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Assessment of the Perception, Readiness and Willingness of Community Pharmacists to Provide Vaccination Services in Edo State.

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ABSTRACT

Background: Vaccines are the most cost-effective intervention in preventing infectious diseases. In recent times, attention has turned to preventing infections and diseases in adulthood. Community pharmacists are possibly underutilized public health professionals especially as they are conveniently located and offer extended working hours. By their accessibility and reach in local communities, community pharmacists are ideally positioned to promote and provide vaccination services. The aim is to assess the perception, readiness and willingness of community pharmacists to provide vaccination services in Edo State.

Method: This was a quantitative cross-sectional study that was conducted among 250 licensed and registered community pharmacies in Edo State. The interviewer questionnaire was the data collection tool. Descriptive and inferential ($\chi 2$ test) analyses were done using SPSS software with a significance value set at <0.05.

Result: One hundred and fifty-nine (77.6%) of community pharmacists demonstrated a positive perception of pharmacists' involvement in vaccination services. The most common vaccines available in the pharmacies included tetanus [191 (93.2%)], antirabies [123(60%)], hepatitis b [31(15.1%)], and typhoid [31(15.1%)]. Eighty-five (41.5%) pharmacists have been trained in all aspects of vaccination services. Eight (3.9%) pharmacists have in place all requirements in terms of equipment and conditions for providing vaccination services, while 99 (48.3%) meet some requirements. Regarding willingness to engage in vaccination provision, 109 (53.2%) community pharmacists expressed a strong desire to provide vaccination services. Government policy 188(91.7%) and support from pharmacy regulatory body and Associations are enablers, while the cost of equipment 165(80.5%) and poor knowledge and skills 160(78%) of community pharmacists are possible hindrances to community pharmacists' participation in the vaccination programme. Pharmacists with >5 years of experience (p=0.00), owners of pharmacies (p=0.001), and those working more than 12 hours daily (p=0.000) were more ready to provide vaccine service.

Conclusion: Most community pharmacists have embraced their expanded role of providing vaccination services. Some are currently providing this service, while others who are yet to get involved are willing to do so. The need for Pharmacy Regulatory organization and Associations to advocate for community pharmacists as vaccinators and for training and retraining of pharmacists will facilitate the recognition of community pharmacists in the National Vaccination Programme.

1. Introduction

Vaccines stand out as the most cost-effective intervention in preventing infectious diseases. Over the years, many childhood preventable diseases have been addressed with vaccines which has reduced mortality rate of children under five years, and reduction in healthcare cost. In recent times, attention has turned to preventing infections and diseases in adulthood, this has led to development of vaccines for adult use[1,2]. Some vaccines administered to adults include vaccines against influenza, hepatitis, human papilloma virus, typhoid, coronavirus and yellow fever. However, despite the availability of vaccines, thousands of adults and children succumb to vaccine-preventable diseases annually[3]. This could be due to non-availability of the vaccine, cost consideration, poor healthcare services, and vaccine hesitancy[18]. The COVID-19 pandemic exposed some drawback in the provision of some healthcare services, including vaccination shortage of healthcare

providers negatively affected the quality of services rendered[4,5]. This highlighted the need to extend the provision of some healthcare delivery such as vaccination to community pharmacies. This is so, because community pharmacists are among the most accessible and trusted healthcare professionals to the public and provide essential services despite unprecedented demand[6,7,8]. Community pharmacists are highly trained but possibly underutilised public health professionals especially as they are conveniently located and offer extended working hours. By virtue of their accessibility and reach in local communities, community pharmacists are ideally positioned to promote and provide vaccination services[9,10,11]. Allowing pharmacy-based vaccination is a healthcare strategy that many countries followed to enhance access and thus increase vaccination uptake in the community. The role of community pharmacies in vaccination has exceptional success in countries like Argentina, the United States of America, Australia, France, Ireland, Italy, Norway, Poland, Portugal, Switzerland, and United Kingdom, suggesting that pharmacists can play a greater role in improving vaccination coverage with the needed training[12,13,14]. Offering vaccinations in community pharmacies not only boosts immunization rates and coverage, but also alleviates the burden on traditional healthcare systems.

Research conducted in Nigeria revealed that in 2016, the pharmacy workforce comprised approximately 21,892 registered pharmacists, with more than half (12,807-58.5%) actively practicing. Moreover, 42% of licensed pharmacists were engaged in community practice. community pharmacists are involved in rendering patient-oriented services such as pharmaceutical care, point of care services, counseling, medication review and medication therapy management and collaborative care with other healthcare professionals with reported success. The presence of a substantial number of registered pharmacists are underutilized in Nigeria, especially in community practice where their potential to improve vaccination coverage remains unexplored. This presents a promising avenue for increasing vaccine uptake in the country[15]. While there's no official restriction on community pharmacists providing immunization services in Nigeria, the absence of clear policy directives or laws has hindered their integration into the vaccine workforce. Consequently, there's limited recognition and support from the healthcare system, hindering pharmacists' role as integral members of the vaccination workforce. Nonetheless, pharmacist-led organizations have spearheaded efforts to include pharmacists in addressing vaccine hesitancy[15]. Studies in Nigeria suggest that community pharmacists in the region have shown great willingness to deliver pharmacy-based vaccination services and some have started rendering such services[16,17,18].

Against this background, the current study aims to assess the readiness and willingness of community pharmacists in Edo State to provide vaccination services. It seeks to examine their perceptions towards vaccination and to identify potential hindrances to offering such services.

Methods:

Study design: This is a quantitative cross-sectional study that was conducted among pharmacists in community setting.

Setting: This study was conducted among licensed and registered community pharmacies in Edo State.

Data Collection Process: The survey was developed based on a deep literature review[8,19,11,20,21] and an analysis of the structure, content validity, and applicability of the survey tool to the setting in Nigeria. The survey consisted of six sections grouped into seven categories: i) demographics; ii) perception toward vaccination; iii) Availability of vaccines; iv) Readiness to vaccinate; v) willingness to receive training to administer vaccines; vi) factors influencing the decision to administer vaccines;. A pilot test was conducted on 10 pharmacists and reliability testing was done with Cronbach alpha score of 0.853 and the questionnaire was found to be reliable. Perception to vaccinate section of the questionnaire had nine items graded on a scale of 1-5 from strongly disagree to strongly agree. Score of 40-45 was interpreted as good, 35-39.5 as average and less than 35 as poor.

Sample size Determination/ Inclusion criteria: The latest report from the Association of Community Pharmacists of Nigeria (Edo state chapter) shows that there are currently 250 Community Pharmacists in Edo State. Using a margin of error of 5%, an effect size of 50% and at confidence interval of 95%, 152 Community Pharmacists was calculated as required sample size for this study using Raasoft online calculator. To account for attrition, the sample size obtained was 200. Convenience sampling was used to include community pharmacists in the study. Community pharmacists who are licensed and working in registered community pharmacies with 2 years or more years of working as community pharmacists participated in the study.

Data analysis: Quantitative data obtained in this study was analyzed using SPSS software. Descriptive statistics such

as frequencies, proportions, range, mean, and cross tabulations were applied for descriptive analysis. $\chi 2$ Test, Fisher's exact test and t-test were used to measure differences in variables with significance value set at >0.05.

Results

A total of 205 community pharmacists participated in the study. From Table 1, a majority 141.7 (68.7%) of them were aged 25-34 years, and more than half were males 122 (59.5%). Most 182 (88.8%) of them acquired only undergraduate degree (BPharm or PharmD), others had postgraduate degree either as Master, West Africa College of Pharmacy Fellowship or PhD. Less than a third of the participants are pharmacy owners and 158 (77.1%) of them work less than 12 hours daily. One hundred and seventy-eight (88.6%) of the community pharmacies are independent, while 164 (80%) are located in urban setting. All community pharmacies have at least one pharmacist and 87 (42.45) have two or more pharmacists on duty.

Table 1. Socio-demographics of Participants

Variable	Frequency/Percentage N (%)
Age	
<25	7 (3.4)
25-34	141(68.7)
35-<40	34(16.6)
>40	22(10.7)
Gender	
Male	122(59.5)
Female	83(40.5)
Highest Degree	
Undergraduate	182(88.8)
Postgraduate	23 (11.2)
Years of Experience in Community Practice (Years)	
<5	
>5-9	73 (35.6)
≥10	76(37.1)
	56(27.3)
Employment	
Pharmacy owner	56(27.3)
Employed by Pharmacists	76(37.1)
Employed by Non-Pharmacists	73(35.6)
Daily Working Time (Hours)	
<12	47 (22.9)
≥12	158(77.1)
Average Number of Clients Daily	
<30	31(15.1)
>30-50	74(36.1)
>50-100	78(38)
>100	22(10.7)

One hundred and fifty-nine (77.6%) of them have a good perception of their involvement in offering vaccination services and scored between 40-45, 36 (17.6%) of them scored between 35-39, while 10 (4.9) of them scored poorly (<35). For specific items, 182 (88.8%) of pharmacists feel that every pharmacy should be approved for vaccination, only 28 (13.7%) believe that pharmacy-based vaccination service can be risky (Table 2).

Table 2. Perception of Community Pharmacists in Vaccination Services

Perception	Strongly Agree N (%)	Agree N (%)	Neutral N (%)	Disagree N (%)	Strongly Disagree N (%)
Every pharmacy should be approved for vaccination services	132 (64.4)	50 (24.4)	13 (6.3%)	9 (4.4)	1 (0.5)
Pharmacists should engage in vaccination services	156 (76.1)	40 (19.5)	8 (3.9)	0	1 (76.1)
Pharmacy-based vaccination could be risky	11 (5.4)	19 (9.3)	47 (22.9)	84 (41)	44 (21.5)
Pharmacists should be paid for rendering vaccination services	151 (73.7)	43 (21)	9 (4.40	2 (1)	0
Client may prefer to get their vaccines at the pharmacy to save time	150 (73.2)	52 (25.4)	3 (1.5)	0	0
Clients will trust the pharmacist to vaccinate them	142 (69.3)	50 (24.4)	12 (5.9)	1 (0.5)	0
Pharmacists should be trained before engaging in vaccination services	183 (89.3)	20 (9.8)	2 (1)	0	0
Pharmacists should encourage clients to get vaccinated	168 (82)	32 (15.6)	4 (2)	0	1 (0.5)
Pharmacies approved for vaccination service should be fully equipped.	175 (85.4)	28 13.7)	2 (1)	0	0

Regarding vaccine availability in community pharmacies, all vaccines investigated were in stock but to varying extent. The most common vaccines available in the pharmacies included tetanus [191 (93.2%)], antirabies [123(60%)], hepatitis B [31(15.1%)], and typhoid [31(15.1%)] (Figure 1).

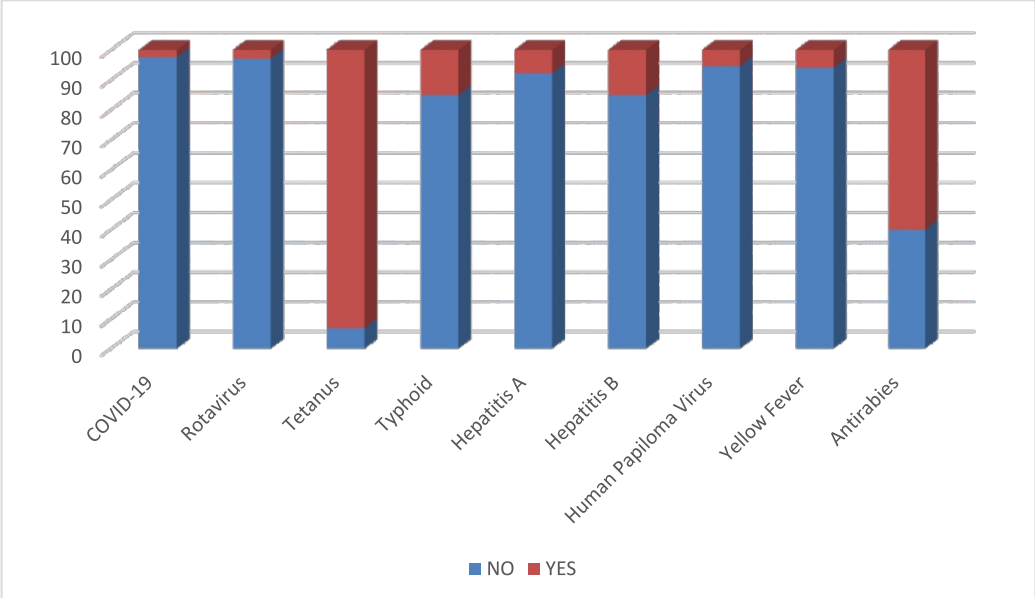

Figure 1. Availability of Vaccines in Community Pharmacies

Eighty-five (41.5%) pharmacists have been trained in all four aspects of vaccination. Eighty-seven (42.4%) community pharmacists have been trained in three of the training domains, while 33 (16.1) of them have acquired no training or have been trained in one or two of the domains. More than half of the participants have acquired cardio-pulmonary resuscitation (CPR) [131 (63.9%)] and immunization skills [106 (51.7%)]. Eight (3.9%) pharmacies have in place all requirements in terms of equipment and conditions in their pharmacies to providing vaccination services, while 99 (48.3%) have met up to 7 of 10 requirements. Many community pharmacies were deficient in areas of power source [119 (58%)], medical waste bin [137 (66.8%)], sanitization material [167 (81.5%)] and vaccine specific refrigerator [94 (45.9%)].

Table 3. Readiness in Carrying Out Vaccination in the Pharmacy

Which of the Following Have You Fulfilled	Yes N (%)	No N (%)
First aid training	74 (36.1)	131 (63.9)
CPR training	131 (63.9)	74 (36.1)
Immunizing qualification training	106 (51.7)	99 (48.3)
Read the guidelines on vaccination	88 (42.9)	117 (57.1)
Which of the following is Present in Your Pharmacy		
Vaccination specific place/room	145 (70.7)	60 (29.3)
Refrigerator specific for vaccines	111 (54.1)	94 (45.9)
Temperature monitor	137 (66.8)	68 (33.2)
Alternative power source for cold chain items/ refrigerator	86 (42)	119 (58)
Anaphylaxis response kit	179 (87.3)	26 (12.7)
Anaphylaxis management poster/guidance	174 (84.9)	31 (15.1)
Safety box	119 (58)	86 (42)
Medical waste bin	68 ((33.2)	137 (66.8)
Materials for hand sanitization and surface cleaning	38 (18.5)	167 (81.5)
Vaccinated patients record	185 (90.2)	20 (9.8)

Regarding willingness to engage in vaccination provision, 163 (79.5%) community pharmacists expressed strong desire to participate in vaccination, while 164 (80%) of them are highly likely to be trained in the future. Almost all, 199 (97.1%) of community pharmacists intend to request for service fee for vaccination (Table 4).

Table 4. Willingness to Vaccinate

Activity	Highly likely N (%)	Likely N (%)	Do not know N (%)	Unlikely N (%)	Highly unlikely N (%)
I am willing to practice vaccination in the future	163 (79.5)	38 (18.5)	4 (2)	0	0
I am willing to encourage clients to get vaccinated	167 (81.5)	36 (17.6)	0	1 (0.5)	1 (0.5)
I am willing to get first aid training	164 (80)	38 (18.5)	2 (1)	0	1 (0.5)
I am willing to get training related to vaccination	164 (80)	40 (19.5)	1 (0.5)	0	0
I am willing to get CPR training	156 (76.1)	47 (22.9)	2 (1)	0	0
I am willing to get the equipment/facilities required for vaccination such as anaphylactic shock kit and private place	161 (78.5)	32 (15.6)	12 (5.9)	0	0
I intend to request for a service charge for rendering vaccination services	166 (81)	33 (16.1	5 (2.4)	1 (0.5)	0
I am willing to have an appointment system for vaccination services	165 (80.5)	34 (16.6)	6 (2.9)	0	0

Government policy 188(91.7%) and support from pharmacy regulatory body and Associations are enablers, while lack of regular power supply 185 (90.2%), cost of equipment, 165(80.5%) and poor knowledge and skills 160 (78%) of community pharmacists are possible hindrances to community pharmacists' participation in vaccination programme.

Table 5. Factors Hindering Delivery of Vaccination Service in Community Pharmacy

Factor	Yes N (%)	No N (%)
Pharmacist skill and knowledge	61 (29.8)	144 (70.2)
Number of client or prescriptions for vaccination	81 (39.5)	124 (60.5)
Participation by other Pharmacists	114 (55.6)	91 (44.4)
Support from Pharmacy regulatory body and Associations	45 (22)	160 (78)
Support from Ministry of Health and government policy	17 (8.3)	188 (91.7)
Cost of equipment/tools	40 (19.5)	165 (80.5)
Acceptance of community pharmacists to vaccinate by clients	95 (46.3)	110 (53.7)
Time needed to vaccinate	144 (70.2)	61 (29.8)
Patient’s willingness to pay	109 (53.2)	96 (46.8)

Pharmacy premise design/ structure	161 (78.5)	44 (21.5)
Space Limitation	149 (72.7)	56 (27.3)
Lack of Regular Power Supply	185 (90.2)	20 (9.8)

Table below show the relationship between demographics of community pharmacies and their readiness to start vaccination services based on their training. Pharmacists with >10 years of experience (p=0.00), owners of pharmacies (p=0.001), and those working more than 12 hours daily (p=0.000) were more training-ready to provide vaccine service. Gender and location of pharmacy do not affect readiness to engage in vaccine service provision.

Table 6. Relationship Between Demographics of Community Pharmacies and Training-Ready to Provide Vaccination Services

Variable	Readiness (Score ≥7) N (%)	Readiness (Score <7) N (%)	p-value
Gender			
Male	46 (54.1)	76 (63.3)	0.119
Female	39(45.9)	44 (36.7)	
Education			
BPharm/PharmD	68 (80)	114 (95)	0.001
Postgraduate	17(20)	6 (5)	
Years of Community Pharmacy Practice			
≥10			
<10	37 (43.5)	21 (17.5)	
	48 (56.5)	99 (82.5)	0.000
Employment			
Pharmacy Owned	39 (45.9)	17 (14.2)	0.001
Employee	46 (54.1)	103 (85.8)	
Type of Pharmacy			
Independent	68 (80)	110 (91.6)	
Chain	17 (20)	10 (8.4)	0.002
Location of Pharmacy			
Urban	68 (80)	96 (80)	
Rural	17 (20)	24 (20)	1.000
Daily Working Hours			
≥12	30 (35.3)	17 (14.2)	
<12	55 (64.7)	103 (85.8)	0.000

Discussion

This study sought to investigate the perception, readiness and willingness of community pharmacists to render vaccination services. Majority of the pharmacists have a positive view of pharmacist involvement in vaccination services. This shows that pharmacists realize that their roles are expanding and are open to embrace opportunities that allow them to provide more clinical and health services. This is similar to studies conducted in other regions of Nigeria, where some community pharmacists showed good understanding on vaccination services and perceived being vaccinators as a welcomed role. Some are already providing vaccination in their communities[17,18]. In this study a few community pharmacies have in stock some vaccines

such as tetanus, antirabies and hepatitis B vaccines. Community pharmacists can contribute to the prevention of public health crisis due to their role expansion with vaccination as a highlight. A global survey was conducted in 2020 in over 99 countries and territories by the International Pharmaceutical Federation[10] and found that pharmacy-based vaccination services were available in at least 36 countries and territories and were proposed or were in the process of implementation in 16 more countries. Involvement of community pharmacists in vaccination services during pandemics showed that community pharmacies offered a low and convenient cost for vaccination, being already prepared for vaccination logistics with multiple strategies for injection/vaccine supply chain management. They are often conveniently located and do not usually require appointments for vaccination services. This can increase access to vaccines that are medically suggested. The report also indicated that immunization services at community pharmacies were accessible by 1.8 billion people around the world. In addition, pharmacists are also able to address misinformation, clearly communicate, and assess patient understanding, therefore decreasing vaccine hesitancy through persistent education[22].

The use of pharmacists as vaccine administrators has contributed to higher vaccination rates and accessibility and better clinical outcomes in several countries. For instance, a review on the impact of pharmacists as immunizers compared with provision by traditional providers with no pharmacy involvement. Pharmacist involvement in immunization led to increased uptake of immunizations. In addition, there was a positive impact of pharmacists as immunizers irrespective of their role or the type of vaccine given. A systematic review including 12 studies on pharmacy-based interventions on influenza vaccination acceptance, demonstrated the impact of pharmacists in improving vaccination acceptance of up to 27% as against the standard of care and up to 117% for those who were not vaccinated for influenza a year before[12,23].

In this present study, more than 80% of community pharmacists expressed their willingness to engage in vaccination provision. They are also willing to obtain the necessary training and equipment required to provide the services. However, currently, about half of the pharmacists are training-ready to provide vaccination services, while less than 10% of them are ready in terms of infrastructure and design of the pharmacies to enable provision of vaccines. Our study showed that pharmacy owners, those working longer hours and those with more years of experience are more ready to providing vaccination services. These pharmacists are also more likely to show commitment to embracing this added role. However, more pharmacists can be ready if the hindrances identified in this study are looked into. One key area to positively influence community pharmacist' participation as immunizers is their recognition by government health policies and inclusion in the Nigerian National Immunization Programmes. In Nigeria, the vaccination schedule is drafted as per the National Program on Immunization (NPI). The vaccines are administered across a wide range of government and private hospitals, yet pharmacies and/or pharmacists are not involved in the administration of vaccines and this has posed a great limitation to the uptake of vaccines[24]. Although there is no official restriction limiting community pharmacists from providing immunization services in Nigeria, there have not been any policy directions or law towards the involvement of them into that[24]. Many countries around the world have authorized vaccination in community practice and/or by pharmacists. This practice has been initiated in countries like South Africa, United State of America (USA), United Kingdom (UK), Portugal, Argentina, Australia, Ireland, Philippines, and Switzerland. In the USA and UK, pharmacies and/or pharmacists are playing a crucial role in the administration of COVID-19 and influenza vaccines among others[23]. Similarly, in the USA, pharmacies have been partnered to distribute and administer the vaccines to the priority groups to provide a more efficient platform for distribution and administration than hospitals. This shows that pharmacies and/or pharmacists have an important role to play to enable many Nigerians get wider vaccination access in a short while whether childhood vaccines including human papilloma virus vaccine which is currently being rolled out, or adult vaccines such as typhoid, hepatitis and others[14,24,23]. Pharmacy Council of Nigeria (PCN) the regulatory body of Pharmacy profession and pharmacy Associations such as the Pharmaceutical Society of Nigeria (PSN), Association of Community Pharmacists of Nigeria (ACPN) and Clinical Pharmacists Association of Nigeria (CPAN) can work hand in hand with government to ensure that community pharmacists are publicly accepted as immunizers.

Lack of necessary training and skills for rending vaccination services as pointed as a barrier in this study can be mitigated through various strategizes. One strategy is that community pharmacists can be prepared to provide vaccination services through undergraduate pharmacy education or through training programmes tailored to the

professional and practice requirements of the country. For instance, in Canada and the USA, several immunization-training programmes were developed to ensure safe and effective administration of vaccines by pharmacists. A randomized controlled trial conducted among US community pharmacists evaluated the impact of vaccination training programme on participants' vaccination-related confidence, perceived barriers and perceived influence on immunization services using a pre- and postintervention survey. The training programme significantly improved the intervention pharmacists' confidence in determining the appropriateness of pneumococcal vaccine[23]. Currently in Nigeria, the CPAN and ACPN are partnering with some organizations to provide vaccination-related training to community pharmacists in the country. Community pharmacists can also undergo comprehensive training program on immunization which can be included in the annual mandatory continuous professional development (CPD) by the Pharmacists Council of Nigeria (PCN). Other factors like cost of equipment, restructuring and design of pharmacy and power supply can limit many community pharmacies from being approved as vaccination sites. More so, not every community pharmacy should be eligible as vaccination centre, hence these requirements can be used to maintain standard. However, some community pharmacies that many be limited by the factors mentioned above can be encouraged with provision of loans and partnership with government or health organizations. A limitation of this study lies in the self-reported data which is not without bias, however, the strength of the study is the fact that it was conducted among majority of community pharmacies in Edo State this gives a near representation of responses of pharmacists in the State.

Conclusion: Community pharmacists in Edo State generally have a positive perception and strong willingness to offer vaccination services, with many ready for training. However, a lack of basic infrastructure remains a major barrier. Integrating community pharmacies into the National Immunization Programme and providing necessary training could help expand vaccination access in Nigeria should be promptly considered. Future research can investigate the long-term impact of pharmacist-led vaccination services.

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