Community Pharmacists' Preparedness for COVID-19 Testing in Nigeria

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ABSTRACT

Background: The Nigeria Centre for Disease Control recently approved the use of Antigen based rapid diagnostic test kits for the diagnosis of COVID-19 in Nigeria, with the goal to scale up COVID-19 testing. Community Pharmacists can be mobilized to be part of meeting this goal, since they are the closest and most accessible healthcare practitioners in the communities. This study aimed at assessing the community pharmacist's knowledge, preparedness, and willingness to get involved in COVID-19 testing.

Methods: A cross-sectional self-administered structured questionnaire based survey of 449 consenting community pharmacists across Nigeria between April and May 2020 was used for this study. Descriptive and inferential statistics were done with the Statistical Package for Social Sciences, with the level of significance set at <0.05.

Results: Average knowledge of COVID-19 and its testing was displayed by 53.2% of the respondents, 336 (74.8%) stated that their pharmacies did not have a properly ventilated isolation room, and 401 (89.3%), were willing to be trained on how to use the test kits for COVID-19 testing. Community pharmacies that offered comprehensive laboratory services were better prepared for COVID-19 testing ($\chi^2 = 12.294$, p = 0.000), and demographics of the respondents did not affect their knowledge of COVID-19 and its testing ($\chi^2 = 10.469$, p = 0.106).

Conclusion: Majority (53.2%) of the community pharmacists had average knowledge. Although, majority of the community pharmacies were not adequately prepared for COVID-19 testing, most of them were willing to be trained on how to use the test kits. The Government can explore this willingness by providing adequate training and equipment necessary for COVID-19 testing.

1. Introduction

In December 2019, the World Health Organization (WHO) got an alert from China about a new strain of coronavirus that was ravaging the city of Wuhan, and gradually started spreading to nations outside China.[1] By March 11, 2020, the WHO declared the coronavirus, now renamed COVID-19, a pandemic that required the cooperation and collaborations among different nations to fight and overcome.[2]

The World Health Organization outlined strategic objectives for the management of the COVID-19 pandemic. They are, intercepting human to human transmission, identifying, isolating and caring for COVID-19 patients early, identifying and reducing transmission from animal sources, addressing crucial unknowns regarding clinical severity, extent of transmission and infection treatment option, communicating critical risk and event information to all communities and countering misinformation, and minimizing social and economic impact through multi-sectoral partnership. Most of these strategies are hinged on early detection via testing.[3]

The confirmatory test for the diagnosis of COVID-19 is the reverse transcription polymerase chain reaction conducted on samples collected from the upper respiratory tract from nasopharyngeal swab and/or oropharyngeal swab, the lower respiratory tract, which are sputum and bronchoalveolar lavage, and rectal swab.[4,5] Recently, the WHO approved the use

of antigen-based rapid diagnostic test (Ag-RDT) for the diagnosis of COVID-19, which has also been approved by the Nigeria Centre for Disease Control (NCDC).[6]

On the 15th of April, 2020, NCDC issued a statement on their plan to scale up access to COVID-19 testing in Nigeria, in the bid to combat the spread of the virus in the communities.[7] The report stated that Nigeria's COVID-19 testing capacity was 2500 tests per day, but also stated that the organization was working to scale up testing to 6300 tests per day between May and September 2020.[7] On the 28th of April, 2020, the NCDC further announced in a news report, a COVID-19 testing target of two million by the end of August, 2020.[8] To attain this target, a minimum of 22,000 daily tests must be carried out, and a minimum of 50,000 tests per state. As at the 30th of September, 2020, a total of 519,140 samples had been tested for COVID-19,[9] which is far below the target proposed. As at the 20th of January, 2021, a total of 1, 198,758 samples had been tested,[10] though a major improvement, but it is still far from the target set for September 2020.

Community Pharmacists are the closest and most accessible healthcare professionals in the communities, and their facilities are the first point of contact of patients with the healthcare team in most communities across the world.[11] The role of community pharmacists in the healthcare team have evolved over the years, from just filling and refilling prescriptions, to include clinical activities such as immunization, health screenings with point of care testing and medication therapy review.[12] Studies have shown that point-of-care testing for chronic, acute and infectious diseases are feasible in community pharmacies.[13] With regards to the current pandemic, community pharmacies are the first point of call for COVID-19 related health issues and for people that needs medications and advice about the disease and their health. Community pharmacies are suitably positioned as points of intervention to curb the spread of the COVID-19 by providing essential pharmaceutical services, which include access to medications and protective equipment such as face masks and alcohol based hand-sanitizer.[14,15] Additionally, COVID-19 testing have been incorporated into some community pharmacy services, as seen in the United States of America, where licensed community pharmacists have been authorized to carry out COVID-19 testing, this is expected to increase access to testing in communities, since the community pharmacies are easily accessible to people in the communities.[16]

With the recent approval of the use of Ag-RDTs in Nigeria, community pharmacies can play a significant role in increasing testing capacity, like their counterparts in developed countries, more so, most of them now offer some point-of-care tests thereby providing some level of preparedness of the pharmacies for COVID-19 testing. This study therefore aimed at assessing the community pharmacist's knowledge, preparedness and willingness to get involved in COVID-19 testing, and to identify what needs to be done by stakeholders before community pharmacies can commence screening for COVID-19

2. Methods

This study was a questionnaire-guided prospective interaction with registered community based pharmacy practitioners who are members of the Association of Community Pharmacists of Nigeria, in the six geopolitical zones of Nigeria, i.e. north-west, north-east, north-central, south-west, north-east and south-south zones, with Nigeria's latitude and longitude being 10° 00' N and 8° 00' E. The total population of community pharmacists in Nigeria is estimated at 6,000, a representative target sample size of 370 Community Pharmacists was calculated using the easy sample size calculator, with a confidence interval of 95% and a 5% margin of error. Pharmacists in other practice settings (i.e., Academic, Hospital, Administrative and Industrial settings) were excluded from the study. Community pharmacists were approached online via WhatsApp® messages, general online Community Pharmacists platforms across the different geographical zones of Nigeria. The objectives of the study were explained through the different 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.

The study was carried out via a pre-tested and validated google form questionnaire comprising of six sections. Section A gathered socio-demographic data of the community pharmacists i.e. years of practice (post-graduation), highest educational qualification and geographical zone. Section B assessed the current practices in the respondent's community pharmacies, with emphasis on the clinical pharmacy practices such as consultation with patients, point of care testing, comprehensive laboratory services and provision of immunization services. Section C and D assessed the community pharmacist's knowledge on COVID-19 and its testing. Section E assessed the preparedness of community pharmacies for COVID-19 testing, and Section F assessed the community pharmacist's willingness to get involved in COVID-19 testing.

Data obtained from the questionnaire were sorted, coded and entered into the Statistical Package for Social Sciences, version 20, for data analysis and management. Descriptive statistics i.e. frequency and percentages were used to summarize the data. Chi square test and Fischer exact tests were used to evaluate the relationship between the years of practice (post-graduation), geographical zones and the knowledge of community pharmacists about COVID-19 and the testing, the preparedness of community pharmacists and willingness to participate in COVID-19 testing.

3. Results

A total of 455 community pharmacists participated in the study from the six geographical zones of Nigeria, with a 98.7% response rate (449). Of these, 146 (32.5%) had 5-10 years of practice post-graduation, with 297 (66.2%) of them having the bachelor of pharmacy degree as their highest degree and, 163 (36.3%) of the respondents practiced in the south-western geopolitical zone. Majority; 292 (65.0%) were involved in four of the six clinical services assessed, with the mean number of clinical services being 4.16, and a standard deviation of 0.762 (Table 1).

Table 1: *Socio-demographic data of respondents and summary of number of clinical services offered in the community pharmacies.*

Variable (n = 449)		Frequency (%)
Years of practice (post-graduation)	< 5 years	66 (14.7)
	5 – 10 years	146 (32.5)
	11 – 15 years	69 (15.4)
	16 – 20 years	54 (12.0)
	>20 years	114 (25.4)
Highest Educational Qualification	B.Pharm	297 (66.2)
	M.Sc.	63 (14.0)
	Pharm D	42 (9.4)
	FPCPharm	24 (5.3)
	Others	23 (5.1)
Geopolitical Zones	South-West	163 (36.3)
	South-South	147 (32.7)
	North-Central	67 (14.9)
	South-East	55 (12.3)
	North-East	11 (2.5)
	North-West	6 (1.3)
Number of clinical services offered	One	2 (0.4)
	Two	8 (1.8)
	Three	38 (8.5)
	Four	292 (65.0)
	Five	84 (18.7)

Almost all the respondents were involved in filling and refilling of prescriptions (437; 97.3%), point of care testing (diabetes screening i.e., blood sugar testing) (410; 91.4%), while only a minority were involved in comprehensive laboratory services (68; 15.1%), and immunization services (71; 15.8%). Majority (336; 74.8%) of the respondents stated that their community pharmacies did not have a properly ventilated isolation room, though majority had handwashing apparatus (422; 94.0%), and e-payment system (430; 95.8%), but most of the community pharmacies did not have disposable aprons in the pharmacy; 375 (83.5%) and foot-operated pedal waste bins (318; 70.8%) (Table 2).

Table 2: *Clinical pharmacy practices in the community pharmacies and preparedness of the pharmacies for COVID-19 testing.*

Variable	Yes (%)	No (%)
Clinical Pharmacy Practices in the Community Pharmacies (n=449)		
Filling and Refilling of Prescriptions	437 (97.3)	12 (2.7)
Consultations with patients	440 (98.0)	9 (2.0)
Point of care testing (Blood pressure check)	443 (98.7)	6 (1.3)
Point of care testing (Diabetes screening i.e. blood sugar)	410 (91.3)	39 (8.7)
Comprehensive laboratory services	68 (15.1)	381 (84.9)
Immunization services	71 (15.8)	378 (84.2)
Preparedness of Community Pharmacies for COVID -19 testing (n = 449)		
Properly ventilated isolation room	113 (25.2)	336 (74.8)
Handwashing apparatus	422 (94.0)	27 (6.0)
E-payment services	430 (95.8)	19 (4.2)
Personal Protective Equipment	153 (42.6)	206 (57.4)
Sanitizer gel stationed at the entrance of the pharmacy	415 (92.4)	34 (7.6)
Sanitizer gel stationed at more than one place in the pharmacy	258 (57.5)	191 (42.5)
COVID-19 poster stationed in the pharmacy	195 (43.4)	254 (56.6)
Disposable aprons in the pharmacy	74 (16.5)	375 (83.5)
Use of facemasks by pharmacy staff	411 (91.5)	38 (8.5)
Separate waste bin for disposable gloves, facemasks and aprons in the pharmacy	217 (48.3)	232 (51.7)
Pharmacy floor marked to indicate social distancing	155 (34.5)	294 (65.5)

With regards to the community pharmacist's knowledge on COVID-19 and its testing, only a minority (16 ;3.6%) had good knowledge of COVID-19 and its testing, as they could answer 85 -100% related questions. Mean knowledge score was 12.87 ± 2.175, out of a total of 19 knowledge-based questions (Table 3).

Table 3: *Assessment of knowledge on COVID-19 and its testing.*

Statements (n=449)	Correct answers, n (%)	Incorrect answers, n (%)
COVID-19 is a bacterial disease (False)	446 (99.3)	3 (0.7)
COVID-19 can be treated with antibiotics (False)	341 (75.9)	108 (24.1)
COVID-19 can be treated with chloroquine (False)	189 (42.1)	260 (57.9)

COVID-19 is a viral disease (True)	446 (99.3)	3 (0.7)
People with HIV/AIDS are at lower risk of contracting the COVID-19 (False)	407 (90.6)	42 (9.4)
Exclusive symptoms of COVID-19 are high blood pressure, high blood sugar and fever (False)	419 (93.3)	30 (6.7)
COVID-19 testing cannot be done with blood samples (False)	240 (53.5)	209 (46.5)
Nasopharyngeal swab are the most common specimens collected for COVID-19 testing (True)	400 (89.1)	49 (10.9)
The confirmatory tests for COVID-19 is RT-PCR (True)	263 (58.6)	186 (41.4)
The chest -CT scan is not relevant in COVID -19 testing (False)	211 (47.0)	238 (53.0)
The mean incubation time for COVID-19 is 14 days (False)	16 (3.6)	433 (96.4)

Majority, (401; 89.3%) were willing to be trained on how to use the test kit for COVID-19 testing, but only about two-third (286; 63.7%) were willing to allow their pharmacies to be used as a COVID-19 testing centre (Table 4).

Table 4: *Willingness of community pharmacists to get involved in COVID-19 testing.*

Variable (n = 449)	Yes (%)	No (%)	Indifferent (%)
Will you be willing to be trained on how to use the test kit for COVID-19 testing?	401 (89.3)	26 (5.8)	22 (4.9)
Will you be willing to be involved in COVID -19 testing?	368 (82.0)	49 (10.9)	32 (7.1)
Will you be willing to allow your pharmacy to be used as a COVID-19 testing centre?	286 (63.7)	93 (20.1)	70 (15.6)
Will you be willing to allow your pharmacy to be used for COVID -19 testing centre, with the tests conducted by other medical personnel?	229 (51.0)	137 (30.5)	83 (18.5)

There was a statistically significant relationship between community pharmacies that offered comprehensive laboratory services and the pharmacy's preparedness for COVID-19 testing, as shown in table 5, but no statistical relationship between geographical zone and respondent's knowledge ($\chi^2 = 10.469$, p = 0.106).

Table 5: *Relationship between offering comprehensive laboratory services and preparedness for COVID-19 testing*

Specific items that determine preparedness of the pharmacy	Community Pharmacy offering Comprehensive Laboratory Services		Chi-square	P-value
	Yes, n (%)	No, n (%)		
Disposable aprons in the pharmacy				
Yes	23 (31.1)	51 (68.9)	17.510	0.000*
No	45 (12.0)	330 (88.0)		
Foot-operated pedal waste bins in the pharmacy				
Yes	28 (21.4)	103 (78.6)	5.585	0.018*
No	40 (12.6)	278 (87.4)		
Separate waste bins for hand gloves, facemasks and aprons				
Yes	46 (21.2)	171 (78.8)	11.975	0.001*
No	22 (9.5)	210 (90.5)		
Personal protective equipment in the pharmacy				
Yes	44 (21.7)	159 (78.3)	12.294	0.000*
No	24 (9.8)	222 (90.2)		
Presence of lever arm water taps in the pharmacy				
Yes	39 (19.2)	164 (80.8)	4.769	0.029*
No	29 (11.8)	217 (88.2)		
Ventilated isolation room in the pharmacy				
Yes	23 (20.4)	90 (79.6)	3.189	0.074
No	45 (13.4)	291 (86.6)		
Sanitizer gel stationed at more than one place in the pharmacy				

*significant difference with chi square test for relationship between categorical variables

4. Discussion

COVID-19 is a pandemic that caught the world unawares, but regardless, the world has to rise up collectively, with collaborations amongst major stakeholders to fight the pandemic through prevention of transmission, identifying infected people and their management.[17] This study reveals that majority of community pharmacies in Nigeria offer point-of-care testing (diabetes screening), this aligns with other similar studies that showed the availability of point-of-care tests in community pharmacies.[18] However, majority of the community pharmacies have not totally keyed into other clinical services as practiced in developed countries such as immunization services, as only a minority offer immunization services in their pharmacies. This contrasts with what happens in the United States of America, where the report of the Annual Pharmacy Based Influenza and Adult Immunization Survey in 2013 states that Pharmacists in 83% of community pharmacies provide

immunization services, and the community pharmacies are now receiving referrals from primary care practitioners for immunization.[19]

This study showed varying degree of the perception of community pharmacists on the treatment of COVID-19. Most of the respondents stated that COVID-19 could not be treated with antibiotics, even though majority knew that COVID-19 was not a bacterial infection. The use of antibiotics to treat COVID-19 will be an irrational use of antibiotics because antibiotics are drugs that fight bacterial infections through specific target mechanisms; they are not meant to treat all kinds of microorganisms.[20] Some of the respondents believed chloroquine was a treatment option for COVID-19. Though, there are sufficient pre-clinical data justifying the effectiveness of chloroquine and hydroxychloroquine in the treatment of COVID-19, the executive group of the solidarity trial (an international clinical trial group launched by the WHO, to find an effective treatment for COVID-19) on 24, May 2020, implemented a temporary pause on the hydroxychloroquine arm of the trial for safety concerns such as increased mortality rate and increased frequency of irregular heartbeats, however, clinical data is still being reviewed.[21]

This study also showed that though the respondents knew about the COVID-19 infection, the knowledge of COVID-19 testing was below average amidst the respondents. Though, laboratory services are not core pharmacy services, the role community pharmacies play in the communities and the need to curb the spread of the virus in the communities by increasing availability and accessibility to testing, requires that community pharmacists become acquainted with information about the testing. As regards questions addressing the population groups at risk of severity of COVID-19, about one-third of the respondents did not give the correct answer, this proportion is higher than what was obtained in another study that also assessed the knowledge of healthcare practitioners of risky groups.[22]

Overall, majority of the respondents had average knowledge of COVID-19 and its testing, this is similar to what was obtained from other studies that have assessed the knowledge of healthcare workers.[23] However, a study on frontline doctors in Jordan showed that majority of the respondents had good knowledge level, this disparity in knowledge could be due to the nature of healthcare service offered by the respondents, since the study was carried out amidst doctors who were directly involved in the management of COVID-19 patients.[24] In comparison with other studies, community pharmacists in Nigeria have shown to have very good knowledge of other disease conditions like cardiovascular disease, which has translated to their involvement in cardiovascular health screening.[25] Our study also showed that there was no relationship between educational qualification, geographical zone, number of years of practice and the knowledge score. The

study carried out amidst dental practitioners' point to the contrary, as dentists with higher qualification were reported to have better knowledge scores.[23] This disparity could be due to the different study setting, since their study was a multi-national study, and ours was limited to Nigeria. The knowledge score recorded in our study may be attributed to the novelty of the disease, and non-direct involvement of the respondents in the management of COVID-19 patients. However, because community pharmacists are information providers to their immediate communities, they should be knowledgeable about the pandemic and their roles in curbing it. Community pharmacists can explore the WHO online training on COVID-19, to keep abreast on information and studies carried out on the novel disease.

The preparedness of any facility that will be used as a testing centre is a major consideration in approving a facility for testing, as seen in the U.S.A., where Clinical Laboratory Improvement Amendment (CLIA) approval is obtained before point-of-care testing can be conducted in the specific pharmacies.[26] Because of how contagious COVID-19 is, a properly ventilated isolation room is a major requirement, but majority of the community pharmacies assessed in this study do not have properly ventilated isolation rooms, personal protective equipment, disposable aprons and foot operated pedal waste bins. The level of preparedness recorded in this study is similar to what was obtained in a study of the preparedness of frontline doctors in Jordan, where a minority of frontline doctors in Jordan reported that all protective measures were available.[24] However, the model of training and provision of necessary equipment, as seen in a study in Peru can be adopted to upgrade level of preparation of community pharmacies in Nigeria, while the community pharmacies can make provision for an properly ventilated isolation centre.[27]

Majority of the respondents were willing to be trained on how to use the COVID-19 test kit, this is similar to the willingness of community pharmacists to adopt pharmaceutical care services.[28] However, some of our respondents were unwilling to be involved in COVID-19 testing, and to allow their pharmacy to be used as testing centers. This might be due to the fear of the nature of the disease being highly contagious, fear from the news of healthcare providers that have contacted the virus in the line of duty.[29] The law of inertia could also be a reason for their unwillingness since this is a completely new terrain. However, government can explore the willingness of community pharmacists to be trained on how to use the test kits, by organizing educational interventions on how to protect themselves, provision of personal protective equipment, and remuneration for the services, since studies have shown actual and potential increase in testing of other infectious diseases when community pharmacists got involved.[30]

Community pharmacies that were directly involved in comprehensive laboratory services were more prepared to take

up COVID-19 testing than those that were not involved in comprehensive laboratory services. This is similar to a study carried out by Amadi *et al*., 2018 in Abuja showing the feasibility of integrating community pharmacists into community based anti-retroviral therapy program provided the pharmacy had some degree of preparedness such as a separate counselling room, and in turn, the principal investigator organized necessary training for them to be adequately prepared to take up the role.[25] The involvement of community pharmacists in COVID-19 testing can therefore start with community pharmacies that offer comprehensive laboratory services, while investments can be made by the government to prepare other community pharmacies for the testing. This is a call to community pharmacies in Nigeria to raise the bar in the clinical services they provide, so they can be more involved in public health, including, the management of pandemics like COVID-19.

5. Conclusion
Majority of the community pharmacists had fair knowledge of COVID-19 and its testing, but there was no significant relationship between the demographics of the community pharmacists and their knowledge of COVID-19 and its testing. Although, majority of the community pharmacies were not adequately prepared for COVID-19 testing, most of them were willing to be trained on how to use the test kits. Majority of the community pharmacies that offered comprehensive laboratory services were more prepared to take up COVID-19 testing than those who did not offer comprehensive laboratory services.

Limitations and Recommendations
The study was limited to Nigeria. Nigerian government can explore the willingness of community pharmacists to be trained on how to use the test kit and bring them onboard the scale up for COVID-19 testing, by providing necessary training, equipment to upgrade the suitability of their pharmacies, and provide sufficient reimbursement for the service.

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