department of Clinical Pharmacy & Pharmacy Practice, Faculty of Pharmaceutical Sciences, Ahmadu Bello University, Zaria, Nigeria
[2]Department of Pharmacology & Therapeutics, Faculty of Pharmaceutical Sciences, Ahmadu Bello University, Zaria, Nigeria
[3]Health Systems and Policy Research Unit, Ahmadu Bello University, Zaria, Nigeria

A – research concept and design; B – collection and/or assembly of data; C – data analysis and interpretation; D – writing the article; E – critical revision of the article; F – final approval of article.

Abstract

Background: Medication dispensing and counselling are routine but very important activities carried out by pharmacists in a wide variety of healthcare settings. While these processes are often overlooked when issues around the rational use of medication are being considered, any mistake(s) in one or both processes can seriously undermine patient care.

Objective: To assess selected factors, and identify problems affecting medication dispensing and counselling in outpatient hospital pharmacies in northwest Nigeria.

Methods: Mixed methods were used to collect data from 19 outpatient pharmacies in eight public hospitals located in Kaduna and Kano states from November 2019 to March 2020. Quantitative data was generated from a survey, while qualitative data was collected from key-informant interviews with heads of the pharmacies. Data collected from the survey were analyzed to generate descriptive statistics (frequencies and percentages), while interview data were transcribed and analyzed using thematic/content analysis.

Results: Only two pharmacies (10.5%) had dispensing standard operating procedures, and only one (5.2%) had a completely private counselling area. Pharmacy technicians were present in most of the pharmacies (84.2%), and students were widely involved in medication dispensing and counselling activities (73.7%). Identified problems from the interviews included issues with prescribers and medication availability, inadequate staffing levels and absence of materials and/equipment required for dispensing and counselling.

Conclusion: There is an urgent need for multi-faceted interventions to improve on several of these findings and enhance the quality of care provided to patients.

Keywords: Factors, Hospital pharmacy, Medication dispensing, Medication counselling, Nigeria

INTRODUCTION

Medication dispensing encompasses all the activities that occur between the time a prescription is presented at a healthcare facility, and the time the prescribed medicine or other items are issued (MSH, 2012). Medication counselling is widely considered as part of the dispensing process, and involves the provision of verbal and/ written information about medicines or other items that have been dispensed. Both are routine but very important activities carried out by pharmacists or other relevant personnel in a wide variety of healthcare settings.

While these processes are often overlooked when issues around the rational use of medication are being considered, any mistake(s) in one or both processes (dispensing errors) can seriously undermine patient care (MSH, 2012). Proper medication dispensing and counselling are needed to ensure that an effective form of the correct medicine is provided to the right patient, in the correct dosage and in adequate quantities, accompanied by clear instructions for use. Thus, both activities are vital steps that ensure that all of the other resources that have gone into patient care prior to them are not wasted, as would be the case if a patient did not receive the correct medicine(s) and or appropriate usage instructions (MSH, 2012).

Results from studies carried out all around the world seem to suggest that both medication dispensing and counselling activities are often not optimally carried out in pharmacy settings, resulting in the occurrence of dispensing errors during these processes, and poor patient medication knowledge even after counselling has been carried out. Research has shown that various types of dispensing errors can occur during medication dispensing and counselling (Aldwaihi *et al*., 2016; Maharaj *et al*., 2020; Mohammed Ibrahim *et al*., 2020), and some of these errors may have serious clinical consequences. Other studies have also shown that many patients' medication knowledge is poor even after medication counselling has been provided by pharmacy staff (Rubio *et al*., 2015; Hirko *et al*., 2017; Ramia *et al*., 2017), suggesting that they may not have enough information to use their medications safely and correctly.

If medication dispensing and counselling are to be optimally carried out in any healthcare setting, certain structures and/ organizational attributes are required (MSH, 2012). These structures/ attributes, each encompassing several factors can be loosely divided into three main groups and include: the dispensing environment, dispensing personnel and dispensing processes (MSH, 2012). Consequently, environmental elements like a well-designed and properly organized dispensing area, adequate numbers of trained dispensing personnel and clearly outlined work procedures in addition to several other factors, are important in ensuring correct medication dispensing and preventing dispensing errors.

Within the community pharmacy setting, research (Harvey *et al*., 2015; Croft *et al*., 2017), has shown that several of the structures present in some community pharmacies are inadequate to support good dispensing practices. These studies have reported that factors include staffing levels, staff communication patterns, several aspects of the dispensing environment (e.g., physical layout, size etc.) and even dispensing processes are often sub-optimal, negatively influencing medication safety and contributing to the occurrence of dispensing errors (Harvey *et al*., 2015; Croft *et al*., 2017). To the best of our knowledge however, there is currently no study examining the adequacy (or lack thereof) of these factors within hospital pharmacy settings anywhere. Thus, the aim of this study was to assess some of the factors affecting medication dispensing and counselling in selected outpatient hospital pharmacies in northwest Nigeria, in addition to qualitatively identifying problems faced during these processes.

METHODOLOGY

Study sites

Eight major public hospitals from two states (Kaduna and Kano) located in northwest Nigeria were chosen as the study sites. Four hospitals were selected from each state: two secondary and two tertiary hospitals each. Nineteen pharmacies located within these hospitals were then purposively sampled based on their outpatient prescription volumes. Selected hospitals and outpatient pharmacies are shown below in table 1

Table 1: Selected study hospitals (n=8) and outpatient pharmacies (n=19)

Category	Location	Name of Hospital	Unit(s) visited in the hospital
Tertiary	Kaduna	Ahmadu Bello University Teaching Hospital, (ABUTH)	Main Pharmacy NHIS Pharmacy Polyclinic Pharmacy
Tertiary	Kano	Aminu Kano Teaching Hospital (AKTH)	GOPD Pharmacy NHIS Pharmacy Polyclinic Pharmacy (Specialty Pharmacy)
Tertiary	Kaduna	Barau Dikko Teaching Hospital (BDTH)	Main Pharmacy NHIS Pharmacy
Tertiary	Kano	Mohammed Abdullahi Wase Teaching Hospital (MAWTH)	Main Pharmacy NHIS Pharmacy
Secondary	Kaduna	Yusuf Dantsoho Memorial Hospital (YDMH)	Main Pharmacy FMCH Pharmacy POPD Pharmacy
Secondary	Kaduna	Gwamna Awan General Hospital (GAGH)	Main Pharmacy POPD Pharmacy
Secondary	Kano	Hasiya Bayero Pediatric Hospital (HBPH)	Main Pharmacy
Secondary	Kano	Murtala Mohammed Specialist Hospital (MMSH)	Main Pharmacy GOPD Pharmacy NHIS Pharmacy

FMCH= Free Maternal and Child Health Pharmacy, GOPD= General Outpatients Department Pharmacy, MP= Main Pharmacy, NHIS=National Health Insurance Scheme Pharmacy, POPD=Pediatrics Outpatient Department Pharmacy

Study design

This was a mixed methods study that utilized both quantitative and qualitative methods to collect data from November 2019 to March 2020. Quantitative data was generated from a survey using a data collection form filled by the investigators after inspecting the dispensaries of the hospital pharmacies and collecting data from relevant record books. While qualitative data was collected from semi-structured interviews with key informants (heads of the outpatient pharmacies).

Data Collection Instruments

Data collection form: A data collection form designed by the researchers was used to survey the pharmacy units. The form contained eight questions, and collected quantitative data about the number of pharmacists and/ pharmacy technicians present, number of prescriptions dispensed during a typical week, nature of drug arrangement on the shelves etc.

Interview guide: An interview guide was developed for the key informant interviews with heads of the hospital pharmacies. This guide contained five questions that explored barriers to efficient dispensing and counselling they faced within their pharmacies.

Data Collection

Survey: The data collection form was filled after one of the researchers spent the morning shift (9 am to 2 pm) of at least one working day (Monday to Friday) observing ongoing activities, inspecting the dispensaries and collecting data from relevant record books at each of the hospital pharmacies visited.

Key informant interviews: The interview with each pharmacy head was conducted after his/her hospital pharmacy had been surveyed. For these interviews, all heads of the pharmacies were approached and asked whether they were willing to be interviewed. Those who agreed were then interviewed, and all of the interviews were conducted by the same researcher. Willing pharmacy heads were interviewed in their offices either early in the day before work began or at the end of the day, after they had closed. The interview guides mentioned above were used, and all of the interviews were audio recorded.

Data analysis

Survey: Data collected were coded and entered into a Microsoft Excel 2013 spreadsheet and analyzed to generate descriptive statistics (frequencies and percentages) which were presented as a table.

Key informant interviews: Data from the semi-structured interviews were transcribed by two of the researchers and checked for accuracy by a third researcher. Directed qualitative content analysis (Hsieh and Shannon, 2005) also known as thematic analysis was then used for analysis. This was done by two researchers independently manually coding the interview transcripts, which were then confirmed by the other two, who also resolved any disagreements. Identified codes were then placed into pre-defined categories. Participants' quotes were used to illustrate these codes and improve result clarity.

Ethical considerations

Ethical clearance for the study was obtained from the ethical review committees of Kaduna State Ministry of Health and Human Services (MOH/ADM/744/VOL.1/723), Kano State Ministry of Health (MOH/Off/797/T.I./1807), Ahmadu Bello University Teaching Hospital (ABUTHZ/HREC/G30/2019), Aminu Kano Teaching Hospital (NHREC/28/01/2020/AKTH/EC/2808), Barau Dikko Teaching Hospital (19-0004-11) and from Ahmadu Bello University, Zaria (ABUCUHSR/2020/017).

RESULTS

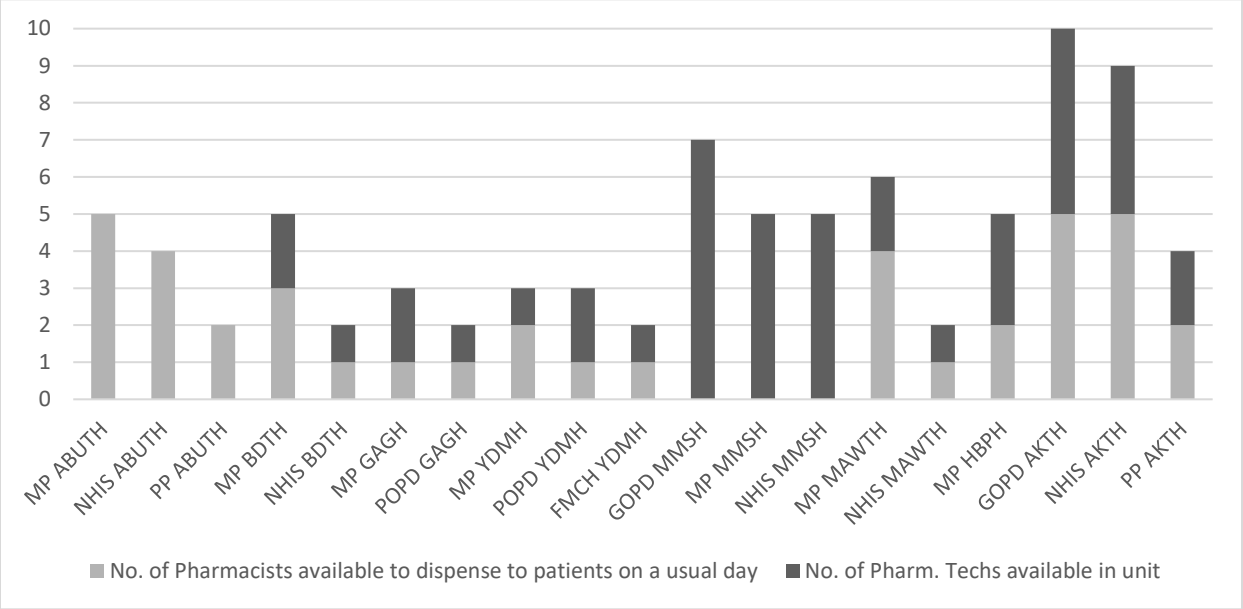
Selected factors affecting medication dispensing and counselling in the hospital pharmacies visited

Only one pharmacy (5.2%) had a completely private counselling area (table 2). Most of the others had semi-private counselling areas (52.6%) or dispensed through the window (26.3%). The most common way of arranging drugs in these pharmacies was based on drug formulation e.g. all liquid dosage forms kept in the same cabinet (n=19, 59.4%). Many of them also arranged at least one drug class (usually solid dosage forms e.g. tablets and capsules) in groups based on their pharmacological actions e.g. all antibiotics kept together on the same shelf (n=11, 34.4%). Despite the presence of shelves and cabinets to store medication in all of the pharmacies, five of them had noticeably large quantities of drugs stored outside of these storage areas. Pharmacy technicians were also present in most of the pharmacies, and students (both pharmacy undergraduates and pharmacy technician students) involved in medication dispensing and counselling (table 2).

Table 2: Selected factors affecting medication dispensing and counselling in the hospital pharmacies surveyed (n=19)

Characteristic	Variables	n (%)
****Availability of software to help in costing prescriptions***	Yes	**7 (38.9)**
	No	**11 (61.1)**
*****Nature of medicines arrangement in unit***	Alphabetical	**2 (6.2)**
	Pharmacological	**11 (34.4)**
	Based on Formulation	**19 (59.4)**
Availability of dispensing and/counselling standard operating procedures in unit	Yes	**2 (10.5)**
	No	**17 (89.5)**
Availability of pharmacy technicians	Yes	**16 (84.2)**
	No	**3 (15.8)**
Average number of prescriptions dispensed daily	50 or less	**7 (36.8)**
	51-150	**11 (57.9)**
	Over 150	**1 (5.3)**
Drugs arrangement outside of shelves or cabinets	Yes	**5 (26.3)**
	No	**14 (73.7)**
Nature of counselling area	Private[a]	**1 (5.3)**
	Semi-Private[b]	**10 (52.6)**
	Over the Counter[c]	**3 (15.8)**
	Window[d]	**5 (26.3)**
Student involvement in medication dispensing and/ counselling	Yes	**14 (73.7)**
	No	**5 (26.3)**

*Values in this row sum up to less than total because one of the observed units only dispensed free drugs, so there was no need for drug costing in that pharmacy.**Values in this row sum up to more than total because different types of drugs could be arranged in different ways. [a] Counselling area is secluded and has a door that can be shut, both dispensers and patients can sit comfortably. [b] Patient can come into the pharmacy and may sit down, however area is not secluded and conversations can be overheard. [c] Patient can enter the pharmacy but there is no allowance for sitting, the dispensers are behind tables or a concrete slab. [d] Patients cannot enter the pharmacy, and dispensers communicate with patients through a window.



FMCH= Free Maternal and Child Health Pharmacy, GOPD= General Outpatients Department Pharmacy, MP= Main Pharmacy, NHIS=National Health Insurance Scheme Pharmacy, POPD=Pediatrics Outpatient Department Pharmacy, PP=Polyclinic or Specialty Pharmacy (any pharmacy unit serving patients from specialized hospital clinics)

Figure 1: Staffing Characteristics of the 19 Outpatient Pharmacies Surveyed

Only one pharmacy out of the 19 visited (MP MMSH) did not have a pharmacist present at all, the other two (GOPD MMSH and NHIS MMSH) had 2 pharmacists each that were not involved in dispensing and counselling. All of the others had at least one pharmacist present up to a maximum of ten. However due to various reasons, not all of these pharmacists were available to dispense and counsel patients. In all of the pharmacies surveyed, no more than five pharmacists were ever available to dispense and counsel patients on a typical day (Figure 1), and in most of them dispensing and counselling were the responsibility of students, pharmacy technicians or young pharmacists (either interns or pharmacists with less than two years of work experience).

Results from the key informant interviews

The 12 key informant interviews (KIIs) conducted lasted for between 5-11 minutes. The interviewees were aged between 27-58 years and were mostly pharmacists (table 3). They had been practicing for between 4-32 years, even though half of them had spent a year or less in charge of the affairs in the observed unit.

Table 3: Socio-demographic Characteristics of Key Informant Interviewees (n=12)

Interviewee code	Gender	Age	Profession	Length of time in charge of the unit (in years)	Type of healthcare facility
R01	F	27	Pharmacist	1	Tertiary
R02	M	51	Pharmacy technician	1	Tertiary
R03	M	52	Pharmacist	5	Secondary
R04	M	58	Pharmacy technician	2	Secondary
R05	F	30	Pharmacist	4	Secondary
R06	F	40	Pharmacist	3	Tertiary
R07	F	29	Pharmacist	< 1	Secondary
R08	M	32	Pharmacist	4	Tertiary
R09	M	44	Pharmacist	< 1	Tertiary
R10	M	31	Pharmacist	< 1	Tertiary
R11	F	39	Pharmacist	< 1	Tertiary
R12	F	43	Pharmacist	5	Tertiary

Codes obtained from these interviews were grouped into three categories

i. Problems related to the dispensing environment
ii. Problems related to dispensing or other related personnel
iii. Problems related to the dispensing process

Category one: Problems related to the dispensing environment

Several respondents complained of the small sizes and poor layouts of the pharmacies, which hindered counselling and sometimes caused them problems with patients.

"Ideally…. the pharmacy is supposed to have several counselling areas... but as you can see, because of the lack of space…. we are just managing the entire room…. sometimes we have four or five or six different patients all inside at the same time…. Some (of the patients) may feel free to talk to you, to tell you exactly what is on their minds if they have one or two questions…. but some because of the crowd, may not be able to tell you…"
(R09 Male pharmacist, tertiary facility)

"The environment it is not conducive as you can see... the pharmacy is not big…. it is very small…. and there are many patients so one of the challenges is that the patients-all of them, want to be in the main dispensary area. So while telling them that they should please wait outside, some of them will start insulting us …."
(R10 Male pharmacist, tertiary facility)

Outright absence in some cases, while in others-inadequacy of materials and/ equipment needed for dispensing and/counselling, was another finding. These materials ranged from small tools like dispensing trays and spoons to larger equipment including furniture.

"Sometimes we want to dispense but we don't have dispensing materials…. common dispensing envelopes we don't have… Even other dispensing materials, things like dispensing trays, we often have to improvise…."
(R07 Female pharmacist, secondary facility)

"We don't have good chairs or furniture for the patients to really sit and feel comfortable…. then the issue of calculators (for costing) which are supposed to be provided by the hospital, I think in this unit, we don't have more than one standard calculator that we can use …"
(R09 Male pharmacist, tertiary facility)

While technology was not widely available, in units where computers were present, they were not being maximally used. Issues with these devices ranged from problems with their software to network fluctuations etc.

"Our technology... is not connected to the doctors... it's just the drugs…that's it and we just cost..…. We would have preferred if it (the software) was connected to the doctors... we could get patient information…. so that we would really know what to counsel the patient about"
(R11 Female pharmacist, tertiary facility)

"The costing table itself…. we use a software..…. and at times, the network fluctuates…. So we often have to switch back to manual costing and this increases patient waiting times……"
(R06 Female pharmacist, tertiary facility)

Category two: Problems related to dispensing or other related personnel

One of the main codes under this category included problems with staffing, which when combined with the large patient numbers attended to in many of these pharmacies, increased the workload for dispensers and contributed to long patient waiting times and poor counselling practices.

"*Due to the high number of patients that we see every day, and the fact that we (the dispensing staff) are few, we hardly have time to really attend to them properly… For that reason, it's only on a very few occasions…. drugs that we feel they actually need to be counselled on properly before taking, are the drugs we actually take our time to explain to them how to use…. other than those, conventional drugs…. drugs like paracetamol and anti-malarials… we don't normally have the time to explain to them how to go about taking those drugs…"*
(R08 Male pharmacist, tertiary facility)

The other code in this category concerned problems arising from prescribers or their prescribing practices. Complaints here included issues with prescriber handwriting and their prescribing practices for patients with health insurance etc.

"They (patients with health insurance) have a list of drugs that they are entitled to……. but sometimes, the doctors will just prescribe any drug... When we tell them that (the prescribed drug), is not part of their scheme they don't understand…."
(R01 Female pharmacist, tertiary facility)

"The doctors themselves…. you may see that the strength of the medicine... you will see that they did not write it correctly or they will prescribe using brand names..... not using generic names…. You will then have to check official books or other sources like that (to find out what the drug is) …."
(R02 Male pharmacy technician, tertiary facility)

Category three: Problems related to the dispensing process
The major finding under this category had to with drug availability and issues arising from this. Many interviewees complained of frequent out of stock situations / medication shortages within their units

"That (stockouts) are our main problem seriously …. This is my seventh month here, and I think we've had drugs (were fully stocked) just twice..... now, we don't have Ciprofloxacin or diclofenac tablets… there are no infusion fluids in the hospital……"
(R07 Female pharmacist, secondary facility)

Even where medications were available, changes in suppliers and other factors meant that drug brands or formulation types and their prices kept on changing, making it difficult for dispensers to keep track of available medication and cost accurately (especially since this was done manually in most cases).

"……. let me give you an example, Orelox® (branded Cefpodoxime) is expensive... so we have a cheaper brand called Emplon®. So sometimes, one of my staff will just dispense Orelox® (the expensive one) instead of the cheaper one (Emplon®) that was costed… Other times like now, we don't have liquid antacids, but we have the tablets... sometimes they (the dispensers), just tell patients that we do not have antacids……. I have to keep reminding them that they can dispense the tablets instead…."
(R01 Female pharmacist, tertiary facility)

To mitigate some of these availability issues, dispensers would often substitute medications for patients. In some cases, this substitution was relatively straightforward like brand-generic substitution, while in others, the substitution fell under much broader categories e.g. therapeutic substitution. This in turn created new problems for them with both patients and prescribers.

"……If we don't have, we just substitute with the one we have…. Like the fluoroquinolones, if we don't have a particular one, we will just switch to another (drug within the same class) because that's what we have… Some doctors also emphasize on a particular brand, like for the amoxicillin clavulanic acid combination, some of them prefer branded Augmentin and we usually stock several generic brands. So, when you dispense, they send the patient back, that this is not what they wrote…"
(R05 Female pharmacist, secondary facility)

Finally, some pharmacy heads also complained about poor hospital and workflow processes that made life difficult for both dispensing staff and patients. For staff, these processes included some cumbersome documentation and/ stock keeping procedures that increased their workload. While for patients, these processes would often involve multiple visits to other places outside the pharmacy (e.g. payment points and other documentation processes) before their prescriptions could be dispensed. Consequently, by the time the patients were to collect their medicines, they were tired and not responsive to counselling.

"And you know, they (the patients) have gone around the hospital... so when they come to the pharmacy…. it is like we are their final bus stop ...they just want to rush and go home…"
(R11 Female pharmacist, tertiary facility)

DISCUSSION
This study assessed selected factors affecting medication dispensing and counselling in the hospital pharmacies visited, in addition to qualitatively identifying problems faced during these processes. Findings from the pharmacies visited revealed that students were widely involved in dispensing and counselling, and majority of them did not have standard operating procedures (SOPs) for these processes. Identified problems from the key-informant interviews included issues with medication availability and prescribers, inadequate staffing levels and poor layouts of the pharmacy units.
Poor staffing was a major complaint by several of the interviewed pharmacy heads despite the presence of pharmacy technicians in many of the pharmacies visited, and this could be one reason why students were involved in dispensing and counselling processes. However, students should not be allowed to directly dispense medications to patients, because they are not officially qualified to do so, and are a known source of dispensing errors (WHO, 2016: Saxena, 2019). In the same vein, while high dispenser workload is a well-known cause of poor medication dispensing and counselling practices (MSH, 2012; WHO, 2016), there is no official standard for the number of prescriptions to be optimally handled by a single dispenser, or the optimum number of dispensing staff to be present during any given time period. It

should however be noted that it is preferred for at least three dispensing staff be present at any given time (which was the case in many of the pharmacies visited), because this has been shown to reduce the occurrence of dispensing errors (Flynn *et al*., 2002).

With respect to dispensing processes, the presence of written dispensing Standard Operating Procedures (SOPs) improves the consistency and quality of dispensing, and can be used for training and reference purposes (MSH, 2012). These SOPs can also be used to reduce errors and increase patient safety (CPBC, 2013; WHO, 2016). Majority of the pharmacies in this study did not have any such SOPs, ensuring that the staff working within these units did not have a guide or standard with which to work with or assess the quality of their dispensing. Similarly, poor drug availability-an issue affecting dispensing in this study, has been reported as a problem in other settings (Phuong *et al*., 2019), and shown to compromise the quality of patient care and lead to errors.

The dispensing environment within pharmacies can cause or help to prevent dispensing errors (Croft *et al*., 2017). Current best practice recommendations are for drugs to be arranged alphabetically on shelves (MSH, 2012), as this has been shown to increase the detection rate of dispensing errors (Flynn *et al*., 2002). While drugs were arranged a wide variety of ways in the pharmacies visited, only two of them had one type of drug formulation each arranged alphabetically. Likewise, while a limited range of medication that are dispensed very frequently maybe kept outside shelves within easy reach of dispensing staff (MSH, 2012), almost a third of the pharmacies visited kept large quantities of drugs spread out on tables or other areas constituting a potential source of dispensing errors. Private counselling areas are also preferred as there is some evidence showing that their use can improve the quality of counselling provided, and the number of patients counselled (Gu *et al*., 2016). Despite this, only one pharmacy out of the 19 visited had a private area set aside for patient counselling.

Finally, many of the challenges identified during this study including poor staffing, issues with prescribers and poor pharmacy layout have also been reported as barriers to proper medication dispensing and/ counselling in other studies both within (Okonta *et al*., 2012) and outside the country (Asrade and Mishra, 2016; Benkhaial *et al*., 2019). These issues have also been shown to contribute to the occurrence of dispensing errors in hospital pharmacy settings (Aldwaihi *et al*., 2016).

Some strengths of this study include the fact that many outpatient pharmacies were visited, and the use of mixed methods (both quantitative and qualitative) for data collection. However, some limitations should be noted. Although we believe that our findings are reflective of conditions within our study settings, the extent to which these findings may be generalized to other settings is arguable and requires further research. Finally, social desirability bias (a tendency of research subjects to behave in ways or choose responses they believe are more socially desirable or acceptable) from the interview responses can also not be totally ruled out.

CONCLUSION

Several problems affecting medication dispensing and counselling were identified, and some of the assessed factors in the pharmacies visited (e.g. absence of operating procedures, nature of drug arrangement and student involvement in dispensing & counselling) were found to be problematic. There is an urgent need for multi-faceted interventions both from within and outside these pharmacies to improve these aspects, and ultimately enhance the quality of care provided to patients.

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*Address for correspondence: Samirah N. Abdu-Aguye
Department of Clinical Pharmacy & Pharmacy Practice,
Faculty of Pharmaceutical Sciences,
Ahmadu Bello University,
Zaria, Nigeria.
Telephone: +234 803 201 9135
E-mails: sn.abduaguye@gmail.com

Conflict of Interest: None declared
Received: April 22, 2021
Accepted: June 30, 2021