Original Article

Assessment of the knowledge, practice, and barriers of physicians in Lagos about respiratory diseases preventable vaccines

Oluwafemi Tunde Ojo[1,2], Olufunke Olayinka Adeyeye[1,2], Temitope V. Fapohunda[2]

[1]Department of Medicine, Lagos State University College of Medicine, [2]Department of Medicine, Lagos State University Teaching Hospital, Lagos, Nigeria.

*Corresponding author:
Oluwafemi Tunde Ojo,
Department of Medicine, Lagos
State University College of
Medicine, Lagos, Nigeria.

ojofemi911@yahoo.com

ABSTRACT

Objectives: Immunizations are indicated in a wide range of clinical situations. There are gaps in the implementation of the acceptable recommended guidelines on adult immunization in Nigeria. This study aims to evaluate the perceptions, practices, and barriers of physicians in recommending adult vaccines.

Materials and Methods: A descriptive cross-sectional study was conducted using an anonymous, self-administered survey to understand the perceptions, practice, and barriers to adult vaccine recommendations among adult physicians in Lagos.

Results: Ninety-seven physicians completed the questionnaire with male-to-female ratio of 1:1.3. The mean age of the responders was 39.54 ± 6.2. The proportion with overall good knowledge was 40 (41.2%). The vaccines routinely recommended include: Pneumococcal conjugate vaccine 73 (81.1%), COVID-19 vaccine 70 (77.8%), and influenza vaccine 57 (63.3%), respectively. The common barriers for vaccine recommendation include: Unavailability 53 (54.6%), poor reminder systems, 43 (44.3%), inadequate insurance coverage 33 (34%), and vaccine shortage 31 (32%). There was a significant association between the knowledge of physicians and sociodemographics, including age (χ^2 = 6.548, P = 0.038), duration of practice (χ^2 = 7.761, P = 0.039), type of specialist training (χ^2 = 3.860, P = 0.049), as well as specialty (χ^2 = 11.282, P = 0.004).

Conclusion: This study suggests that the knowledge of physicians regarding adult vaccinnations is below average. Most recommended adult respiratory disease preventable vaccines are pneumococcal conjugate, influenza, and COVID-19 vaccines. The major barriers to vaccination include availability and cost. The implication of this finding is the need to increase awareness about vaccine utilization as well as access among physicians in Lagos and Nigeria at large if the narrative must change.

Keywords: Adult immunization, Respiratory vaccination, Pneumococcal, Influenza, Vaccine barriers

INTRODUCTION

Elderly people and adults with chronic diseases or compromised immune status are at increased risk of respiratory infections, with pneumonia being the most common serious presentation and a significant cause of morbidity and mortality.[1] Most European countries, as well as North American Countries, have well-established recommendations for adult vaccination, but this seems to be less popular or at best an evolving development in Africa.[1,2] The commonly recommended adult

respiratory disease preventable vaccines include pneumococcal, influenza, HIB (Haemophilus influenza type B), and most recently COVID-19 vaccine.[2] The recommendations for most of these vaccines in Nigeria for adults are based on international guidelines and expert opinion locally.[3,4]

Childhood vaccination coverage in Nigeria has significantly improved in the past two decades, averting millions of deaths per year.[5,6] However, adult vaccination coverage remains poor.

The Nigerian government funds childhood vaccination, while the adult vaccine except that for COVID-19 is largely funded out of pocket and not covered by the government initiatives.

Several studies have evaluated factors affecting vaccine coverage. Logan *et al.*, in a study in the United States of America, noted that many groups in the United States are to yet benefit from potentially life-saving influenza vaccination due to cost, insurance status, language differences, underestimation of personal risk, misunderstanding of vaccination risks, and mistrust toward the health-care system.[7] Al Awaidy *et al.* also noted that despite existing policies, influenza vaccination coverage remains far below the WHO recommendations in the Middle East and Northern Africa as a result of decreased awareness and effective implementation of policies with the collaboration of stakeholders.[8] Vaccine coverage may also be affected by the recommendations of the healthcare providers, even in patients with a negative attitude toward vaccination.[9-11] The level of awareness and knowledge of physicians may also affect the recommendation of these vaccines. Vora and Shaikh reported that 3.97%, 53.08%, and 42.95% of physicians had high, medium, and low levels of awareness about influenza vaccination, respectively, in India in a multicenter cross-sectional survey.[12]

There are gaps in the adequate recommendation of adult immunization in Africa. We hypothesized that the barriers to adult vaccination in Africa are multifactorial and include access to vaccine availability, cost, and lack of adequate recommendations by healthcare professionals.

This study aimed to evaluate the perceptions, practice, and barriers of the physician in recommending adult vaccines. This will help to highlight some of the major challenges affecting adult vaccine coverage and will be useful in guiding the focus of intervention by policymakers and stakeholders at the state and national levels on how best to improve the adult vaccine coverage.

MATERIALS AND METHODS

Study design

This was a descriptive study. We designed an anonymous, self-administered survey to understand the knowledge, practice, and barriers to adult vaccine recommendations among adult physicians in Lagos.

Study setting

This study was conducted among physicians practicing in government and private hospitals in Lagos. Lagos is a metropolitan city of about 25,000,000 people with two teaching hospitals (Lagos University Teaching Hospital, and Lagos State University Teaching Hospital, [LASUTH]), one Federal Medical Center (Ebute-Metta), about 26 general hospitals, and over 3000 estimated private hospitals.

Study population

The targeted group was practicing physicians most likely to be involved in the provision of adult vaccinations. Hence, family physicians, community health physicians, and internal medicine subspecialists including the consultants and residents were selected for convenient sampling. Participants were selected from the provider list provided by the Nigerian Medical Association, Lagos state branch. This list contains information on more than 200 physicians.

Inclusion criteria

The following criteria were included in the study:
- Consultants in internal medicine, community medicine, and family medicine practicing in Lagos.
- Residents in internal medicine, community medicine, and family medicine practicing in Lagos.

Exclusion criteria

Non-physicians and general practitioners were excluded from the study.

Sample size

The minimum sample size of 90 for this study was calculated using the formula for finite population size. The significant level was set to 0.05, the standard normal variate of 1.96 (at 95% confidence level), the precision of 5%, and prevalence were taken as 54% of physicians with good knowledge of vaccine from the previous study. The targeted sample size was achieved between December 2021 and January 2022.

Bias

This was minimized by making the survey anonymous, avoiding leading questions in the questionnaire, including multiple questions to assess each domain, and including specific questions in the questionnaire.

Data collection

We developed the questionnaire with Center for Disease Control and Prevention (CDC) recommendations and documents on

experts' opinions about vaccination in Nigeria. Inputs were also taken from other previously developed questions incorporating knowledge from existing publications on adult vaccines including influenza, pneumococcal, and HIB vaccination practices.[3,4,13] The questionnaire was divided into four sections to assess the following: Sociodemographics, knowledge of physicians about the vaccine, how often a physician recommended the adult vaccine, and barriers to recommending the vaccines. House officers in LASUTH were pretested for the survey.

The questionnaire was developed with Google form and sent to the participating doctors through WhatsApp. The message was sent up to 3 times to serve as a reminder.

Data analysis

Descriptive statistics were generated with frequencies and percentages for binary variables, and the mean was generated for continuous variables. There were 27 questions assessing the knowledge of physicians on the vaccine. This was divided into three domains (types of vaccine, indication for vaccination, and guidelines). Each correct question was scored as 1. The total score was then calculated. The maximum score was 27 and the minimum score was 0. A total score of 17 (60%) and above were categorized as a good score. There were 25 questions used to assess different barriers. These barrier responses assessed issues around access, availability, cost, safety, efficacy, education, and other factors with about 2–4 questions asked on each category. A probability value of <0.05 was considered to be statistically significant.

Ethical approval and consent

The study was reviewed by the ethical board of Lagos State University Teaching with approval number-LREC/06/10/1728. Informed consent was obtained among participants. Confidentiality was maintained as participants' names were not included in the questionnaire.

RESULTS

The sociodemographic characteristics of the participants are shown in [Table 1]. Ninety-seven (97) physicians completed the questionnaire. Most of the respondents were consultants 54 (55.7%). The mean age of the respondents was 39.54 ± 6.2. Most physicians were female (55:56.7%), in the age group ages 36–45 (59:60.8%), internal medicine physicians (58:59.8%), and practicing in tertiary public (75:77.3%) hospitals and have practiced for 10–14 years (37:38.1%).

Knowledge about types of vaccines, indications for vaccination, and the guidelines

[Table 2] summarizes the knowledge regarding immunizations in general.

Table 1: Sociodemographic characteristics of participants.

Variable	Frequency (*n*=97)	Percentage
Age group (Years)		
≤35	24	24.7
36–45	59	60.8
>45	14	14.4
Mean±SD	39.54±6.2	
Gender		
Male	42	43.3
Female	55	56.7
Duration of practice as a medical practitioner (Years)		
<10	23	23.7
10–14	37	38.1
15–19	24	24.7
≥20	13	13.4
Type of specialist training		
Fellow	54	55.7
Resident	43	44.3
Area of specialization		
Family medicine	27	27.8
Internal medicine	58	59.8
Public health	12	
Type of practice		
Military	5	5.2
Public	75	77.3
Private	14	144
NGO	3	3.1
Level of healthcare service		
Primary	5	5.2
Secondary	8	8.2
Tertiary	84	86.8

The overall good knowledge was 40 (41.2%). Physicians were aware of the need to prescribe influenza 83 (85.6%), pneumococcal conjugate 89 (91.2%), pneumococcal polysaccharide 89 (91.2%), HIB 65 (67%), COVID 77 (79.4%), and BCG 77 (73.2%) vaccines. About 68 (70.1%) physicians were aware of recommended guidelines for respiratory disease preventable vaccines. Only 32 (33%) physicians were aware of Nigerian guidelines on adult vaccination. The most commonly used guidelines were CDC 39 (57.4%) and WHO 49 (72.1%).

Mostly, physicians believed vaccines were important for protecting the health of patients with the following conditions: Chronic lung diseases 84 (86.6%), age>65 81 (83.5%), close contact with someone at high risk 59 (60.8%), COPD 80 (82.5%), asthma 55 (56.7%), and asplenia 76 (78.4%).

Practice and vaccine recommendations

The most common vaccines routinely recommended were pneumococcal conjugate 73 (81.1%), COVID-70 (77.8%), and influenza 57 (63.3%), respectively. The least recommended

vaccine was pneumococcal polysaccharide vaccine 30 (33.3%). This is shown in [Table 2].

Table 2: Knowledge of adult vaccination.

	Frequency (*n*=97)	Percentage
*Awareness of the need to prescribe vaccination for following respiratory disease		
Influenza	83	85.6
Pneumococcal conjugate	89	91.2
Pneumococcal polysaccharide	65	67.0
HIB	77	79.4
COVID	88	90.7
BCG	71	73.2
Awareness of any adult vaccination guidelines regarding respiratory disease		
Yes	68	70.1
No	29	29.9
Known guideline		
CDC	39	57.4
WHO	49	72.1
ATS	5	7.4
ERS	6	8.8
NICE	32	47.1
Awareness of any Nigeria guidelines on adult vaccination		
Yes	32	33.0
No	66	67.0
Vaccine Recommendation		
Pneumococcal conjugate	73	81.1
Pneumococcal polysaccharide	30	33.3
Influenza	57	63.3
COVID	70	77.8
HIB	38	42.2
BCG	48	53.3
*Condition adult vaccination is recommended		
Aged<50	24	24.7
Aged>65 years	81	83.5
Chronic lung disease	84	86.6
Diabetes mellitus	58	59.8
Heart disease	59	60.8
Chronic liver disease	45	46.4
Chronic kidney disease	58	59.8
Weak immune system	70	72.2
Radiation/chemotherapy	50	51.5
Asplenia	76	78.4
Complications or risk from other illness	42	43.3
Smoker	46	47.4
Close contact with someone at high risk	59	60.8
COPD	80	82.5
ASTHMA	55	56.7

*Multiple responses

Barriers

In [Table 3], the common barriers in recommending adult vaccines include: unavailability 53 (54.6%), poor reminder systems 43 (44.3%), high cost for patients 43 (44.3%), inadequate insurance coverage 33 (34%), vaccine shortage 31 (32%), and side effects concerns 27 (27.8%).

Relationship between knowledge and sociodemographic characteristics

In [Table 4], there was a significant association between the knowledge of physicians and sociodemographics including age (χ^2 = 6.548, *P* = 0.038), duration of practice (χ^2 = 7.761, *P* = 0.039), type of specialist training (χ^2 = 3.860, *P* = 0.049), as well as specialty (χ^2 = 11.282, *P* = 0.004). This implies that better knowledge was demonstrated by internal physicians, older physicians, and physicians with longer years of practice.

Table 3: Barriers and limitations encountered by the physician in recommending the vaccines.

Variable	Frequency	Percentage
Vaccines are usually not easily available	53	54.6
No effective reminder system	43	44.3
Costly and not affordable to most patient	43	44.3
Inadequate insurance coverage	33	34.0
Vaccine too expensive	33	34.0
Vaccine shortage	31	32.0
Concern about side effects	27	27.8
Not enough time in-office visit to discuss it	22	22.7
Unaware of the vaccination schedule	16	16.5
Don't know where the patient can access them since my practice doesn't have them	15	15.5
Limited information about the benefit	12	12.4
Not going to the same physician regularly	11	
Not receiving a physician's recommendation	10	10.3
Not aware of the need	7	7.2
Could worsen current conditions	7	7.2
Confused about the recommended vaccination schedule	7	7.2
Think won't work if sick	4	4.1
Think only of elderly	4	4.1
Could interact with current medications	3	3.1
Fear of needles by patients	1	1.0
Think healthy people don't need it	1	1.0
Believe lifetime protection from childhood vaccines	1	1.0
Think it's ineffective	1	1.0
Lack of knowledge about illness prevention	0	0.0

Table 4: Association between knowledge of adult vaccination and sociodemographic characteristics.

	Good (*n*=40)	Poor (*n*=57)	χ^2	*P*-value
Age group (Years)				
≤35	5 (20.8)	19 (79.2)	6.548	**0.038***
36–45	30 (50.8)	29 (49.2)		
>45	5 (35.7)	9 (64.3)		
Gender				
Male	21 (50.0)	21 (50.0)	2.347	0.126
Female	19 (34.5)	36 (65.5)		
Duration of practice as a medical practitioner (Years)				
<10	4 (17.4)	19 (82.6)	7.761	**0.039***
10–14	19 (51.4)	18 (38.6)		
15–19	12 (50.0)	12 (50.0)		
≥20	5 (38.5)	8 (61.5)		
Type of specialist training				
Fellow	27 (50.0)	27 (50.0)	3.860	**0.049***
Resident	13 (30.2)	30 (69.8)		
Area of specialization				
Family medicine	16 (59.3)	11 (40.7)	11.282	**0.004***
Internal medicine	16 (27.6)	42 (72.4)		
Public health	8 (66.7)	43 (33.3)		
Type of practice				
Military	4 (80.0)	1 (20.0)	3.401	0.334
Public	30 (40.0)	45 (60.0)		
Private	5 (35.7)	2 (64.3)		
NGO	1 (33.3)	2 (66.7)		
Level of healthcare service				
Primary	2 (40.0)	3 (60.0)	0.277	0.871
Secondary	4 (50.0)	4 (50.0)		
Tertiary	34 (40.5)	50 (59.5)		

* Significant association with p value<0.05

On multivariate regression, being an internal medicine specialist was a significant predictor of poor knowledge of adult respiratory disease preventable vaccines (OR: 0.0886, 95% CI: 1.596–14.492, *P* = 0.005) in [Table 5].

DISCUSSION

The CDC recommends immunization schedules for children, adolescents, and adults.[14] The recommendations are available to both healthcare professionals and the general public. Although the Nigerian childhood immunization program has been very successful, the same level of success has not been achieved in adults.[15-17] This study evaluated the knowledge, practice, and barriers of a physician in recommending adult vaccines. We found that the knowledge of physicians about respiratory disease preventable vaccines was below average. However, physicians who had completed their training have better knowledge compared to the resident doctors in training. Internal medicine physicians reported better knowledge about the vaccine compared to other physicians. Most physicians recommend vaccines for patients with chronic lung diseases. About two-thirds of

physicians recommended the common vaccines including pneumococcal and influenza vaccines. The common barriers in recommending vaccines were unavailability, poor reminder systems, high cost of vaccines, inadequate insurance coverage, vaccine shortage, and side effects concerns.

The average knowledge of physicians about respiratory disease preventable vaccines found in this study is similar to reports from previous studies. Amin *et al.* reported that the overall knowledge of physicians about influenza and pneumococcal vaccines was inadequate in Saudi Arabia.[18] James *et al.* in Sierra leone examined the knowledge of health workers and reported that close to half, 321 (46.0%) of healthcare workers were not aware of the influenza immunization guidelines published by the Advisory Committee on Immunization Practices and Centre for Disease Control.[19] Physicians who had completed their training have better knowledge compared to the residents. This is similar to the report of Evren *et al.* who noted a higher knowledge of pneumococcal vaccine among 76.1% of physicians in Cyprus compared to GP.[20] Furthermore, in this study, Internal Medicine physicians reported better knowledge about the vaccines

Table 5: Binary logistic regression showing independent predictor of poor knowledge of adult respiratory vaccines.

	Odd ratio (Adjusted)	95% CI	*P*-value
Age group (Years)			
≤35	1		
36–45	0.400	0.081–1.973	0.260
>45	1.050	0.106–10.388	0.967
Duration of practice as a medical practitioner (Years)			
<10	1		
10–14	0.273	0.052–1.453	0.128
15–19	0.388	0.057–2.655	0.334
≥20	0.211	0.020–2.260	0.199
Type of specialist training			
Fellow	1		
Resident	1.733	0.211–2.542	0.624
Area of specialization			
Family medicine	1		
Internal medicine	4.810	1.596–14.492	**0.005***
Public health	0.886	0.196–4.012	0.875

Significant association with p value<0.05

compared to other physicians. This finding is similar to the report from a multicenter cross-sectional study in India, where the level of knowledge about different types of adult respiratory disease preventable vaccines varies among doctors based on specialties, and regional location.[12]

Most physicians recommended vaccines for patients with chronic lung diseases, ages >65, close contact with someone at high risk, asplenia, and weak immune systems. Satman *et al.* reported physicians' recommendations of influenza and pneumococcal vaccinations up to 87.9% and 83.4%, respectively, among diabetic patients in Turkey.[21] Nichol and Zimmerman also reported that most physicians recommended pneumococcal and influenza vaccines for their high-risk and elderly patients in another study in the United States of America.[22] This calls for the attention of physicians to routinely identify patients who will benefit from the recommended vaccines. About two-thirds of physicians recommended the common vaccines including pneumococcal and influenza vaccines. This is lower than the report of Gramegna *et al.* in a surveillance study in Italy who noted the recommendation of influenza vaccine among 80% of physicians.[23] Similarly, Vora and Shaikh reported a significant recommendation for influenza vaccine of about 78% among physicians in India in a survey despite their low knowledge.[12] Evren *et al.* also noted that the rate of influenza vaccination among specialists was high.[20] This implies that the practice of recommending vaccines for an adult is not optimal and may be influenced by the knowledge of the

physician. This is a potential target area to address to improve adult vaccine coverage.

One of the main barriers toward optimal adult vaccination coverage includes a lack of physician recommendations for different reasons ranging from cost, access, availability, and level of awareness to perceptions.[24] In this study, we found the high cost of the vaccine, vaccine shortage, inadequate insurance coverage, side effects concerns, and poor reminder systems as the barriers representing core areas affecting respiratory adult vaccines coverage. Duque *et al.* reported in South Africa that healthcare workers who reported getting the influenza vaccine themselves and offering their patients vaccines were familiar with the guidelines.[25] Navin also reported that the main drivers that may lead a physician to sometimes not recommend vaccination include vaccination concerns about efficacy and safety, the physician's mindset, and lack of availability of the vaccine.[26] The other key factors influencing physicians to recommend or prescribe adult vaccines, in general, were individual's condition and age, recommendations from health authorities, and tolerability of the vaccine.[26] There is a need for all the stakeholders to work on interventions to address most of the barriers identified to improve adult vaccine coverage in Nigeria.

Limitations

This study has some limitations. The data used in the analysis of this study were self-reported, which might suffer from reporting bias. In addition, random sampling surveys were not feasible during this period. As such, the majority of the respondent's practice in the public sector and Internal Medicine.

CONCLUSION

This study evaluated the knowledge, practice, and barriers to adult respiratory disease preventable vaccines among physicians in Lagos. Our findings suggest that the knowledge of physicians is below average. However, the majority recommend common vaccines including pneumococcal conjugate, influenza, and COVID 19 vaccines. The major barriers to vaccination include availability, cost, and fear of side effects. The results of this study suggest that more emphasis should be placed on increasing awareness about these vaccines among physicians. Furthermore, there should be an improvement in the availability of vaccines.

Declaration of patient consent

Patient's consent not required as there are no patients in this study.

Conflicts of interest

There are no conflicts of interest.

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