



ORIGINAL ARTICLE

WILL INFLUENZA VACCINE RECEIVE THE NECESSARY PUSH? AN ASSESSMENT OF TERTIARY HEALTHCARE WORKERS UPTAKE AND WILLINGNESS TO RECOMMEND THE VACCINE IN LAGOS, NIGERIA.

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Abstract

Background: Influenza is a significant health threat, especially in low- and middle-income countries (LMICs) like Nigeria, where healthcare workers (HCWs) play a vital role in curbing its spread. This study examined the awareness and willingness of HCWs at Lagos State University Teaching Hospital (LASUTH) to receive and recommend the influenza vaccine.

Methods: A cross-sectional survey was conducted from May 2024 to September 2024, using a structured electronic questionnaire to assess HCWs' uptake and willingness to recommend influenza vaccination. Two hundred and fifty-two (252) respondents participated in this study, and they were chosen using consecutive and convenience sampling. Ethical approval was obtained from the LASUTH Ethics and Research Committee. The dataset was analyzed using IBM SPSS version 25, with univariate, bivariate and multivariate analysis done to identify significant relationships, setting statistical significance at $p < 0.05$.

Results: The modal age group was 35-44 years (31.0%), more than three-quarters of respondents were females (77.8%), and the majority of the respondents had at least a tertiary education (67.9%). Most respondents (59.29%) demonstrated good knowledge of influenza, with 92.3% recognizing it as a viral infection. Willingness to recommend (81.4%) and receive (85.7%) the vaccine was high. Clinical roles and educational levels significantly influenced willingness, with clinical staff being more likely to recommend ($p < 0.001$) and receive ($p = 0.0086$) the vaccine.

Conclusion: This study examines HCWs' uptake and willingness to recommend the influenza vaccine. Targeted education about vaccine safety misconceptions could enhance HCW uptake, promoting broader public vaccination.

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INTRODUCTION

Seasonal influenza is a global public health issue that causes significant illness and death annually. The World Health Organization (WHO) estimates that each year, influenza results in approximately billion infections, with 3 to 5 million severe cases and up to 650,000 respiratory-related deaths.² Influenza is an acute viral respiratory disease caused mainly by influenza A and B viruses, leading to widespread epidemics.³ While it affects all age groups, certain populations—such as young children, the elderly, pregnant women, and individuals with chronic conditions—are more vulnerable to severe complications, including pneumonia and sepsis. Despite the global burden of influenza, vaccination rates remain low in many regions, particularly in low- and middle-income countries (LMICs), where access to vaccines and public awareness are limited.^{5–7} Influenza spreads primarily through respiratory droplets from coughing or sneezing, with symptoms typically appearing after an incubation period of 1 to 4 days.¹ Common symptoms include fever, cough, headaches, muscle aches, and fatigue. Most individuals recover within a week, but severe cases can lead to hospitalization and death, particularly among high-risk populations.⁴ In industrialized countries, most influenza-related deaths occur in individuals aged 65 years and older, while 99% of deaths in children under five with influenza-related lower respiratory tract infections occur in developing countries.⁸ Annual vaccination is the most effective way to prevent influenza and reduce its severity. The Centers for Disease Control and Prevention (CDC) recommends vaccination for all individuals aged six months and older without contraindications.⁹ However, vaccination rates are far from ideal in many LMICs, where vaccines are not routinely available, and public health systems focus on other infectious diseases.¹⁰ Misconceptions about vaccine safety and efficacy also hinder uptake, exacerbating the already low coverage in these regions. In Nigeria, there is limited data on the burden of

influenza, largely due to underreporting and a lack of diagnostic infrastructure. However, a study among pregnant women in Lagos identified influenza as a significant contributor to frequent hospital visits during pregnancy. The study also revealed that both seasonal and pandemic influenza were responsible for many pregnancy-related complications.¹¹ This underscores the need for further exploration of healthcare workers' (HCWs) knowledge and awareness of influenza vaccination, as they are most likely to recommend vaccines to at-risk groups like pregnant women.¹² Healthcare workers (HCWs) play a critical role in preventing and controlling the spread of influenza, particularly in healthcare settings where they are frequently exposed.¹³ HCWs face higher risks of contracting and transmitting the virus to vulnerable patients.¹⁴ Despite this, vaccination rates among HCWs are often lower than expected. Research has shown that HCWs' knowledge and perceptions of influenza and vaccination strongly influence their likelihood of recommending vaccination to patients.^{15,16} Misconceptions and a lack of awareness about vaccine safety contribute to low vaccination rates, limiting the potential for widespread vaccine uptake.^{17,18} In many African countries, including Nigeria, influenza vaccines are not part of routine immunization programs, and there are no clear national policies to promote their use.¹⁹ This results in low vaccine coverage among HCWs and the general population, who may not view influenza as a serious health threat. In particular, Nigeria lacks comprehensive data on the impact of influenza on other high-risk groups, such as children and the elderly. The absence of reliable surveillance systems further complicates efforts to quantify the disease's burden, highlighting the need for more robust public health interventions.⁸

This study assessed the knowledge of seasonal influenza among HCWs at the Lagos State University Teaching Hospital and explore their willingness to recommend and receive the influenza vaccine.

Table 1: Socio-Demographic Characteristics of Healthcare Workers

Characteristic	Frequency	Percentage (%)
Age Group		
18-25	7	2.8
26-34	74	29.4
35-44	78	31.0
45-54	55	21.8
55-64	37	14.7
65 and above	1	0.4
Gender		
Male	56	22.2
Female	196	77.8
Marital Status		
Single	48	19.0
Married	196	77.8
Divorced	2	0.8
Separated	1	0.4
Widowed	5	2.0
Education Level		
Secondary	3	1.2
Tertiary	171	67.9
Postgraduate	78	31.0
Professional Cadre		
Nursing Officers	90	35.7
Pharmacists	71	28.2
Doctors	91	36.1
Department		
Pharmacy	71	28.2
Emergency Medicine	10	3.9
Haematology	11	4.4
Oncology	6	2.4
Dentistry	9	3.6
ENT	5	2.0
Internal Medicine	49	19.4
Obstetrics and Gynaecology	7	2.8
Family Medicine	25	9.9
Surgery	23	9.1
Ophthalmology	6	2.4
Community Health & Primary Health Care	30	12.0

By identifying the factors influencing HCWs' knowledge and attitudes, this research will provide valuable insights into barriers to vaccine uptake in Nigeria. The findings will contribute to the development of more effective public health strategies and educational programs to improve vaccine coverage among HCWs and ensure better protection for high-risk populations. Ultimately,

this study aims to inform public health efforts aimed at reducing influenza-related morbidity and mortality in Nigeria.

METHODOLOGY

Description of the Study Area

Lagos State University Teaching Hospital (LASUTH) is located in the capital city of Lagos, Nigeria's most populous state.

Table 2: Knowledge of Influenza Infection, Transmission, Symptoms and Vaccines

Knowledge Item	Frequency	Percentage (%)
Influenza is caused by a virus	229	92.3
Transmitted from person to person	224	90.3
Seasonal occurrence	55	22.2
Preventable disease	191	77.0
Also known as the common cold	154	62.1
Influenza causes hospital admission	222	88.1
Symptoms		
Runny nose	230	91.3
Sneezing	228	90.5
Sore throat	199	79.0
Vomiting	32	12.7
Diarrhoea	25	9.9
Abdominal pain	22	8.7
Vaccine Knowledge Item		
Aware of the existence of an influenza vaccine	222	88.1
Believes the vaccine is safe	199	79.0
Vaccine is effective in preventing illness	208	82.5
Correct route of administration (IM)	225	94.9
Risk Group		
Everyone above 6 months	182	72.2
People with comorbidities	152	60.3
Immunocompromised individuals	152	60.3
Elderly (65 years and above)	141	56.0

It is a tertiary healthcare facility with a 750-bed capacity, offering multispecialty clinics and employing a diverse range of healthcare professionals, including doctors, nurses, pharmacists, laboratory scientists, social workers, and physiotherapists. LASUTH serves as the only state-owned tertiary healthcare facility in Lagos State and acts as a referral centre for hospitals across the region. The hospital receives approximately 50,000 patients quarterly, providing care that spans from primary to tertiary services.

Study Design and Study Population

This study used a descriptive cross-sectional design. The study population consisted of clinical healthcare workers, including doctors, pharmacists, and nurses employed at LASUTH. Healthcare workers working in clinical departments were included in the study, while those who were not directly consulting or counselling patients were excluded.

Sampling Technique

The minimum sample size was determined using Fisher's formula for sample sizes when the population is less than 10,000 for descriptive studies.²⁰ The sample size formula was $n = \frac{z^2 pq}{d^2}$ where:

- **n** is the sample size,
- **z** is the standard normal deviate,
- **p** is the estimated prevalence, 0.882.²¹
- **q**= complimentary probability=1-p
- **d** is the desired level of precision which was taken as 0.05

Based on a previous Nigerian study in which 88.2% of healthcare workers expressed willingness to receive the influenza vaccine, the minimum sample size calculated was 159.²¹ To improve the reliability of the study, a sample size of 200 healthcare workers was chosen as the minimum.

Table 3: Distribution of Knowledge among Respondents

Knowledge	Frequency	Percentage
Fair	86	33.99%
Good	150	59.29%
Poor	17	6.72%

RESULTS

A total of 252 healthcare workers (HCWs) from Lagos State University Teaching Hospital (LASUTH) participated in the study, as shown in Table 1. The majority were under 45 years (159, 63.1%) and mostly females (196, 77.8%). The majority of participants were Nursing Officers (90, 35.7%), Pharmacists (71, 28.2%), and Doctors (91, 36.1%). Regarding educational attainment, 171 (67.9%) had completed tertiary education, and 78 (31.0%) held postgraduate degrees. Pharmacy (71, 28.4%), Internal Medicine (49, 19.4%), and Community Health & Primary Health Care (30, 12.0%) were the most represented departments. As outlined in Table 2, most respondents were well-informed about influenza. A total of 229 (92.3%) correctly identified it as a virus, and 224 (90.3%) recognized it as transmissible between individuals. However, only 55 (22.2%) were aware of influenza's seasonal nature, and 154 (62.1%) mistakenly believed it to be the same as the common cold. Common symptoms, such as arunny nose (230, 91.3%) and sneezing (228, 90.5%), were well-known, although fewer respondents identified less common symptoms, including vomiting (32, 12.7%) and abdominal pain (22, 8.7%). Awareness of the influenza vaccine was high, with 222 (88.1%) aware of its existence and 199 (79.0%) considering it safe. Knowledge of high-risk groups was also significant, with most participants recognizing individuals over six months (182, 72.2%) and those with comorbidities (152, 60.3%) as priority groups. The distribution of knowledge levels, shown in Table 3, indicated that most participants had good knowledge (150, 59.3%), with 86 (33.9%) fair and only 17 (6.7%) had poor

knowledge. A high percentage of participants were willing to recommend (192, 81.4%) and receive (216, 85.7%) the influenza vaccine. Additionally, 116 (49.2%) were aware of the vaccine's availability at LASUTH. (Table 4). Factors influencing the willingness to recommend and receive the vaccine are detailed in Table 5. Higher educational levels were associated with greater willingness, with tertiary (130, 82.3%) and postgraduate (61, 81.3%) graduates showing the most willingness to recommend ($p < 0.001$). Knowledge level also significantly impacted willingness to recommend, with 133 (88.7%) of participants with good knowledge being willing to recommend vaccine uptake ($p < 0.001$). Perceptions of vaccine safety and effectiveness strongly influenced willingness. Of those who viewed the vaccine as safe, 192 (82.1%) were willing to recommend, and 214 (91.9%) were willing to receive the vaccine ($p = 0.0095$). Belief in vaccine effectiveness also encouraged recommendation (178, 86.8%) ($p < 0.001$). Age and perceived seriousness of influenza did not significantly impact willingness to recommend or receive the vaccine. Multivariate logistic regression revealed that healthcare workers who believed the influenza vaccine was effective were significantly more likely to recommend it (OR = 4.26; 95% CI: 1.62–11.20; $p = 0.0033$). However, vaccine safety perception was not a statistically significant predictor of recommendation (OR = 1.52; 95% CI: 0.05–49.80; $p = 0.813$), nor were clinical role (OR = 1.39; 95% CI: 0.21–8.98; $p = 0.731$), knowledge level (OR = 0.50; 95% CI: 0.02–10.83; $p = 0.656$), or educational level (OR = 0.93; 95% CI: 0.43–2.01; $p = 0.862$). (Table 6).

Table 4: Willingness to Recommend and Receive Influenza Vaccine

Awareness and Willingness	Frequency	Percentage (%)
Willing to recommend the vaccine	192	81.4
Willing to receive the vaccine	216	85.7
Aware of vaccine availability at LASUTH	116	49.2

Respondents who believed the vaccine was safe were over nine times more likely to be willing to receive it (OR = 9.57; 95% CI: 1.00–91.52; $p = 0.050$). Educational level also played a significant role; respondents with a postgraduate with were less likely to be willing to receive the vaccine compared to those with only tertiary education (OR = 0.35; 95% CI: 0.14–0.90; $p = 0.029$). Clinical role was not a significant predictor of willingness to receive the vaccine in the adjusted model (OR = 1.84; 95% CI: 0.18–18.59; $p = 0.607$).

DISCUSSION

The findings of this study offer significant insights into healthcare workers' (HCWs') knowledge, attitudes, and willingness regarding influenza vaccination. Our study found that HCWs had a high level of knowledge about Influenza, with 92.3% recognizing it as a viral infection and 90.3% acknowledging human-to-human transmission. Despite efforts to sensitize healthcare workers about influenza, many misconceptions persist; 62.1% of healthcare workers in our sample incorrectly identify influenza as a common cold. Similar issues were found in studies from Saudi Arabia and Tunisia, where HCWs' moderate knowledge levels correlated with lower influenza vaccination rates due to misunderstandings about influenza's severity and transmissibility.^{22–24} Studies from the United States and India support this view, revealing that HCWs who understood the severe nature of influenza were more likely to endorse influenza vaccination.^{25,26} Our study also found that a substantial proportion of HCWs were willing to both recommend (81.4%) and receive (85.7%) the influenza vaccine. This finding aligns with studies conducted in the United Kingdom and

the United States, which suggest that healthcare workers (HCWs) who perceive the vaccine as safe and effective are more likely to advocate for its use.^{27–29} In South Africa, despite some concerns about vaccine safety, HCWs showed a strong willingness to recommend influenza vaccination, particularly for vulnerable populations like the elderly.³⁰ Research from Greece during the COVID-19 pandemic also supports this finding, suggesting that HCWs' willingness to recommend influenza vaccination is closely linked to their confidence in the vaccine's safety and effectiveness.³¹ In Kenya, many HCWs expressed a strong desire to receive the vaccine if it were available. However, some remained uncertain about its safety.³² Similarly, a study from Nigeria indicated that high knowledge levels alone did not predict willingness to vaccinate, but a positive attitude toward influenza prevention contributed to HCWs' intent to vaccinate.²¹ The influence of education and clinical exposure on vaccine attitudes was also apparent. In our study, HCWs with postgraduate degrees were more likely to recommend the vaccine. Clinical staff showed a higher willingness to recommend (82.53%) and receive (91.67%) the vaccine compared to non-clinical staff. These trends are similar to findings from studies in South Africa and Saudi Arabia, where higher educational levels and clinical exposure correlated with stronger support for influenza vaccination.^{22, 30} In Poland, physicians were more likely to receive vaccinations than nurses, highlighting how clinical exposure can enhance HCWs' awareness of the vaccine's protective benefits.³³ Perceived vaccine safety and effectiveness were key determinants in HCWs' willingness to recommend and receive the influenza vaccine.

Table 5: Factors Affecting Willingness to Recommend and Receive the Influenza Vaccine

Factor	Willing to Recommend	p-value (Recommend)	Willing to Receive	p-value (Receive)
Age Group				
< 45 years	122 (79.22%)	0.3808	141 (92.16%)	0.8314
≥ 45 years	69 (85.19%)		74 (91.36%)	
Education Level				
Postgraduate	61 (81.33%)	<0.001	64 (85.33%)	0.0390
Tertiary	130 (82.28%)		150 (94.94%)	
Secondary	1 (33.33%)		2 (100.00%)	
Knowledge Level				
Fair	59 (71.95%)	<0.001	77 (93.90%)	0.6022
Good	133 (88.67%)		136 (90.67%)	
Poor	0 (0.00%)		3 (100.00%)	
Vaccine Safety				
Safe	192 (82.05%)	0.0095	214 (91.85%)	0.0095
Not Safe or Unsure	0 (0.00%)		2 (100.00%)	
Vaccine Effectiveness				
Effective	178 (86.83%)	<0.001	190 (92.68%)	0.2589
Not Effective or Unsure	14 (45.16%)		26 (86.67%)	
Perceived Severity				
Serious	141 (81.50%)	0.0586	162 (93.64%)	0.1048
Not Serious	51 (80.95%)		54 (87.10%)	

In our study, HCWs who viewed the vaccine as safe demonstrated a high willingness to recommend (82.05%) and receive (91.85%) the vaccine. Similarly, studies in South Africa and Kenya reported that safety concerns limited vaccine uptake, underscoring the need for clear communication about vaccine safety to alleviate fears and address misconceptions.^{30, 31} A study in Saudi Arabia also found that HCWs who perceived the vaccine as effective were more likely to recommend it, further emphasizing the importance of educating HCWs on vaccine efficacy.³⁴ Studies from Greece and Tunisia indicate that HCWs are more engaged in vaccination programs when they view the vaccine as protective and feel assured of its benefits.^{23,31} Research from the United Kingdom and the United States reinforces this finding, showing that HCWs who perceive the vaccine as safe and

effective are more likely to recommend it to patients.^{29,35} While age did not significantly predict vaccine acceptance in our study, research from high-income countries suggests that older HCWs are more likely to accept vaccination due to heightened awareness of personal health risks.^{36 – 38} Studies from Greece and the United States support this, finding higher vaccination rates among older HCWs.^{31,39} Although perceived influenza severity did not significantly influence willingness to vaccinate in our study, research from the United Kingdom and Tunisia indicates that HCWs are often motivated by the belief that vaccination protects both themselves and others, including patients and family members.^{23,27} The multivariate analysis in this study identified key predictors of influenza vaccine uptake and recommendation among healthcare workers (HCWs). Notably, the perception of vaccine

effectiveness emerged as a significant factor influencing the willingness to recommend the vaccine, with those who believed in its efficacy being over four times more likely to recommend it ($p = 0.0033$). This aligns with findings from studies conducted in the United Kingdom and Switzerland, which noted that HCWs' belief in vaccine effectiveness plays a pivotal role in their advocacy for immunization.^{40, 41} Interestingly, while belief in vaccine safety significantly predicted willingness to receive the vaccine ($p = 0.050$), it did not show a significant association with willingness to recommend it ($p = 0.813$). This contrasts with previous studies, which suggest that safety concerns were central to both personal uptake and professional recommendations.⁴¹ The difference may reflect a growing distinction HCWs make between personal health choices and professional responsibilities or may point to systemic factors not captured in this study. Contrary to some expectations, knowledge level was not significantly associated with willingness to recommend or receive the vaccine. This finding differs from earlier research that demonstrated a strong link between knowledge and vaccination behaviour.⁴² It implies that while knowledge is essential, it may not independently drive behavior unless accompanied by positive perceptions and supportive institutional environments. Additionally, educational attainment and clinical status, though significant in bivariate analysis, lost statistical significance in the multivariate model. Surprisingly, having a postgraduate education was associated with lower odds of vaccine uptake ($p = 0.0294$), a finding inconsistent with some literature suggesting higher education correlates with increased vaccine acceptance.⁴³ However, other studies have reported that higher education can sometimes be associated with a greater critical scrutiny of health interventions.⁴⁴ These results suggest that efforts to improve vaccination coverage among HCWs must extend beyond knowledge dissemination.

Emphasis should be placed on strengthening confidence in vaccine safety and efficacy, clarifying the broader public health benefits, and addressing contextual barriers.^{45, 46}

CONCLUSION

This study highlights the significant impact of healthcare workers' (HCWs') knowledge and attitudes on influenza vaccination efforts. Enhancing HCWs' understanding of vaccine safety and efficacy, while addressing misconceptions, can improve vaccine uptake markedly. The high willingness observed among HCWs to both receive and recommend the influenza vaccine suggests that targeted educational programs and clear communication could strengthen HCWs' engagement in influenza prevention. In Nigeria, where healthcare access remains limited, these initiatives are essential in empowering HCWs to protect vulnerable populations from seasonal influenza.

STRENGTHS AND LIMITATIONS OF THE STUDY

The study literates the willingness of health workers to recommend vaccine uptake. It provides a contextual basis for further policy and planning considerations, particularly regarding the influenza vaccine, which is not widely popular among healthcare workers in Nigeria. The study was a cross-sectional study, which provides a snapshot in time, limiting causal inference. Longitudinal studies would provide a more accurate assessment of changes in knowledge or willingness over time or following interventions. Additionally, reliance on self-administered questionnaires may introduce social desirability or recall bias, particularly when addressing sensitive issues such as vaccine hesitancy.

IMPLICATIONS FOR FUTURE RESEARCH

Expanding the study to multiple healthcare facilities, including those in rural and underserved areas, would provide a more comprehensive understanding of influenza vaccine attitudes among HCWs in Nigeria. Furthermore, in-depth interviews or focus group discussions could explore the underlying reasons behind vaccine

Table 6: Multivariate Logistic Regression: Factors Influencing Willingness to Recommend and Receive the Influenza Vaccine

Factor	Willing to Recommend (OR [95% CI])	p-value (Recommend)	Willing to Receive (OR [95% CI])	p-value (Receive)
Vaccine Safety (Safe/ Not Safe)	1.52 [0.05 – 49.80]	0.813	9.57 [1.00 – 91.52]	0.050
Clinical Role	1.39 [0.21 – 8.98]	0.731	1.84 [0.18 – 18.59]	0.607
Vaccine Effectiveness	4.26 [1.62 – 11.20]	0.0033	–	–
Knowledge Level	0.50 [0.02 – 10.83]	0.656	–	–
Educational Level	0.93 [0.43 – 2.01]	0.862	0.35 [0.14 – 0.90]	0.029

hesitancy, misconceptions, or mistrust in more detail than quantitative methods allow.

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CONFLICT OF INTEREST

No conflict of interest is declared

AUTHORS' CONTRIBUTION

AAA: Research conceptualization, development of research protocol, literature search, study tool design, preparation of draft manuscript, data collection and analysis, manuscript review

BFP: Data analysis, manuscript writing, and preparation of draft manuscript

MRA: Research conceptualization, study tool design, manuscript review

AOA: Data collection, manuscript review

SB:Data collection, manuscript review

OA: Data analysis, data collection

OO: Research conceptualization, Data collection

KOW: Research conceptualization, study tool design, manuscript review

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