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Pharmacists' knowledge and practice regarding immunization in Ogun State, Southwest, Nigeria

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ABSTRACT

Background: Immunization is a public health intervention aimed at reducing morbidity and mortality from vaccine-preventable infectious diseases. However, evidence suggests that vaccine coverage is low especially in developing countries including Nigeria. To improve vaccine uptake among the public, strategies including the inclusion of professional non-traditional vaccine administrators such as pharmacists in immunization schemes have been advocated. However, there is paucity of data on pharmacists' knowledge and practice of immunization in Nigeria.

Objective: This study aimed to evaluate the knowledge and practice of pharmacists regarding immunization in Osun State Southwestern Nigeria.

Methods: A quantitative cross-sectional study was carried out among consecutively selected pharmacists in purposively selected five local government areas in Ogun State, Southwest, Nigeria. A 30-item pre-tested questionnaire that explored the participants' socio-demographics, their knowledge and practice of immunization was administered to them in their respective places of work. Chi-square test was used to determine associations between respondents' socio-demographics and categorical variables of interest. A p-value < 0.05 was considered significant.

Results: Of the 180 copies of the questionnaire distributed 145 (80.6%) were retrieved and analysed. Almost half of the respondents (71; 49.0%) were aged <30 years (mean age =35.43+0.28 years), 106 (73.1%) rated their participation in the distribution of immunization leaflet as <20%, 127 (87.6%) knew that the aged require immunization but many (104;71.7%) could not give reasons. There was no significant association between the length of practice and pharmacists' engagement on the immunization advisory committee (p= 0.196).

Conclusion: An appreciable proportion of the pharmacists who took part in the study had inadequate knowledge and engaged sub-optimally in immunization activities.

Keywords: Pharmacist, immunization, older people, health, intervention

Connaissances et pratiques des pharmaciens en matière de vaccination dans l'État d'Ogun, au sud-ouest du Nigeria

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RÉSUMÉ

Contexte : La vaccination est une intervention de santé publique visant à réduire la morbidité et la mortalité dues aux maladies infectieuses évitables par la vaccination. Cependant, les données entrevoient que la couverture vaccinale est faible, surtout dans les pays en développement, y compris le Nigeria. Pour améliorer l'adoption des vaccins par le public, des stratégies comprenant l'inclusion d'administrateurs professionnels non traditionnels de vaccins, tels que les pharmaciens dans les programmes de vaccination ont été préconisées. Cependant, il existe peu de données sur les connaissances et les pratiques des pharmaciens en matière de vaccination au Nigeria.

Objectif : Cette étude vise à évaluer les connaissances et la pratique de la vaccination chez les pharmaciens au Nigeria.

Méthodes : Une étude transversale quantitative a été menée auprès de pharmaciens sélectionnés consécutivement dans cinq zones de gouvernement local sélectionnées à dessein dans l'État d'Ogun, dans le sud-ouest du Nigéria. Un questionnaire pré-testé de 30 éléments, explorant les données sociodémographiques des participants, leurs connaissances et leur pratique de la vaccination, leur a été administré sur leurs lieux de travail respectifs. Le test du chi-carré a été utilisé pour déterminer les associations entre les données sociodémographiques des répondants et les variables catégorielles d'intérêt. Une valeur $p < 0,05$ a été considérée comme significative.

Résultats : Sur les 180 exemplaires du questionnaire distribués, 145 (80,6%) ont été récupérés et analysés. Près de la moitié des personnes interrogées (71 ; 49,0%) étaient âgés de moins de 30 ans (âge moyen =35,43+0,28 ans), 106 (73,1%) ont évalué leur participation à la distribution de la brochure de vaccination comme étant <20%, 127 (87,6%) savaient que les personnes âgées avaient besoin d'être vaccinées mais beaucoup (104 ; 71,7%) n'ont pas pu donner de raisons. Il n'y avait pas d'association significative entre la durée d'exercice et la participation des pharmaciens au comité consultatif sur la vaccination ($p= 0,196$).

Conclusion : Une proportion appréciable de pharmaciens de l'État d'Ogun avaient des connaissances inadéquates et ne participaient pas de manière optimale aux activités de vaccination.

Mots-clés : pharmacien, vaccination, personnes âgées, santé, intervention

INTRODUCTION

Immunization is a cornerstone of public health interventions towards the reduction and elimination of vaccine-preventable infectious diseases and their complications.[1,2] Despite the significant stride in the development of vaccines for many of the infectious diseases, many countries are still burdened by infectious diseases, including measles, diphtheria and of recent Covid-19, resulting in significant mortality and morbidity among the various segments of the population.[3,4] This is partly as a result of low immunization coverage and the hesitancy to immunization by the public.[5,6] Globally, adult immunization is rare in medical care and many health workers may not bother to inform their clients about needed vaccines to prevent certain diseases thereby resulting in frequent medical visits and premature death.[7]

To improve immunization coverage, strategies including the inclusion of non-traditional vaccine providers such as pharmacists have been suggested.[8] The American Centre for Disease Control and Prevention (CDC) recommends that pharmacists' role be expanded to include the storage and administration of vaccines to widen the providers' base.[9] Pharmacists, due to their presence in a large number of communities, can provide a bridge towards covering the hard-to-reach populations. They can also disseminate information on immunizations, given that they are a principal counsel for many patients.[10,11] Evidence has shown that pharmacists' counselling of clients on immunization can assist to reduce vaccine hesitancy among individuals, thus improving the coverage.[12] Pharmacists are, therefore, well-positioned to work with other healthcare providers in designing and implementing strategies to achieve immunization targets.[8] However, several challenges that militate against the involvement of pharmacists in immunization have been identified. These include lack of adequate training on the Adverse Effect Following Immunization (AEFI), time constraints on the part of pharmacists, resistance on the part of other healthcare providers and the public lack of awareness of the potential contribution pharmacists can provide in immunization.[13-15]

In Nigeria, despite the National Programme on Immunization (NPI) project, the immunization coverage is still low and vaccine equity is still a mirage. According to the World Health Organization, 50% of the global under-five mortality in 2019 occurred in Nigeria, India, Pakistan, the Democratic Republic of the Congo and Ethiopia with Nigeria and India alone accounting for almost one-third of all deaths.[16] Even the marginal achievement recorded through the NPI is difficult to sustain due to low uptake by the public as a result of lack of awareness of the benefits, misinformation, long waiting time, inaccessible immunization centres, poor remuneration of the immunization providers and poor cold-chain management.[17,18]

In Nigeria, pharmacists cannot administer vaccines except few like oral polio that do not require licensure, but they can store and dispense it. There has been a clamour for the recognition of pharmacists' clinical role in immunization projects in Nigeria. However, there is a dearth of information about pharmacists' knowledge, challenges and practices of immunization in the country. This study aimed at evaluating pharmacists' knowledge and practices regarding immunization in Nigeria.

METHODS

Study design

This study was a descriptive quantitative cross-sectional survey among consecutively sampled pharmacists in purposively selected five local government areas (LGAs) in Ogun State, Southwest, Nigeria. Hard copies of a 30-item questionnaire were administered to the participants in their respective places of work between the 2nd of March and 15th May, 2021.

Setting

Ogun state is one of the southwestern states in Nigeria. The state has twenty LGAs. The study sites included Sagamu, Ijebu ode, Ijebu North, Ijebu East and Abeokuta South LGAs. These LGAs were selected because they are among the most populous LGAs in the state, with a large concentration of pharmacists.

Study population

This study included consecutively sampled pharmacists practising either part-time or full time in a clinical pharmacy setting (hospital or community pharmacy) across the selected five local governments of the State. Pharmacists that were unavailable at their practice sites in the local governments and those on compulsory National Youth Service Corps at the time of the study were excluded.

Sample size estimation:

The sample size was estimated using the formulae previously described.[19]

$$n = \frac{Z_{1-\alpha/2}^2 P(1-P)}{d2}$$

Where n = sample size, Z = Standard normal variate, P = expected prevalence or proportion and d = precision.

In the calculation, the following were used; Z = 1.96, P = 0.5 and d = 0.05.

Therefore;

$$n = 384.16 \sim 384$$

$$nf = \frac{n}{1+\frac{n}{N}}$$

where N= (Pharmacists population in the 5 selected LGAs =198) Sample size = 130.6 approx=131.

With additional 10% for attrition rate=144

Instrument

A 30-item self-administered questionnaire was adapted from previous studies.[14,15,20] The questionnaire was validated by an academic who was not part of the study and pre-tested among five pharmacists at the Olabisi Onabanjo University Teaching Hospital who were subsequently excluded from the main study. The outcome of the pre-test was used to rephrase some perceived ambiguous questions. The final draft of the questionnaire was sectioned into three. Section A comprised nine questions that evaluated the socio-demographics of the participants. Section B used seven open-ended and optional questions to evaluate the knowledge of the participants while section C evaluated the pharmacists' practice with 10 questions. Four questions in section D evaluated the participants' perceptions regarding immunization in Ogun state using a 5-point Likert scale "strongly agree" to strongly disagree. The final questionnaire was administered to the participants in their places of work at the selected LGAs.

Data analysis

Data were summarized using frequencies and percentages. Chi-square test or Fisher's exact test (as appropriate) was used to determine associations between respondents' socio-demographics and categorical variables of interest. A p-value < 0.05 was considered significant.

Ethics approval

Approval for the study was sought and obtained from the Ethics committee of the Federal Medical Centre, Abeokuta. Protocol number: FMCA/470/HREC/01/2020/05.

RESULTS

Of the 180 copies of the questionnaires distributed, 162 (90.0%) were retrieved but 145 (80.6%) were analysed. The remaining 17 (9.4%) were excluded due to missing demographic information. Table 1 shows the demographic characteristics of the respondents. Many of the respondents (71; 49.0%) were aged < 30 years (mean age =35.43±0.28 years), female (75; 51.7%) and had a BPharm degree (98; 67.6%)

Table 1: The socio-demographic characteristics of respondents

Variable	Group	Frequency	percentage
Age	<30 years	71	49.0
	30-40years	40	27.6
	41-50 years	21	14.5
	>50 years	13	9.0
Gender	Male	70	48.3
	Female	75	51.7
Marital status	Single	66	45.5
	Married	79	54.5
Highest qualification	BPharm-	98	67.6
	Pharm D	8	5.5
	MSc	36	24.8
	Postgraduate fellowship	2	1.4
	PhD	1	0.7
Length of practice	0-5 years	79	54.5
	6-10 years	35	24.1
	11-15 years	17	11.7
	>15 years	14	9.7
Area of practice	Community	57	39.3
	Hospital	88	60.7

Figure 1 depicts the frequency of respondents' involvement in immunization activities. Majority 106 (73.1%) rated their participation in the distribution of immunization leaflet as <20% while 69 (47.6%) engaged in the verification of their clients' immunization status in <20% of cases.

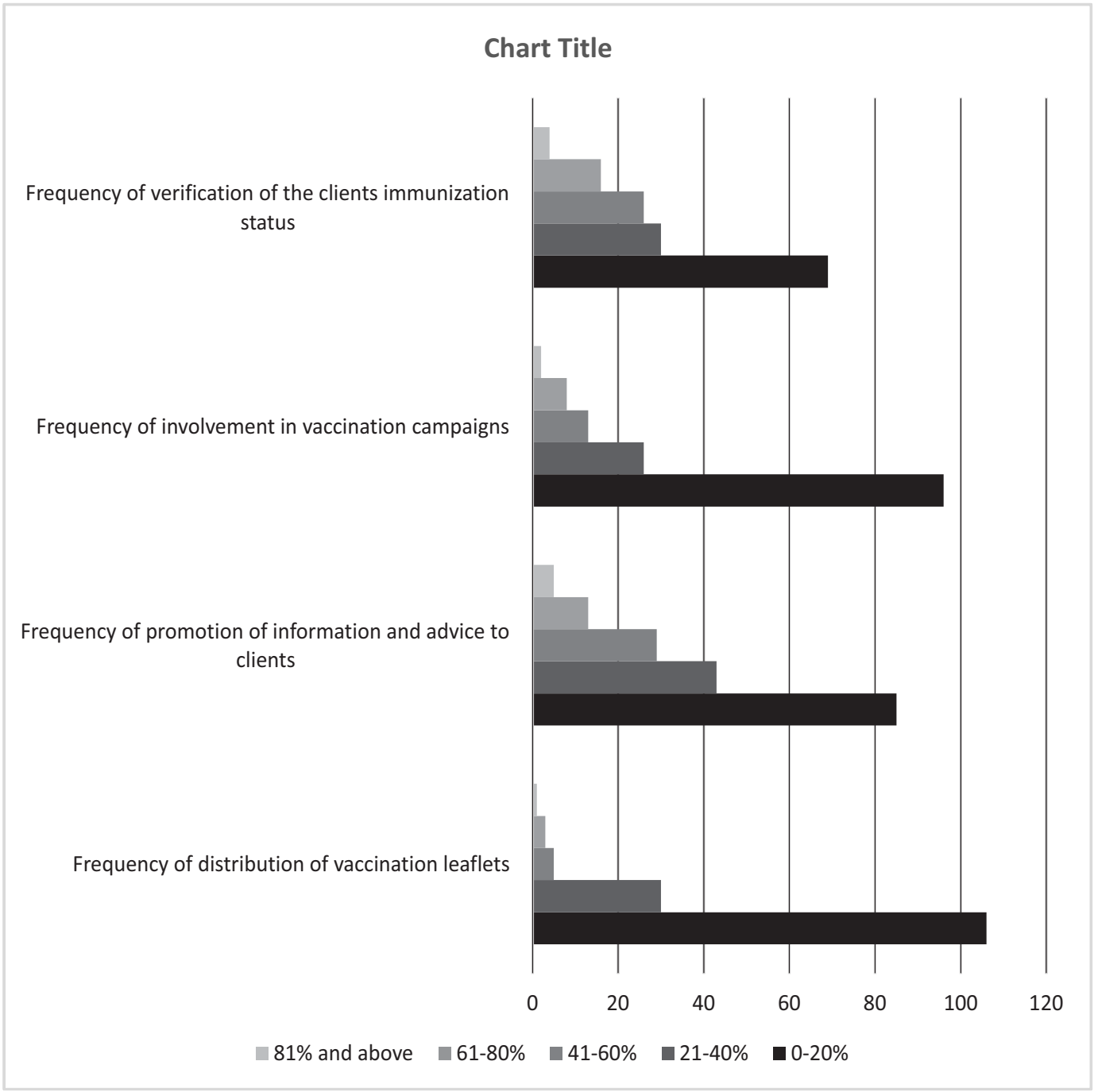

Figure 1: Frequency of pharmacists' involvement in immunization activities

Tables 2 shows the respondents' knowledge about immunization. The majority (127; 87.6%) knew that the aged require immunization but could not give reasons (104;71.7%).

Table 2: The respondents' knowledge about immunization

Variable	Frequency	Percentage (%)
The aged require immunization		
Yes	127	87.6
No	18	12.4
Reasons the aged need immunization		
No response	104	71.7
Weak Immune system	12	8.3
Susceptibility to infection	10	6.9
Adequate disease outbreak control	4	2.8
Immunization given at birth no longer effective	6	4.1
Not being vaccinated as a child	5	3.4
Protection against infection	4	2.8
Types of Vaccine given to the aged		
COVID-19 vaccine	19	13.1
Pneumococcal vaccine	33	22.8
Influenza	37	25.5
Zoster vaccine	22	15.2
Tdap vaccine	88	60.7
No response	2	1.4
Immunization record keeping duration		
Forever	41	28.3
5 years	40	27.6
10 years	10	6.9
15 years	54	37.2
Storage of vaccines		
Refrigeration	90	62.1
Cold chain	50	34.5
According to NAFDAC guidelines	2	1.4
Ice packs	1	0.7
Others	2	1.4
Vaccine disposal		
Incinerate in a non-residential area	7	4.8
Burying underground	12	8.3
Incineration	78	53.8
Return back to manufacturer	11	7.6
According to NAFDAC guidelines	10	6.9
Dispose in a sharp box	1	0.7
Waste bin	2	1.4
Burning	24	16.6
Immunization details that should be recorded *		
Date	54	37.2
Name of Patient	106	73.1
Dose	103	71.0
Route of administration	12	8.3
Type of vaccine	111	76.6
Name and signature of administrator	27	18.6
Name of healthcare facility where the vaccine was administered	29	20.0
Others	7	4.8

*the number may not add up to 145 because respondents' provided more than one answer.

The respondents (145;100.0%) claimed not to have administered vaccines while only a few (3;2.1%) promoted immunizations among all categories of their clients (Table 3).

Table 3: The respondents' practice regarding immunization

Variable	Frequency	Percentage (%)
Do you administer vaccines in the pharmacy		
Yes	0	0.0
No	145	100
Do you dispense vaccines in the pharmacy		
Yes	91	62.8
No	54	37.2
Do you promote immunization among your client		
Yes	137	94.5
No	8	5.5
For which group do you promote immunization?		
Infant only	24	16.6
Children only	40	27.6
Adult only	6	4.1
Aged only	2	1.4
Infant and Children	18	12.4
Infant and Adult	1	0.7
Infant and Aged	1	0.7
Children and Adult	16	11.0
Adult and Aged	1	0.7
Infant, Children and Adult	25	17.2
Children, Adult and Aged	8	5.5
All of the above	3	2.1
Have you ever served on any immunization advisory committee?		
Yes	9	6.2
No	136	93.8
Do you identify adverse events after immunization?		
Yes	70	48.3
No	75	51.7

Table 4 shows the respondents' perceptions about pharmacists' engagement in immunization. Majority of the respondents (107; 60.0%) strongly disagreed or disagreed that pharmacists should give immunization only in an emergency while marginally half (73;50.4%) strongly agreed or agreed that pharmacist basic knowledge is enough to administer vaccines. Inadequate inter-professionalism among healthcare workers (25; 17.2%) and lack of required knowledge and training (24; 16.6%) were perceived to be the most important challenges facing pharmacists' engagement in immunization.

Table 4: The respondents' perception about engagement in immunization

Variable	Frequency	Percentage (%)
Pharmacists should give immunization only in an emergency or disaster		
Strongly agree	15	10.3
Agree	26	17.9
Neutral	17	11.7
Disagree	57	39.3
Strongly disagree	30	20.7
Pharmacists basic knowledge is enough to administer vaccines		
Strongly agree	14	9.7
Agree	59	40.7
Neutral	23	15.9
Disagree	40	27.6
Strongly disagree	9	6.2
Pharmacists should have access to clients immunization record		
Strongly agree	70	48.3
Agree	67	46.2
Neutral	7	4.8
Disagree	1	0.7
Strongly disagree	2	1.4
Pharmacists should be remunerated for immunization		
Strongly agree	70	48.3
Agree	43	29.7
Neutral	28	19.3
Disagree	2	1.4
Strongly disagree	70	48.3
Challenges faced by pharmacists in adopting immunization role		
Lack of adequate storage	10	6.9
Lack of adequate power supply	2	1.4
Unavailability of vaccines in the pharmacy	4	2.8
Inadequate knowledge and training	24	16.6
Inadequate inter-professionalism among healthcare workers	25	17.2
Lack of authorization for pharmacists to administer vaccines	4	2.8
Too cumbersome with little remuneration	5	3.4
Non-cooperation from patients/ clients	7	4.8
Poor funding from government	3	2.1
No response	61	42.1

Marginally half of the respondents (75; 51.7%) had never served on the immunization advisory committee. There was no significant association between the length of practice and pharmacists' engagement on the immunization advisory committee ($p = 0.196$).

Table 5: Association between respondents' length of practice and immunization knowledge, and practice

Question	0-5yrs n (%)	6-10yrs n (%)	11-15yrs n (%)	>15yrs n (%)	Chi-square p value
Do you dispense vaccines in your pharmacy					
Yes	49 (33.8)	23(15.7)	11(7.6)	8(5.5)	
No	30 (20.7)	12(8.3%)	6 (4.1)	6 (4.1)	0.947
Do you promote immunizations among your clients					
Yes	73(50.3)	34(23.4)	17 (11.7)	13(9.0)	
No	6 (4.1)	1(0.7)	0(0.0)	1(0.7)	0.533*
Have you ever serve on the immunization advisory committee?					
Yes	32(22.1)	19(13.1)	11(7.6)	8(5.5)	
No	47(32.4)	16(11.0)	6(4.1)	6(4.1)	0.196
Do you identify adverse events after immunization?					
Yes	67(46.2)	32(22.1)	1(0.7)	12(8.3)	
No	12(8.3)	3(2.1)	16(11.0)	2(1.4)	0.626*

*Fisher's exact

DISCUSSION

Immunization is an important public health intervention to prevent many infectious diseases. This study aimed to evaluate the extent of pharmacists' knowledge and involvement in immunization in Nigeria. The finding of the study indicates inadequate knowledge and sub-optimal practice of immunization among pharmacists in Ogun State.

Inadequate knowledge of healthcare providers regarding vaccine indications, storage and side effects can negatively impact on immunization uptake.[21] It is therefore essential that healthcare providers including pharmacists are up-to-date in knowledge. In this study, although most of the participants were aware that the aged require immunization like the younger population but many could not provide reasons for immunization need in the older group. This knowledge deficit, although surprising maybe because adult immunizations are rare in clinical practice in Nigeria and may not have been given the seriousness it deserves in the country's pharmacy curriculum. Practical sessions on immunization should be incorporated into the undergraduate pharmacy training curriculum. The aged require immunization due to declining immunity and waning of the previous immunization.[22] Pharmacists' adequate knowledge of immunization is vital because clients often regard their opinions and counsel as reliable and trustworthy.[23] Improved training of Nigerian pharmacists on immunization is advocated.

In this study, many of the respondents indicated that vaccines should be stored in the refrigerators as against the fewer pharmacists that indicated cold chain as the appropriate storage facilities. The emphasis should be on cold chain and not refrigeration which many have misconstrued to be storage in a fridge at temperatures which may or may not be appropriate for vaccine storage. Aside, Refrigeration is just a part of cold chain, certain vaccines may need to be stored in freezers. This distinction should be made clear in any training involving pharmacists. Maintenance of vaccines cold-chain has always been a challenge in the developing countries[11] and this is an area where pharmacists are in a good position to establish their professional relevance.

Less than one-third of the respondents in this study correctly answered the question on the duration of vaccine record keeping. Vaccine records are expected to be kept permanently forever and given to the clients/guardians.[24] This is rarely the case in Nigeria because of the poor health care system. Also, importantly, monthly reports of immunization should be submitted to the appropriate authorities for compilation.

Community pharmacies will need to be equipped with suitable facilities for massive immunization campaigns such as during epidemics and routine immunization. Pharmacists may require additional training on the proper management of vaccine records if their engagements in immunization are to be meaningful.

Majority of the respondents in this study were not involved in immunization leaflet distribution and campaigns for immunization. This observation is similar to a previous report in Lagos; another state of the Federation.[20] The result of the present study may be because community pharmacies have not been integrated into the NPI in Nigeria. During immunization programmes, leaflets are distributed to primary health care centres and private nursing homes while community and hospital pharmacies are rarely considered.

None of the participants in this study had ever administered vaccines while the majority had never served on any immunization advisory committee. This is indeed worrisome. The non-recognition of clinical role of pharmacists in immunization projects in Nigeria is tantamount to denying the public, the expertise of this essential health workforce, and may have been contributing to the low vaccine coverage in the country.[4,8, 9,11] The health law in Nigeria did not permit pharmacists to administer vaccines, contrary to what has been canvassed by various global health authorities and obtainable in many developed countries including the United States of America and Canada.[9,25] Pharmacists are knowledgeable, good communicators and trustworthy professionals that are accessible to the public.[11] These attributes of pharmacists should be explored by Nigeria to improve accessibility to vaccines and improve coverage.

Almost half of the respondents strongly disagreed or disagreed that pharmacists basic knowledge is enough to administer vaccines and many considered this as one of the most important challenges facing pharmacists' involvement in immunization. This opinion of the respondents is in tandem with their responses to some knowledge questions in this study. It is also in line with previous study among Italian,[10] Canadian,[13] and Nigerian community pharmacists.[15] This knowledge gap can be bridged by training workshops and continuous professional education and training on immunization for pharmacists.

Majority of the respondents in this study strongly agreed or agreed that pharmacists should be renumerated for immunization. This is similar to the reports among Canadian pharmacists.[13,25] This study, however, noted that only very few of the respondents considered remuneration as an important challenge militating against effective pharmacists' engagement in immunization. This may be an indication that pharmacists are willing to provide immunization services with little incentives given the right environment. The recognition of community pharmacists as primary healthcare providers may serve as an impetus for their engagement in immunization

In this study, inadequate interprofessional collaboration was considered as the most important singular factor militating against the involvement of Nigerian pharmacists in immunization. This result contradicts the observation of a similar study among community pharmacists in Canada that reported full acceptance of pharmacists' immunization roles by other healthcare providers.[25] The health sector in Nigeria is bedeviled with professional rivalry. It is a serious factor militating against efficient health care delivery to the Nigerian public.[26] However, it should be noted that this is the pharmacists' view and other healthcare workers may have a different perception.

This study highlighted the knowledge, practice and challenges of pharmacists in Ogun State regarding immunization in Nigeria. The finding of this study may be useful in designing appropriate interventions for pharmacists' engagement in immunization to improve vaccine coverage in the country. This study, however, is limited by the sample size. The consecutive sampling adopted in the study may have introduced bias into the study. The study did not evaluate the respondents' knowledge of the adverse effects following immunization. The findings of this study should, therefore, be interpreted in the context of these limitations. Future studies should explore patients' acceptability and willingness to assess immunization services from pharmacists especially the community pharmacists.

CONCLUSION

Many pharmacists in Ogun State had inadequate knowledge and engaged sub-optimally in immunization activities. Inadequate inter-professional collaboration between pharmacists and other healthcare workers was perceived as an important obstacle towards pharmacists' engagement in immunization in Nigeria. More emphasis should be placed on vaccine related topics in the curriculum for the training of pharmacists in Nigeria.

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