

Knowledge and Challenges of Pharmacists in Ghana during the COVID-19 Pandemic

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Abstract

The Coronavirus disease 2019 is a public health problem which has had a significant impact on healthcare workers globally. Pharmacists have played a vital role in public education, approval of treatment options and management of infected individuals during the pandemic. This study assessed the knowledge and challenges of pharmacists in Ghana during the coronavirus disease 2019 pandemic. A cross-sectional study was conducted amongst registered pharmacists in Ghana from 13th July to 19th August, 2020 after seeking ethical approval. Data was collected using a pre-tested validated online questionnaire. Data was entered into Microsoft Excel and was exported to STATA 15.0 for statistical analysis. Factors influencing pharmacists' ability to work and challenges were summarized as frequencies, percentages and a chart. A total of 488 pharmacists participated in this study. Official international health organization sites and media (N=442, 90.57%) and official government sites and media (N=404, 82.79%) were the most common sources of information on the coronavirus disease 2019 for pharmacists. Over a quarter of the participants (N=122, 28.48%) had been tested for the disease, and 354 (72.54%) had sufficient knowledge about the disease. A total of 398 (81.56%) participants admitted they had used their own personal protective equipment at work. Factors that positively influenced participants' ability to work included motivation (N=36, 21.2%), a sense of duty (N=33, 19.4%) and enforcement of safety protocols (N=20, 11.8%). Non-adherence to safety protocols (N=41, 23.98%), fear of exposure to the virus (N=35, 20.47%) and inadequate provision of personal protective equipment (N=30, 17.54%) were common challenges faced. Pharmacists in various fields of practice demonstrated sufficient knowledge on the coronavirus disease 2019. Their expertise can be utilized to prevent and control the spread of the coronavirus disease 2019 in Ghana.

Keywords: Knowledge of Pharmacists, Challenges of Pharmacists, COVID-19 pandemic, Pharmacy practice in Ghana, COVID-19 and pharmacy practice

Background

The coronavirus disease 2019 (COVID-19) is a new severe pneumonia outbreak which emerged from Wuhan, China (World Health Organization, 2020a). It has attracted much attention worldwide, with a new coronavirus identified as the causative pathogen. The virus, initially named 2019-nCoV (2019 Novel Coronavirus) was subsequently called the SARS-COV-2 (Severe Acute Respiratory Syndrome Coronavirus 2) (Zhu *et al.*, 2020). The World Health Organization (WHO) declared COVID-19 a pandemic on 11th March, 2020 (Khan *et al.*, 2020; World Health Organization, 2020d). Consequently, several measures have been put in place to strengthen health care systems in most countries as part of strategies to manage the COVID-19 pandemic. Pharmacists, being essential players of the health care

system, have played essential roles to complete the management cycle of the coronavirus outbreak. Pharmacists in various fields of practice have been instrumental in disease management, outbreak surveillance and research (Basheti *et al.*, 2020). Pharmacists have also contributed to public health during the outbreak as infection prevention and control advocates, providing patient counselling, patient care, and patient support (Dawoud, 2020; Ung, 2020).

Pharmacists as frontline health workers during the COVID-19 pandemic have worked tirelessly even during the lockdowns in community and hospital pharmacies, in research institutions and industries to offer invaluable services to the general public and communities in need (Bukhari *et al.*, 2020; Ung, 2020). The International Pharmaceutical Federation (FIP) has emphasized on

the effective role of pharmacists in preventing the spread of COVID-19 (International Pharmaceutical Federation, 2020b). Pharmacists often act as a reliable source of information for individuals who require advice about their medical conditions. In addition, community pharmacists triage patients, thus reducing the patient burden on health care facilities, including clinics and hospitals, amidst the pandemic globally. Pharmacists have also played a role in providing home deliveries and seamless care in patients with other ailments (Bukhari *et al.*, 2020; International Pharmaceutical Federation, 2020a; Ung, 2020).

Studies have shown that health workers' ability to adhere to measures instituted to help prevent spread of infections is influenced by their knowledge about the infection and challenges faced in their line of work (Hamza, 2020). Studies about knowledge and challenges, therefore, serve to identify gaps that exist with regards to knowledge, experience, preparedness and awareness level of pharmacists during the COVID-19 pandemic. These studies also enable policy makers to evaluate existing programmes and identify effective strategies to provide an enabling environment that encourages pharmacists to continue to offer their invaluable services (Muhammad *et al.*, 2020).

Methods

Study Design and Setting

A cross-sectional study was carried out amongst registered pharmacists across Ghana from 13th July to 19th August, 2020.

Study Population and Sampling

The study included registered pharmacists working in the different practice areas across Ghana during the COVID-19 pandemic.

The sample size was calculated, using the central limit theorem as given by Jaisingh (Jaisingh, 2006) with a confidence level of 95%, margin of error of 5%, a Z score of 1.96 and an estimated proportion (p) of pharmacists with adequate knowledge about COVID-19 being 0.5.

The formula is

$$n = \frac{(z)^2 * (p)(q)}{(d)^2}$$

COVID-19 pandemic were also included in this section.

Section D consisted of 6 items on a 5- Therefore, a minimum obligatory sample size of 385 pharmacists was required to fill the questionnaires online. Taking into consideration an additional 20% (77) for non-response, inappropriate responses and error in questionnaire filling, a final sample size of 462 pharmacists was required to fill the questionnaires. A total of 488 pharmacists however, filled the questionnaires using Google Forms via WhatsApp instant messaging on pharmacist interest groups pages. The 2019 list of pharmacists in good standing was used as the target population. Pharmacists in good standing were sampled using the convenience sampling technique.

Inclusion Criteria

Pharmacists registered by the Pharmaceutical Society of Ghana (PSGH) who consented to participate in the study were enrolled.

Exclusion Criteria

Pharmacists who are registered to practice in Ghana but were not in Ghana during the COVID -19 pandemic and pharmacists who were in Ghana but were not in good standing during the study period were excluded from the study.

Data Collection Tool

A 38-item structured questionnaire was adapted from questionnaires of similar studies guided by the study objectives (Hayden and Parkin, 2020; International Pharmaceutical Federation, 2020b; Kara, Demirkan and Ünal, 2020). The questionnaire was converted into an electronic questionnaire using Google Forms, and pre-tested among 10 registered pharmacists. The questionnaire was modified after the pre-test to ensure clarity. Pharmacists who participated in the pre-test were excluded from the study. The questionnaire, made up of four sections, was administered in English.

Section A focused on social demographics of respondents. Section B focused on pharmacists' knowledge on COVID-19. Data on pharmacists' sources of information on COVID-19 were gathered. Knowledge of the pharmacists on the cause of disease, mode of transmission and preventive measures were ascertained using 8 questions. Any correct response in relation to the 8 questions about knowledge on COVID-19 was given one point. The total knowledge score ranged from 0 (no correct answer) to 8 (for all correct answers). A cut off mark of ≥ 6 (75%) showed sufficient knowledge and < 6 indicated poor knowledge. Knowledge of pharmacists on the signs and symptoms as well as medications indicated for management of COVID-19 were also assessed.

Section C consisted of 4 items on a 5-point Likert scale that examined factors that influenced a pharmacist's ability to work. Open-ended questions that sought to assess factors that motivated or demotivated the pharmacist during the point Likert scale that focused on challenges faced by pharmacists at their various areas of practice. An open-ended question that sought to identify additional challenges pharmacists faced was also included in this section. Consent was sought from participants via text messages and phone calls before administering the questionnaires online via WhatsApp instant messaging.

Statistical Analysis

Data from the Google forms was exported to Microsoft Excel 2016 after checking for completeness and accuracy of the information. The data was cleaned by identifying all wrong entries and corrections done using the codes in the questionnaire. Data was saved as Microsoft Excel file and exported to STATA for statistical analysis.

Data analysis was done using STATA version 15.0. Descriptive statistics was done for all the socio-demographic characteristics of respondents. Level of knowledge of pharmacists on COVID-19 was summarized as frequencies and percentages. Socio-demographic characteristics of respondents were analysed using descriptive statistics as percentages. A Chi-square test was used to test for association between level of knowledge and all the independent variables. Factors influencing the willingness of pharmacists to work and challenges pharmacists faced were

summarized as frequencies and percentages and presented as charts, and tables.

Ethical Approval

Ethical clearance was sought from the Committee on Human Research Publication and Ethics, School of Medical Sciences, Kwame Nkrumah University of Science and Technology (CHRPE/AP/259/20). Approval was also obtained from the PSGH. Consent was sought from participants via text messages and WhatsApp before being enrolled into the study. Participants were guaranteed of anonymity and confidentiality at all times and that participation in the study was voluntary.

Results

Sociodemographic characteristics of participants

A total of 488 pharmacists participated in this study with a response rate of 100%. Majority of the participants (288, 57.38%) were males, and almost half of the participants (238, 48.77%) were aged between 21 and 30 years. The median age group was 31-40 years. Three hundred and sixty-six participants (75%) work in the southern belt of Ghana and over half of the participants (253, 51.84%) had less than 6 years of working experience (Table 1).

Table 1: Demographic characteristics of participants

Variable	Number	Percentage (%)
Sex		
Male	280	57.38
Female	208	42.62
Age (years)		
21-30	240	49.18
31-40	150	30.74
41-50	56	11.48
51-60	37	7.58
> 60	5	1.02
Regional Belts		
1Northern	22	4.51
2Middle/Central	100	20.49
3Southern	366	75.00
Working Experience (years)		
0-5	253	51.84
6-10	94	19.26
11-15	70	14.34
16-20	26	5.33
> 20	45	9.22
4Direct involvement in COVID-19 Management		
Directly involved	77	15.78
Not directly involved	411	84.22

Northern belt: Savannah, Northern, North East, Upper East and Upper West regions.

Middle/Central belt: Oti, Ashanti, Bono East, Ahafo and Bono regions.

Southern belt: Volta, Eastern, Greater Accra, Central, Western and Western North regions.

Direct involvement in COVID-19 management refers to pharmacists whose duties require direct or face-to-face interaction with suspected or confirmed cases of COVID-19.

Area of Practice of Participants

Two hundred and seventy-six participants (56.56%) were in community practice and 213 (43.65%) were in hospital practice. Public health, patient advocacy and consultancy constituted a total of three (0.6%) of the participants (Figure 1).

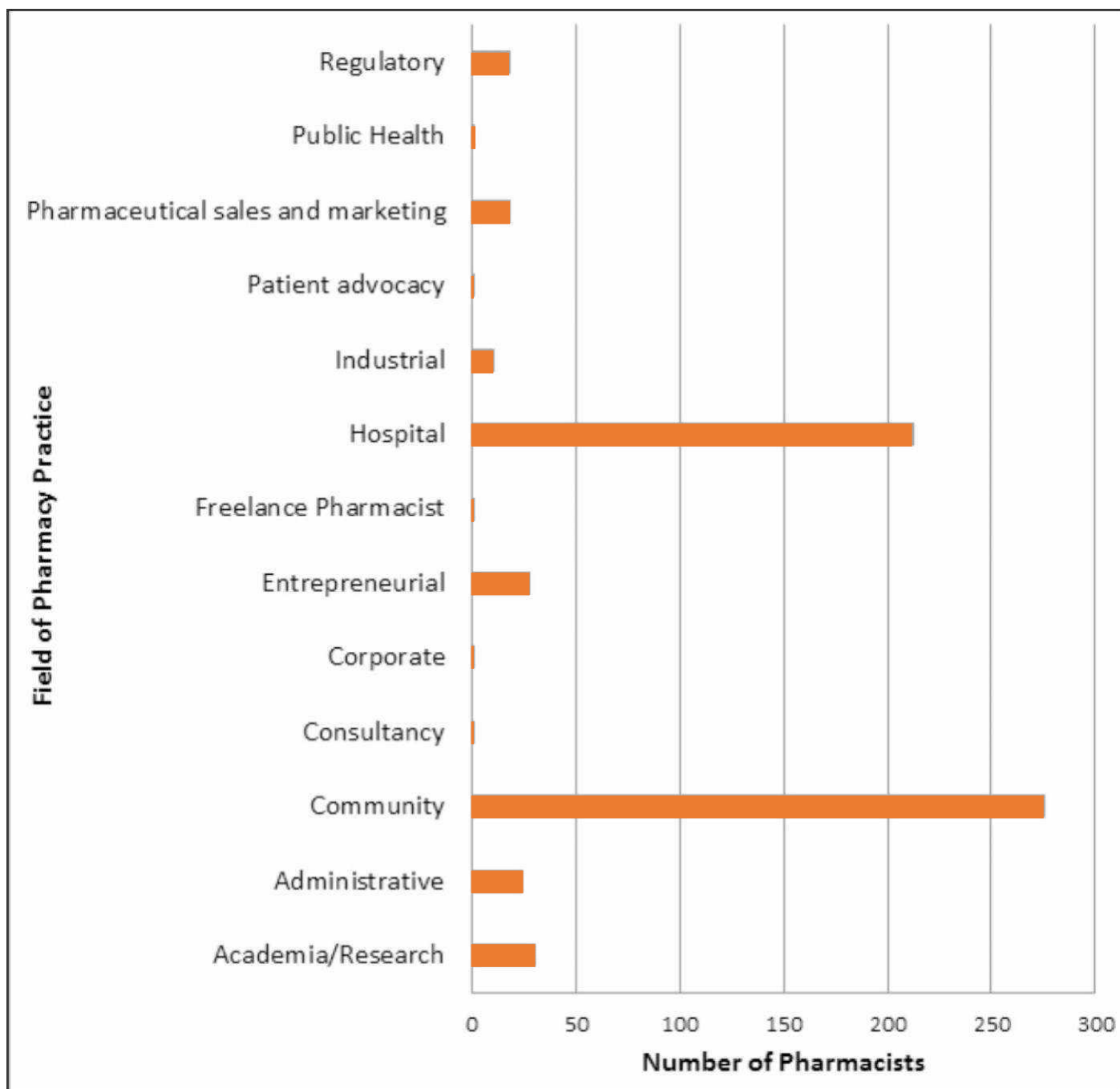


Figure 1: Areas of practice of participants

Training and testing on COVID-19

Four hundred and sixty-three (94.88%) of the participants indicated that the “no mask no entry” rule is enforced at their facilities. Two hundred and sixty-nine participants (55.12%) indicated that they have had an encounter with a suspected/confirmed case before. A total of 139 participants (28.48%) had been tested for COVID-19 with 5 (3.6%) taking the test more than three times (Table 2).

Table 2 : Training and testing on COVID-19

Variable	Number	Percentage (%)
Training		
Have received training	241	49.39
Haven't received training	247	50.61
Test		
Have been tested	139	28.48
Haven't been tested	349	71.52
Number of times tested		
Once	97	29.22
Twice	33	9.94
Thrice	4	1.2
More than thrice	5	1.51
Test result		
Received	15	4.56
Not received	149	45.29

Source of information on COVID-19

Official international health organization sites and media (442, 90.57%), official government sites and media (404, 82.78%), news media (346, 70.90%) and social media (309, 63.32%) were the most common sources of information on COVID-19 for pharmacists (Figure 2).

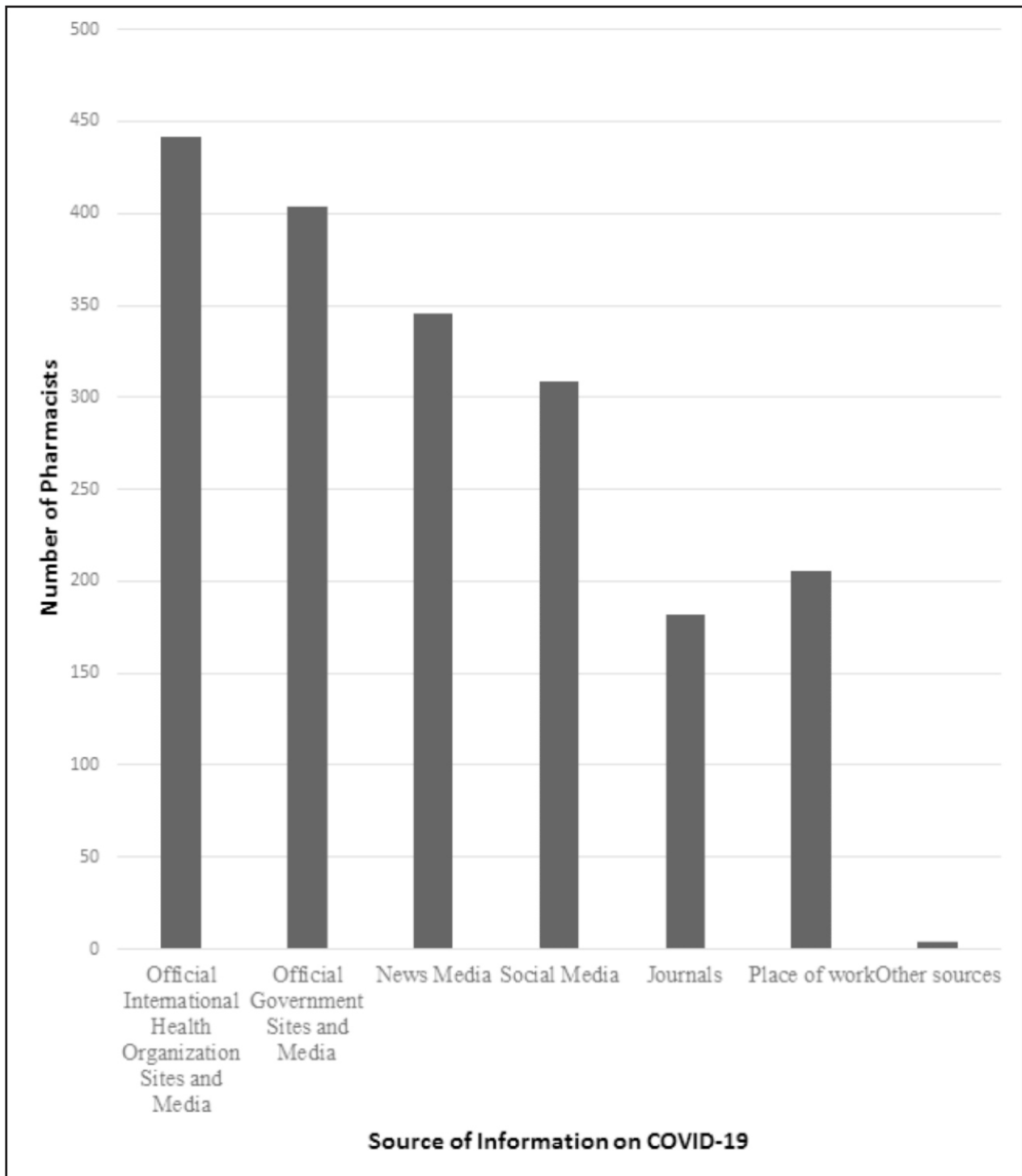


Figure 2: Sources of information on COVID-19 for pharmacists in Ghana

Knowledge of pharmacists about the COVID-19 pandemic

All the participants (100%) were aware that children and young adults are required to take measures to prevent contracting the virus. Three hundred and fifty-four participants (72.54%) had sufficient knowledge about COVID-19 (Table 3).

Table 3 : Knowledge of pharmacists in Ghana about COVID-19

Variable	Frequency (n, %)
Questions	
The quarantine period is 2 weeks when one comes into contact with a suspected COVID -19 patient (False)	85 (17.42)
The quarantine period is 2 weeks when one comes into contact with a confirmed COVID -19 patient unknowingly (True)	446 (91.39)
Eating or contacting wild animals would result in the infection by the COVID-19 virus. (False)	388 (79.51)
A person with COVID-19 cannot infect others when a fever is not present. (False)	462 (94.67)
The COVID-19 virus spreads via respiratory droplets of infected individuals. (True)	481 (98.57)
Children and young adults do not need to take measures to prevent the infection by the COVID-19 virus. (False)	488 (100.00)
Recovery period for a mild case of coronavirus disease is 14-16 days (True)	356 (72.95)
Recovery period for a severe case of coronavirus disease is 3-6 weeks (True)	271 (55.53)
Level of Knowledge on COVID-19	
Sufficient	354 (72.54)
Insufficient	134 (27.46)

Signs, symptoms and medications for the management of COVID-19

All the participants (100%) were aware that fever was a symptom of COVID-19. Three hundred participants (61.48%) were able to identify 6-10 signs and symptoms of COVID-19. A total of 466 participants (95.49%) were aware that zinc was useful in the management of COVID-19, and 302 participants (61.89%) were able to identify more than four medications useful in the management of COVID-19 (Table 4).

Table 4 : Signs, symptoms and medications for the management of COVID-19

Variable	Frequency (n, %)
Signs and Symptoms	
Fever	488 (100.00)
Headache	448 (91.80)
Cough	483 (98.98)
Running nose	354 (72.54)
Nasal congestion	333 (68.24)
Fatigue	452 (92.62)
Muscle pain	308 (63.11)
Joint pain	226 (46.31)
Difficulty in Breathing	384 (78.69)
Loss of Appetite	178 (36.48)
Diarrhoea	316 (64.75)
Smell Disturbances	222 (45.49)
Skin rashes	59 (12.11)
Epigastric pain	114 (23.36)
Knowledge about Signs and Symptoms of COVID-19	
0-5	45 (9.22)
6-10	300 (61.48)
> 10	143 (29.3)
Medications	
Hydroxychloroquine	438 (89.75)
Doxycycline	158 (32.38)
Chloroquine	207 (42.42)
Enoxaparin	169 (34.70)
Azithromycin	465 (95.29)
Zinc	466 (95.49)
Vitamin C	455 (93.24)
Methylprednisolone	216 (44.26)
Knowledge about Medications for Management of COVID-19	
0-4	186 (38.11)
> 4	302 (61.89)

Factors that influence pharmacists' ability to work during the COVID-19 pandemic

Three hundred and ninety-eight participants (81.56%) indicated that they had used their own PPEs at work during the pandemic. Most pharmacists (439, 89.96%) had used their own face masks, while 3.69% had used their own boot covers. Other PPEs used included gloves (155, 31.76%), face shields (160, 32.79%), disposable scrubs (35, 7.17%) and hair covers (31, 6.35%). One hundred and seventy participants (34.8%) indicated, at least, one factor that positively influenced their ability to work during the COVID-19 pandemic. Frequently indicated factors included motivation from employers (36, 21.2%) and a sense of duty (33, 19.4%) (Figure 3).

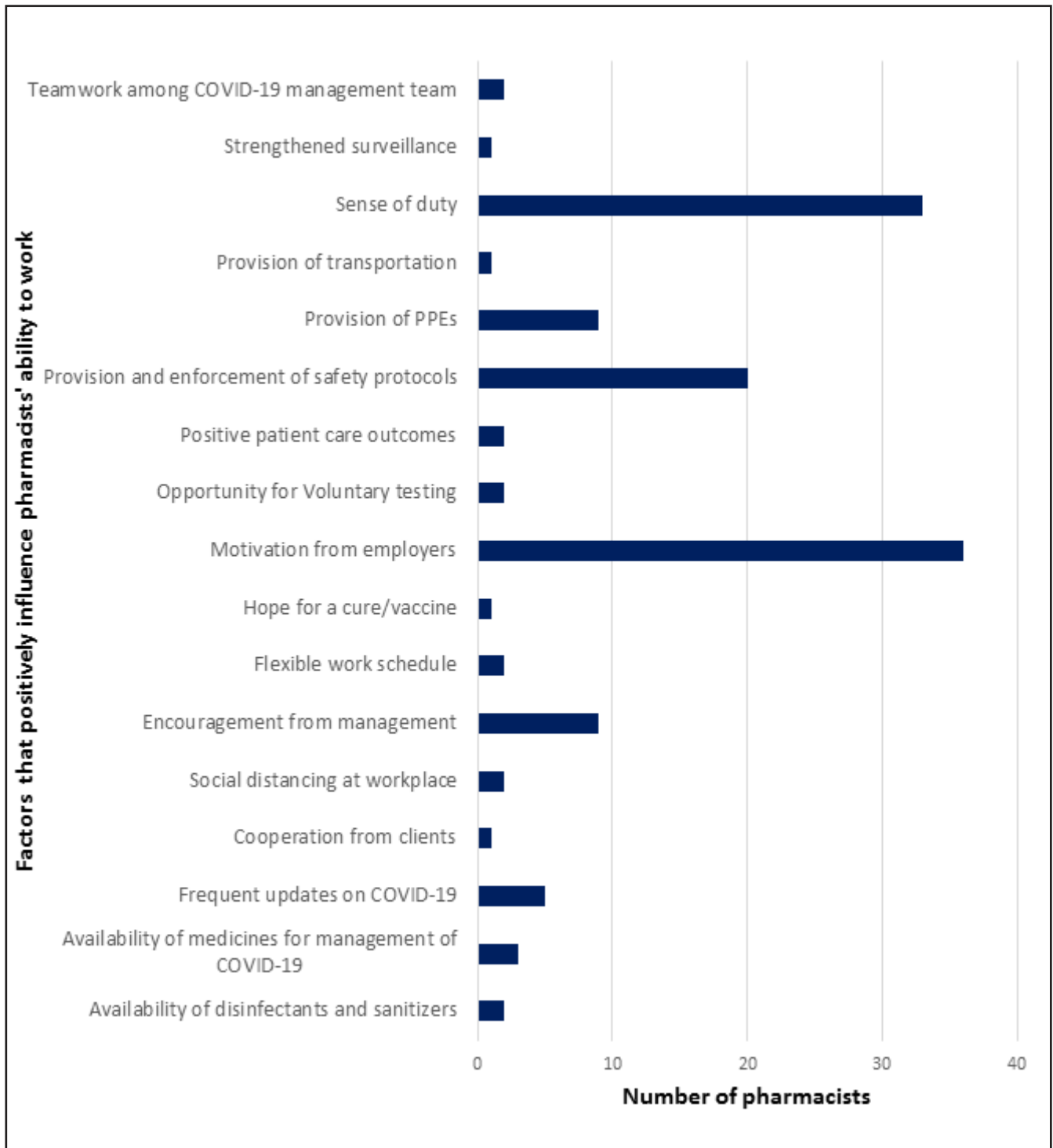


Figure 3: Factors that positively influence pharmacists' ability to work during the COVID -19 pandemic

Challenges pharmacists face during the COVID-19 pandemic

Four hundred and thirty-eight participants (89.75%) agreed that fear of contracting the virus from the workplace was a challenge and 465 participants (95.28%) agreed that fear of contracting the virus and transmitting it to family members was also a challenge. Stigmatization by friends and neighbours was identified as a challenge faced while working during the pandemic by 277 participants (56.77%). Two hundred and eight participants (42.62%) agreed that stigmatization from family was a challenge while 402 participants (82.38%) agreed that fear of encountering or taking care of a patient with COVID-19 unknowingly was a challenge. One hundred and seventy-one participants (35.04%) indicated, at least, one challenge they faced during the COVID-19 pandemic. Of this number, the commonest challenge faced were non-adherence to COVID-19 safety protocols by the public (41, 23.98%), fear of exposure to the virus (35, 20.47%) and inadequate provision of PPE (30, 17.54%) (Figure 4).

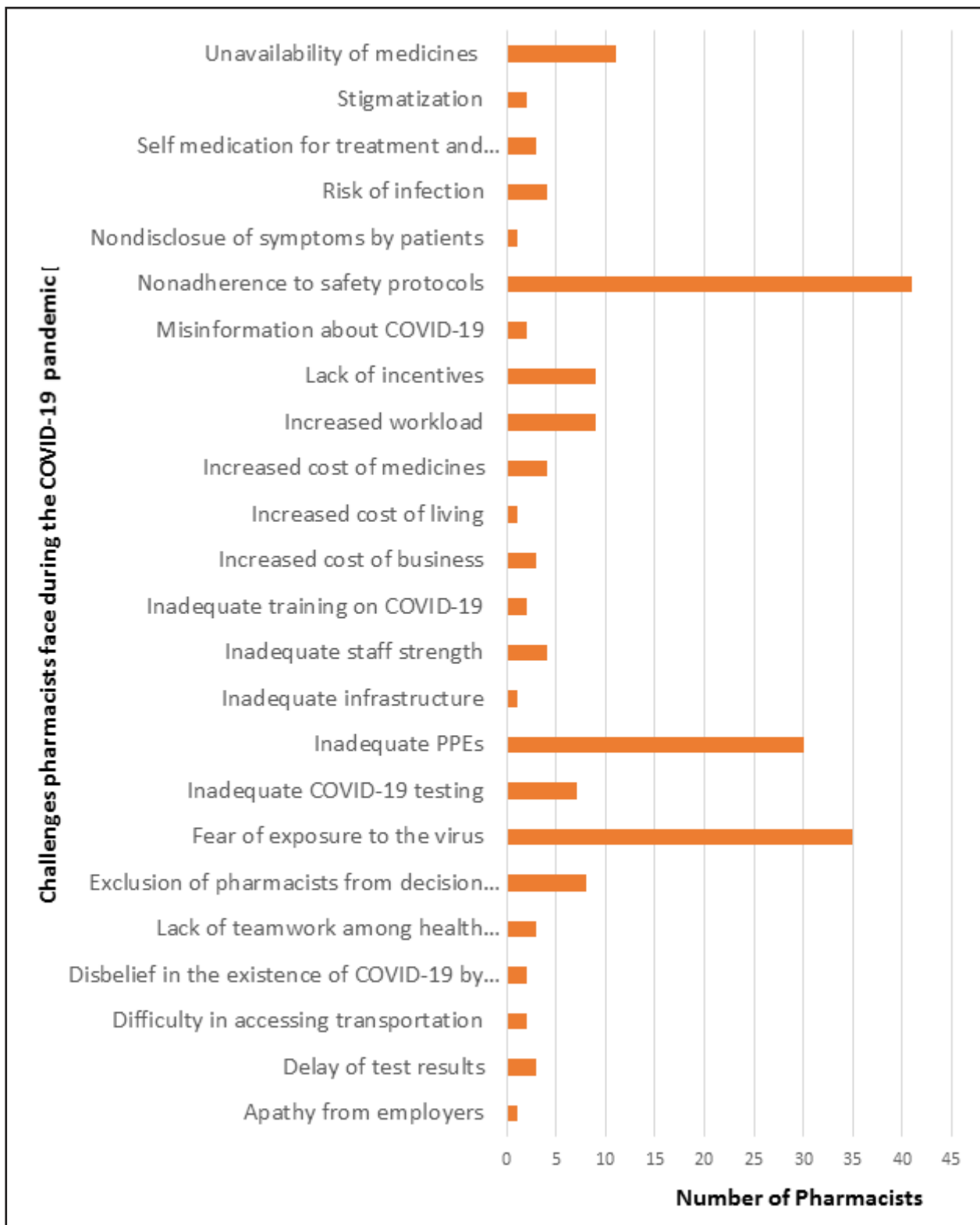


Figure 4: Challenges pharmacists face during the COVID -19 pandemic

Association between level of knowledge of participants and demographic characteristics

Training ($p<0.001$), being tested for COVID-19 ($p=0.022$) and encounter with a confirmed/suspected case ($p<0.001$) were significantly associated with the level of knowledge of pharmacists. However, sex, age, regional belt of practice, work experience and direct involvement in the management of COVID-19 cases were not significantly associated with the level of knowledge of participants about COVID-19 (Tables 5).

Table 5 : Association of level of knowledge and demographics

Variable	Knowledge (n, %)		χ^2	P-value
	Sufficient	Insufficient		
Sex				
Male	200 (71.43)	80 (28.57)	0.4081	0.5230
Female	154 (74.04)	54 (25.96)		
Age (years)				
21-30	167 (69.58)	73 (30.42)	5.5038	0.2390
31-40	115 (76.67)	35 (23.33)		
41-50	43 (76.79)	13 (23.21)		
51-60	27 (72.97)	10 (27.03)		
> 60	2 (40.00)	3 (60.00)		
Region				
1Northern	18 (81.82)	4 (18.18)	2.0715	0.355
2Middle/Central	68 (68.00)	32 (32.00)		
3Southern	268 (73.22)	98 (26.78)		
Working Experience (years)				
0-5	173 (68.38)	80 (31.62)	6.7548	0.149
6-10	76 (80.85)	18 (19.15)		
11-15	54 (77.14)	16 (22.86)		
16-20	20 (76.92)	6 (23.08)		
> 20	45 (68.89)	14 (31.11)		
4Direct involvement in COVID-19 Management				
Directly involved	62 (80.52)	15 (19.48)	2.9217	0.087
Not directly involved	243 (71.05)	119 (28.95)		
Training				
Have received training	195 (80.91)	46 (19.09)	16.754	< 0.001
Haven't received training	159 (64.37)	88 (35.63)		
Test				
Have been tested	111 (79.86)	28 (20.14)	5.2214	0.022
Haven't been tested	243 (69.63)	106 (30.37)		
Encounter with a confirmed/suspected case				
Have encountered	215 (79.93)	54 (20.07)	16.4105	< 0.001
Haven't encountered	139 (63.47)	80 (36.53)		

Northern belt: Savannah, Northern, North East, Upper East and Upper West regions.

Middle/Central belt: Oti, Ashanti, Bono East, Ahafo and Bono regions.

Southern belt: Volta, Eastern, Greater Accra, Central, Western and Western North regions.

Direct involvement in COVID-19 management refers to pharmacists whose duties require direct or face-to-face interaction with suspected or confirmed cases of COVID-19

Discussion

Ghana is among the African countries identified to have highest vulnerability yet limited capacity to respond to the COVID-19 pandemic (World Health Organization, 2020b). Curbing the pandemic in Ghana involved a multidisciplinary approach of which health workers, including pharmacists, constituted an integral part (Gilbert *et al.*, 2020). This study sought to assess the knowledge and challenges of pharmacists in Ghana during the coronavirus disease 2019 pandemic.

A total of 488 Pharmacists participated in this study with a response rate of 100%. More than half of the participants were male, similar to findings from a study conducted in two provinces in Pakistan where males constituted more than half of the participants (Muhammad *et al.*, 2020). On the contrary, two studies conducted in Turkey and Jordan had females being predominant, constituting 66.7% and 78.6% of the participants respectively (Kübra Yılmaz and Şencan, 2020; Karasneh *et al.*, 2021). Most of the participants were between 21 and 30 years old, in agreement with studies from Ethiopia and Turkey where most participants were between the ages of 19 and 30 years (Kara, Demirkan and Ünal, 2020; Tesfaye *et al.*, 2020). A report on the State of the nation's health confirms findings from this study, where most HCWs in Ghana were identified to be between the ages of 18-34 years (University of Ghana School of Public Health, 2018). Over half of the participants had less than 5 years working experience, similar to studies conducted in Jordan (45.9%) and Ethiopia (54.2%) where most participants had worked for 5 years or less (Tefaye *et al.*, 2020; Karasneh *et al.*, 2021). The present youthful age structure of pharmacists in Ghana (University of Ghana School of Public Health, 2018) implies that with several years of working experience ahead of them, measures need to be put in place to build on their capacity and ensure their safety during pandemics such as COVID-19.

Most participants were in community and hospital pharmacy practice, in agreement with a Jordanian study where majority of the pharmacists were in hospital and community practice (Karasneh *et al.*, 2021). However, in a study conducted in Pakistan, majority of the pharmacists were retail pharmacists (Hussain *et al.*, 2020). Over a quarter of participants had been tested for COVID-19 which was in contrast with a study conducted in Italy where less than a quarter of pharmacists had been tested (Cabas *et al.*, 2021). The results indicate that almost half of the pharmacists had received training on COVID-19, contrary to a study conducted in Egypt where only one in five pharmacists had been trained (Bahlol and Dewey, 2021). Training of pharmacists on COVID-19 has proven to be essential in reducing the incidence of COVID-19 amongst trained pharmacists since it improves their knowledge on the use of PPEs, infection prevention and control measures as well as stress reduction (Tan, Zhang and Xu, 2020).

Official international health organization sites and media as well as official government sites and media were the main sources of information on COVID-19 for participants, which was in agreement with the Jordanian and Lebanese studies where most of participants sourced their information on COVID-19 from the WHO, Centers for Disease Control and Prevention

(CDC), FIP and official government websites (Jalil *et al.*, 2020; Zeenny *et al.*, 2020). However, a Pakistani study showed that majority of participants sourced their information from social media (Muhammad *et al.*, 2020). The WHO indicated in February 2020 that the COVID-19 outbreak was also associated with an overabundance of information, which could put HCWs at an increased risk of being exposed to inaccurate sources of information (World Health Organization, 2020c). It is therefore imperative that pharmacists critically evaluate COVID-19 related information from credible sources such as official international health organization and government sites (Bhagavathula *et al.*, 2020; Shimizu, 2020).

Majority of participants demonstrated sufficient knowledge about COVID-19, in agreement with findings from a similar study where majority of the participants (71.5%) also demonstrated sufficient knowledge. These are contrary to findings from an Ethiopia where only half of the participants showed sufficient knowledge (Muhammad *et al.*, 2020; Tesfaye *et al.*, 2020). All the participants in this study knew that children and young adults need to take measures to prevent COVID-19 infection. Participants also demonstrated sufficient knowledge about the quarantine period, mode of spread of infection and the recovery period for infected persons, consistent with findings from similar studies conducted in Ethiopia, Pakistan and Jordan (Muhammad *et al.*, 2020; Tesfaye *et al.*, 2020; Karasneh *et al.*, 2021). Participants also demonstrated sufficient knowledge about the signs and symptoms of COVID-19, similar to studies conducted in Pakistan and Jordan (Muhammad *et al.*, 2020; Karasneh *et al.*, 2021). Most of the pharmacists were aware that hydroxychloroquine, azithromycin, vitamin C and zinc were useful in the management of COVID-19. In a similar study conducted in Turkey, participants also mentioned hydroxychloroquine, azithromycin and vitamin C as useful medicines in the management of COVID-19 (Kübra Yılmaz and Şencan, 2020). This study revealed that, training on COVID-19, being tested for COVID-19 and having an encounter with a confirmed or suspected case were significantly associated with the level of knowledge of participants. This is in contrast with findings from a study conducted in Pakistan where gender, education and place of residence were significantly associated with the level of knowledge (Hussain *et al.*, 2020). It is imperative that pharmacists have sufficient knowledge about COVID-19 since they play critical roles in its management (Athiyah *et al.*, 2019; Dawoud, 2020; Muhammad *et al.*, 2020).

Participants from this study indicated that motivation from employers, a sense of duty and the provision and enforcement of safety protocols positively influenced their ability to work during the pandemic. In two similar studies conducted in Birmingham and West Midlands UK, participants also indicated that a sense of duty influenced their ability to work (Damery *et al.*, 2010; Edeghere *et al.*, 2015). However, in a study conducted in Jordan, participants indicated key factors that influence their work as job stress, staff adequacy and resource adequacy (Hangoma *et al.*, 2020; Tesfaye *et al.*, 2020). Since Pharmacists are the most accessible HCWs, regulations, policies and guidelines must be established and implemented to ensure that they are well motivated and protected in their day-to-day

activities as this can have a positive impact on their attitude to work (Hayden and Parkin, 2020).

The study revealed that fear of contracting the virus and transferring to family, stigmatization by family, friends and neighbours as well as taking care of COVID-19 patients unknowingly were challenges faced while working during the pandemic, in agreement with findings from a similar Jordanian study (Algunmeeyn *et al.*, 2020). Participants also indicated that non-adherence to safety protocols and inadequate provision of PPEs were challenges faced while working during the pandemic, which is consistent with findings from studies conducted in Ethiopia, Canada and Jordan, where participants mentioned scarcity of PPEs among challenges faced (Algunmeeyn *et al.*, 2020; Gregory and Austin, 2020; Tesfaye *et al.*, 2020). It is important for these challenges to be addressed since they could have a negative impact on the quality of service provided by pharmacists in Ghana.

Limitation

Since the questionnaires were administered via WhatsApp instant messaging, pharmacists in Ghana who did not have access to internet were not available to be sampled for this study. In order to ensure a fair representation of pharmacists in future research, other means of communication such as text messaging and phone calls should be included as means of reaching respondents.

Conclusion

Pharmacists in various fields of practice in Ghana demonstrated sufficient knowledge on COVID-19. Their expertise can be utilized to prevent and control the spread of the disease in Ghana. Most Pharmacists indicated that motivation from employers, a sense of duty and the provision and enforcement of safety protocols positively influenced their ability to work, while fear of contracting the virus and transferring to their families, stigmatization and taking care of COVID-19 patients unknowingly were challenges faced.

Declaration of conflicting interest

The Authors declare that there is no conflict of interest.

Authors' contribution

MNAOA, AFAM, JM, JOD, AAA and AOB conceptualized the study. MNAOA supervised the whole study, and all authors participated in its design and coordination. All authors coordinated data collection. MNAOA, AAA and JM analysed and interpreted the data. AFAM, JM, JOD, AAA and AOB drafted the manuscript. The manuscript was reviewed for intellectual content by all authors. All authors read and approved the final manuscript.

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