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Protective measures against COVID-19 and provision of pharmaceutical services in Nigerian hospitals

Wilson O. Erhun[1], Ochuko M. Orherhe[1], Kingsley C. Amibor[2]

[1]Department of Clinical Pharmacy and Pharmacy Administration, Faculty of Pharmacy, Obafemi Awolowo University, P.M.B. 13, Ile-Ife, Osun State, Nigeria.
[2]Deputy Director of Pharmaceutical Services (DDPS), Federal Medical Centre, Asaba, Delta State, Nigeria.

Corresponding Author: Ochuko M. Orherhe
Email: oorherhe@oauife.edu.ng; Phone: +2348051589453

Running Title: Protective measures against COVID-19

ABSTRACT

Background: The World Health Organization has specified guidelines for healthcare workers when providing healthcare services in the bid to curb the spread of COVID-19.

Objectives: The study aimed at evaluating the level of adherence to protective measures against COVID-19 in the provision of pharmaceutical services in Nigerian hospitals.

Methods: A cross-sectional self-administered structured questionnaire based survey of 109 hospital pharmacists across 55 hospitals in Nigeria between April and May 2020. Data was summarized with frequencies and percentages and Chi-square was used to compare categorical variables at $p<0.05$.

Results: Majority of the respondents; 92 (84.4%), reported that they had direct contact with patients when conversing and 54 (49.5%) of them complained that the challenge of maintaining physical distancing impeded their effectiveness. Physical distancing was sub-optimal in about three- quarter; 78 (72.5%), of the pharmacy waiting area of the facilities studied. About one-third of the respondents; 43 (39.6%), reported optimal standards of other protective measures in their pharmacies. Non-tertiary level hospitals had better protective measures in their patient waiting area than the tertiary level hospitals ($\chi^2 = 5.586$, $p = 0.018$), but the practice setting did not affect protective measures in the pharmacy ($\chi^2 = 2.022$, $p = 0.155$).

Conclusion: Majority of the hospital pharmacists did not adhere to protective measures against COVID-19 in the provision of pharmaceutical services in Nigerian hospitals.

Keywords: COVID-19; Protective measures; Pharmaceutical services; Physical distancing

Mesures de protection contre le COVID-19 et fourniture de services pharmaceutiques dans les hôpitaux nigérians

Wilson O. Erhun[1], Ochuko M. Orherhe[1], Kingsley C. Amibor[2]

[1]Département de pharmacie clinique et d'administration de la pharmacie, Faculté de pharmacie, Université Obafemi Awolowo, P.M.B. 13, Ile-Ife, Osun State, Nigeria.
[2]Directeur adjoint des services pharmaceutiques (DDPS), Centre médical fédéral, Asaba, État du Delta, Nigéria.

Auteur correspondant : Ochuko M. Orherhe
E-mail : oorherhe@oauife.edu.ng; Téléphone : +2348051589453

RESUME

Contexte : L'Organisation mondiale de la santé a précisé des lignes directrices pour les travailleurs de la santé lorsqu'ils fournissent des services de santé dans le but de freiner la propagation du COVID-19.

Objectifs : L'étude vise à évaluer le niveau d'adhésion aux mesures de protection contre le COVID-19 dans la prestation de services pharmaceutiques dans les hôpitaux nigérians.

Méthodes : Une enquête transversale basée sur un questionnaire structuré auto-administré sur 109 pharmaciens hospitaliers dans 55 hôpitaux du Nigéria entre avril et mai 2020. Les données ont été résumées avec des fréquences et des pourcentages et le chi carré a été utilisé pour comparer les variables catégorielles à $p<0,05$.

Résultats : La majorité des répondants, 92 (84,4%), ont déclaré avoir eu un contact direct avec les patients lors des conversations et 54 (49,5%) d'entre eux se sont plaints que le défi du maintien de la distanciation physique entravait leur efficacité. La distanciation physique était sous-optimale dans environ trois quarts ; 78 (72,5%), de la zone d'attente de la pharmacie des établissements étudiés. Environ un tiers des répondants, 43 (39,6%), ont signalé des normes optimales d'autres mesures de protection dans leurs pharmacies. Les hôpitaux de niveau non-tertiaire avaient de meilleures mesures de protection dans leur zone d'attente des patients que les hôpitaux de niveau tertiaire ($\chi^2 = 5,586$, $p = 0,018$), mais le milieu de pratique n'affectait pas les mesures de protection dans la pharmacie ($\chi^2 = 2,022$, $p = 0,155$).

Conclusion : La majorité des pharmaciens hospitaliers n'ont pas adhéré aux mesures de protection contre le COVID-19 dans la prestation de services pharmaceutiques dans les hôpitaux nigérians.

Mots-clés : *COVID-19 ; mesures de protection ; services pharmaceutiques ; distanciation physique*

INTRODUCTION

COVID-19 is a new strain of the coronavirus family that was first discovered in the city of Wuhan in China, with patients presenting with pneumonia-like symptoms and on the 11th of March 2020, the disease was declared a pandemic by the World Health Organization (WHO).[1] The WHO recommended measures to help curb the spread of the virus which include regular washing of hands with soap and water, the use of alcohol-based hand sanitizer, avoiding touching of the eyes, nose and mouth.[2] Practicing respiratory hygiene by coughing or sneezing into a bent elbow or tissue and immediate disposal of the used tissue, wearing of face masks and maintaining physical distancing of a minimum of one metre apart have also been recommended by the WHO.[2]

The WHO further expanded the guidelines for healthcare workers to include the appropriate use of personal protective equipment (PPEs) which are gloves, medical masks, goggles, face shield, respirators and aprons. To minimize the use of PPEs, the WHO recommended the use of physical barriers such as glass or plastic windows in places with high influx of patients such as the pharmacy dispensing area.[2]

The roles of a hospital pharmacist include the provision of both clinical pharmacy and traditional pharmacy services i.e. selection, procurement, preparing and dispensing of safe and effective medications. The clinical pharmacy services have evolved over the years to what is now called 'pharmaceutical care', which is a patient-centred practice that involves regular communication with the patients.[3] Processes involved in carrying out pharmaceutical care are assessing the patient's drug-related needs, development of a care plan to meet the specific patients' need and following up on the patient to determine the impact of the decision made and the actions taken; these processes usually involves regular contact and/or communication between the pharmacists and the patients.[4]

As at the 21st of April 2020, the WHO reported that over 35,000 health workers were infected with COVID-19, these infections were attributed to non-optimal observance of measures of protection such as hand hygiene practices and lack or improper use of PPEs.[5] In Nigeria, it was reported that over 800 health workers had contracted the virus, and a recent report by the Pharmaceutical Society of Nigeria, and the Association of Hospital and Administrative Pharmacists of Nigeria stated that six out of the 359 pharmacists' frontline workers had tested positive to COVID-19.[6,7]

With Nigeria being at the community transmission stage, a number of untested asymptomatic COVID-19 patients would at one time or the other, assess care for other illnesses in the hospitals, thereby posing a threat to the healthcare team.[8] This study therefore aimed at evaluating the level of adherence to protective measures against COVID-19 in the provision of pharmaceutical services in Nigerian hospitals. Lessons from this exercise could inform COVID-19 related policy formulation.

METHODS

Study setting

The study was carried out among hospital pharmacists across the three tiers of healthcare system i.e. tertiary healthcare centres and non-tertiary healthcare centres (i.e. primary and secondary healthcare centres). These pharmacists catered for the medication needs of both ambulatory and institutionalized patients in their hospitals and were members of the Association of Hospital and Administrative Pharmacists of Nigeria.

Study design

The study was a cross-sectional self-administered structured questionnaire based survey of 109 practicing hospital pharmacists across 55 hospitals in Nigeria between the 26th of April and 7th of May 2020.

Sample size determination

Information on the accurate number of registered hospital pharmacies was not available, making it difficult to calculate a sample size. However, with the assistance of the Association of Hospital and Administrative Pharmacists of Nigeria, responses were obtained from each geographical region and across the three tiers of healthcare.

Data collection

The study was carried out via a pre-tested and validated newly developed google form questionnaire that comprised of two sections. The objectives of the study were explained to the pharmacists via the Association of Hospital and Administrative Pharmacists in Nigeria (AHAPN) online platforms, after which voluntary informed consent was obtained from each respondent, which was clearly indicated on the first page of the google form questionnaire. Confidentiality of responses and anonymity were assured and adhered to, as the responses obtained was made available to the authors only, and coded afterwards before analysis. Section A gathered socio-demographic data of the respondents i.e. years of practice (post-graduation), state of practice,

practice setting and highest educational qualification. Section B gathered data on the adherence of the pharmacists to avoidance of direct contact with their patients and the adherence of the pharmacists to physical distancing and other protective measures in the pharmacy and in the pharmacy waiting area.

Pre-test and validation

The questionnaire was assessed for content validity by two academic scholars in the department of Clinical Pharmacy and Pharmacy Administration, Obafemi Awolowo University, Ile-Ife, Osun State, Nigeria. Face validity was done with two pharmacists. Necessary modifications were made thereafter to ensure clarity and good understanding of the questions in the light of the specified objectives before the final version of the questionnaire was sent to the respondents.

Statistical analysis

Data obtained from the questionnaire were sorted by the google form used to collect the data. It was thereafter coded and entered into the Statistical Package for Social Sciences, version 20, for data analysis and management. Data obtained were expressed in frequencies and percentages. Chi-square test was used to evaluate the relationship between demographics (practice setting and geographical location) and the operation systems in the pharmacy and patients' waiting area.

RESULTS

A total of 109 consenting hospital pharmacists across 55 hospitals in Nigeria participated in the study. Of these, 39 (35.8%) had over 20 years of post-graduation practice, 69 (63.3%) had a post-graduate degree, 39 (35.8%) practiced in the northern region of Nigeria, 77 (70.6%) practiced in tertiary institutions and only 7 (6.4%) were directly involved in the management of COVID-19 patients. Details are shown in Table 1.

Table 1: Socio-demographic data of respondents

Variable (n = 109)		Frequency (%)
Years of practice (post-graduation)	< 5 years	9 (8.3)
	5 – 10 years	17 (15.6)
	11 – 15 years	28 (25.7)
	16 – 20 years	16 (14.7)
	>20 years	39 (35.8)
Highest Educational Qualification	Graduate	40 (36.7)
	Postgraduate	69 (63.3)
Geographical Location	North	39 (35.8)
	West	36 (33.0)
	South	32 (29.4)
	East	2 (1.8)
Practice Setting	Tertiary institution	77 (70.6)
	Non-tertiary institution	32 (29.4)
Involvement in COVID-19 patient management	Yes	7 (6.4)
	No	102 (93.6)

A few (17; 15.6%) of the facilities studied had systems that optimally avoided direct contact with their patients and 54(49.5%) respondents complained that the challenge of maintaining physical distancing impeded their effectiveness Details are shown in Table 2.

Table 2: Evaluation of operations that ensure avoidance of direct contact between pharmacists and patients

Variable (n= 109)	Yes (%)	No (%)
Patients always bring their hard copy prescriptions to the pharmacy.	71 (65.1))	38(34.9)
A ward assistant always bring the patient's hard copy prescription to the pharmacy.	23 (21.1)	86 (78.9)
Pharmacists always assess patient's prescription via the electronic medical record.	20 (18.3)	89 (81.7)
Patients stand in front of the pharmacy to wait for their drugs.	80(73.4)	29 (26.6)
Patients normally sit in the open space in front of the pharmacy and are called up to pick their drugs afterwards.	94 (86.2)	15 (13.8)
There is a glass barrier between the pharmacist and the patient when conversing	12 (11.0)	97 (89.0)
Patient's drugs are normally transferred through a system that avoids direct contact between the pharmacist and the patient.	10 (9.2)	99 (90.8)
Counselling is done with a glass barrier between the pharmacist and patient.	8 (7.3)	101 (92.7)
Drugs are delivered to inpatients through ward assistants.	33 (30.3)	76 (69.7)
Drugs are delivered to outpatients through clinic/ward assistants.	2 (1.8)	107 (98.2)

Physical distancing was ensured among patients in about a quarter; 31 (28.8%) of the facilities studied, and optimal standards of other protective measures were provided in the pharmacy waiting area in less than half; 51 (46.4%) of the facilities studied. Details are shown in Table 3

Table 3: Evaluation of physical distancing and other protective measures in the pharmacy waiting area

Variable (n= 109)	Yes (%)	No (%)
Physical distancing measures in the patients' waiting area		
Patients sit at least one meter apart	49 (45.0)	60 (55.0)
Patients are seated at least two metres from the dispensary.	65 (59.6)	44 (40.4)
Poster on COVID-19 stationed.	33 (30.3)	76 (69.7)
Poster illustrating physical distancing stationed.	19 (17.4)	90 (82.6)
Floor marked to indicate physical distancing.	7 (6.4)	102 (93.6)
Chairs stationed two metres apart.	24 (22.0)	85 (78.0)
Pegged number of people per time in the pharmacy waiting area.	23 (21.1)	86 (78.9)
Other protective measures in patients' waiting area		
Patients waiting area is thoroughly cleaned and disinfected daily.	52 (47.7)	57 (52.3)
Patients' waiting area is well ventilated.	83 (76.1)	26 (23.9)
Patients are mandated to wear nose masks	44 (40.4)	65 (59.6)
Functional hand washing apparatus	29 (26.6)	80 (73.4)
Alcohol based hand sanitizer always stationed at the entrance of waiting area.	45 (41.3)	64 (58.7)

Physical distancing was ensured among pharmacists in about one-third; 38 (34.9%) of the facilities studied. Also, optimal standards of other protective measures were provided in the pharmacy in about one-third; 43.1 (39.6%) of the facilities studied. Details are shown in Table 4.

Table 4: Evaluation of physical distancing and other protective measures in the pharmacy

Variable (n= 109)	Yes (%)	No (%)	Sometimes (%)
Physical distancing measures in the pharmacy			
Staff ensure physical distancing at least one metre from each other in the pharmacy.	56 (51.4)	53 (48.6)	0 (0.0)
Staff ensure physical distancing of at least two metres from each other in the pharmacy.	29 (26.6)	80 (73.4)	0 (0.0)
Patients enter the pharmacy.	56 (51.4)	29 (26.6)	24 (22.0)
Other protective measures in the pharmacy			
Functional hand washing apparatus	73 (67.0)	36 (33.0)	0 (0.0)
Cash payment in the pharmacy area	36 (33.0)	73 (67.0)	0 (0.0)
Pharmacy staff put on disposable aprons during work hours	3 (2.8)	95 (87.2)	11 (10.1)
Pharmacy staff put on their individual laboratory/ward coat during work hours.	75 (68.8)	7 (6.4)	27 (24.8)
Pharmacy staff put on face mask during work hours.	86 (78.9)	2 (1.8)	21 (19.3)
Separate waste bin for disposable gloves, face masks and aprons in the pharmacy.	10 (9.2)	99 (90.8)	0 (0.0)
Pharmacy staff always put on disposable hand gloves to package drugs for patients.	20 (18.3)	61 (56.0)	28 (25.7)
Foot-operated pedal waste bins in the pharmacy.	21 (19.3)	88 (80.7)	0 (0.0)
Functioning lever-arm tap in the pharmacy	27 (24.8)	82 (75.2)	0 (0.0)

Non-tertiary level health institutions had better protective measures in their patient waiting area than the tertiary level institutions (χ^2 = 5.586, p = 0.018), but the practice setting did not affect physical distancing among patients (χ^2 = 0.090, p = 0.764), and protective measures in the pharmacy (χ^2 = 2.022, p = 0.155). Geographical locations did not affect physical distancing among pharmacists (χ^2 = 0.278, p = 0.870), and among patients (χ^2 = 3.616, p = 0.164). Details are shown in Table 5.

Table 5: Relationship between demographics and protective measures to prevent the spread of COVID-19 in the pharmacy

	Specific protective measures (n=107)		Chi square	P-value
	Optimal, n (%)	**Sub-optimal, n (%)**		
	Physical distancing in patients' waiting area			
Practice setting				
Tertiary	19 (25.3)	56 (74.7)	0.090	0.764
Non-tertiary	9 (28.1)	23 (71.9)		
	Other protective measures in patient waiting area			
Tertiary	16 (21.3)	59 (78.7)	5.586	0.018
Non-tertiary	14 (43.8)	18 (65.6)		
	Other protective measures of in the pharmacy			
Tertiary	16 (21.3)	59 (78.7)	2.022	0.155
Non-tertiary	11 (34.4)	21 (65.6)		
	Avoidance of contact between pharmacist and patient			
Geographical area				
North	9 (23.1)	30 (76.9)	3.749	0.153
South	2 (6.2)	30 (93.8)		
West	6 (16.7)	30 (83.3)		
	Physical distancing in patients' waiting area			
North	14 (35.9)	25 (64.1)	3.616	0.164
South	8 (25.0)	24 (75.0)		
West	6 (16.7)	30 (83.3)		
	Physical distancing in the pharmacy			
North	13 (33.3)	26 (66.7)	0.278	0.870
South	11 (34.4)	21 (65.6)		
West	14 (38.9)	22 (61.1)		
	Other protective measures in in patient waiting area			
North	12 (30.8)	27 (69.2)	0.309	0.857
South	9 (28.1)	23 (71.9)		
West	9 (25.0)	27 (75.0)		
	Other protective measures in the pharmacy			
North	15 (38.5)	24 (61.5)	5.823	0.054
South	5 (15.6)	27 (84.4)		
West	7 (19.4)	29 (80.6)		

**significant difference with chi square test for relationship between categorical variables at p<0.05. Responses from the eastern part of Nigeria was excluded in this chi-square analysis because of the low response rate from the region, as only two hospital pharmacists responded from the region. This accounts for the fall-out of two respondents in this table compared with the other tables.*

DISCUSSION

This study showed that only a few of the hospital pharmacies had systems in place that ensured the avoidance of direct contact between the pharmacists and the patients, this is contrary to International Pharmaceutical Federation guidelines.[9] In a recent study in another facility, 80 - 85% of patients' medications were dispensed by the automated drug dispensing system, with appropriate disinfectant placed close by, so that people assessing the automated dispensing system could disinfect the touch points before use, thereby greatly reducing the risk of cross-infection across users of the machine.[10] Most Nigerian hospitals do not have the automated dispensing system, however, in this phase of community transmission of COVID-19 in Nigeria, hospitals could improvise the use of trays for collection of prescriptions, and dispensing of medications, while ensuring regular disinfection of the trays before picking up the prescriptions and after the patient picks the dispensed drug from the tray.

This study also revealed that majority of the hospitals still used hard copy prescriptions in interfacing between the physicians and the pharmacists, and e-prescribing was scarcely used. This is contrary to what happens in some hospitals in other endemic countries.[11] In the U.S.A, one of the guidelines set by the Centre for Disease Control and Prevention (CDC), was the submission of prescriptions to the pharmacy electronically and maximally avoiding the use of paper prescriptions.[12] Much more than the ability of e-prescribing to effectively minimize direct contact between pharmacists and patients, it has also been proven to reduce waiting time, thereby reducing the population of patients in the waiting area per time.[13]

The use of glass barriers during conversations was stated by the WHO to optimize the use of PPEs, and it has been rightly accepted as a guideline for pharmacists in the U.S.A and UK.[12,14] Most of the respondents communicated with their patients without glass barriers and complained of non-availability of PPEs, disposable aprons being the least available. A study amongst frontline doctors in Jordan also reported non-availability of essential PPEs.[15] Though most of them wore their individual laboratory/ward coats during work hours, they might still be at risk of cross infection if they come in contact with an asymptomatic patient, and if the laboratory/ward coats are not properly washed and disinfected before another use, hence the FIP recommended a combination of personal protective equipment i.e. gloves, disposable aprons, face masks and/or face shields, to optimize protection with the used PPEs properly disposed after use.[9]

Physical distancing of at least one metre apart was recommended by the WHO, but most of the respondents reported that patients in their facilities did not observe the physical distancing, thereby putting both patients and pharmacists at risk.[2] A hospital in Singapore reported compliance to physical distance by patients was enhanced by visual cues.[16] The non-observance of physical distancing by patients in this study could have resulted from the non-availability of posters on COVID-19 as well as posters illustrating physical distancing in the waiting area. Floors of the waiting area were not marked to indicate physical distancing and chairs were not arranged to make room for physical distancing while sitting.

About half of the respondents did not ensure physical distancing of at least one metre from each other in the pharmacy but majority of them had a face mask on, during working hours and functional hand washing apparatus was provided. Although, the existence of a functional hand washing apparatus does not translate to their regular use, a study has shown that it is possible to achieve high level of adherence to hand washing by healthcare workers through enforcement by healthcare team leaders and by real time reminders.[17]

This study showed that non-tertiary level hospitals were better equipped to prevent the spread of COVID-19 in their patients' waiting areas than the tertiary hospitals, but other demographics did not affect protective measures in the pharmacy. A study amongst healthcare workers in Tanzania also showed that facility level and location did not affect compliance to protective measures.[18] The population size of patients in Nigeria hospitals could have led to the outcome of this study, as secondary and primary level health facilities have lesser influx of patients, thereby reducing the cost of logistics needed to provide and enforce preventive measures.

With the increasing rise in COVID-19 infections, and a report from a study that showed high risk of infection among non-frontline healthcare workers,[19] it is of utmost importance that the protection of pharmacists be prioritized by authorities through education, fixing of glass barriers, provision of PPEs, enforcement of use of provided PPEs and provision of standard operating procedures on how to effectively carry out pharmaceutical services during the COVID-19 epidemic in Nigeria. The low response rate from other geographical

regions of Nigeria, particularly the eastern region was a limitation to the study.

CONCLUSION

This study showed that majority of the hospitals assessed had sub-optimal operation systems that avoided direct contact between pharmacists and patients, and adherence to physical distancing in the pharmacies and pharmacy waiting areas were poor. This is because most of the hospitals had no structures that would ensure the practice of physical distancing. Protection of hospital pharmacists must be prioritized by relevant authorities through education, provision of personal protective equipment and enforcing their use.

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