Knowledge and Determinants of Vaccine Hesitancy Among Residents of Ifako Ijaiye LGA, Lagos State

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A R T I C L E I N F O	A B S T R A C T
	Vaccine hesitancy poses a significant challenge to public health efforts in Nigeria. However, vaccine hesitancy is not a matter of chance; such an attitude is shaped by a myriad of factors, among which the knowledge of vaccines plays a complex and sometimes paradoxical role in shaping attitudes toward vaccine uptake. Thus, this study assessed the knowledge and determinants of vaccine hesitancy among residents of Ifako-Ijaiye LGA, Lagos State. The study adopts a cross-sectional survey design, and a total of 427 respondents were selected through a multi-stage sampling. Data was collected using a well-structured questionnaire over a period of three months (June-August, 2025). The retrieved questionnaire was analysed using Statistical Package for Social Sciences (SPSS) version 25.0, and the p-value was set at <0.05. The findings of the study showed that two-thirds of the respondents had good knowledge of vaccination, and 77.4% of the respondents noted that vaccines are easily accessible in their area. Prevalence rate of vaccine hesitancy observed in Ifako-Ijaiye LGA was 14.30%. Factors such as trust in healthcare institutions, knowledge of vaccinations, and occupation were found to be significantly associated with vaccine hesitancy. The study concludes that vaccine hesitancy is not merely a product of insufficient knowledge but arises from the interplay of religious identity, educational background, economic conditions, and most critically, levels of trust in vaccine safety.

1.0 Introduction

Vaccination remains an effective intervention to address public health concerns by reducing the global burden of infectious diseases and preventing annual death ranging 2 to 6 million. Despite this success, suboptimal vaccine coverage remains a critical challenge, contributing to about 1.5 million preventable deaths/year[1]. The emergence and persistence of vaccine hesitancy defined as a delay in acceptance or refusal of vaccines despite availability threatens to undermine decades of progress in controlling communicable diseases. This complex phenomenon is influenced by a confluence of factors, including misinformation, low confidence in health systems, socioeconomic barriers, and cultural or religious beliefs [2,3]. In Nigeria, vaccine hesitancy represents a significant barrier to achieving herd immunity for vaccine-preventable diseases, with recent outbreaks of diphtheria and measles highlighting vulnerabilities in immunization programs [4,5,6]. The Ifako-Ijaiye Local Government Area of Lagos State offers an instructive context for examining vaccine hesitancy, characterized by its dense population, socioeconomic diversity, and mix of urban and informal settlements. To date, no comprehensive study has examined the knowledge, attitudes, or structural determinants underlying vaccine decision-making in this community. Thus, by assessing the prevalence and determinants of vaccine hesitancy, the goal of generating evidence to support targeted, equitable, and effective vaccination strategies tailored to local needs and realities can be achieved

2.0 Materials and Method

2.1 Study Area

This study was conducted in the Ifako-Ijaiye Local Government Area (LGA) of Lagos State, Nigeria. The area is geographically located between latitude 6°52'0" N and longitude 2° 3'60" E. According to the Lagos State Government data, the LGA had an estimated population of 774,000 people as of 2006. The area comprises approximately 16 settlements, including Abule-Egba, Oko-Oba, Ijaiye-Ojokoro, Alagbado, and Alakuko, among others. It is important to note that the Ojokoro Local Council Development Area, an autonomous council with its headquarters at Ijaiye, was carved out of Ifako-Ijaiye LGA.

The healthcare infrastructure within the LGA includes 11 public primary healthcare centers (PHCs), 30 private PHCs, and 12 secondary healthcare facilities. While most PHCs offer vaccination services, the availability of specific vaccines can vary [7]. The population is diverse, encompassing various professions, religions, beliefs, and socioeconomic backgrounds. The predominant languages spoken are Yoruba, English, and Pidgin English, making it a suitable location for this study.

2.2 Study Design

A community-based, cross-sectional survey design was employed for this study. This design was appropriate for simultaneously assessing the prevalence of vaccine hesitancy, levels of knowledge, vaccine uptake rates, and identifying sociodemographic factors associated with vaccine hesitancy among the adult population.

2.3 Study Population

The study population consisted of adult residents (aged 18 years and above) of Ifako-Ijaiye LGA. All participants were assessed for general vaccine hesitancy. Furthermore, parents and primary caregivers within this population were specifically assessed for the routine uptake of vaccines for both themselves and their children under 14 years of age.

2.4 Inclusion Criteria

To be eligible for participation, individuals had to:

1. Be aged 18 years or older.

2. Have been a resident of Ifako-Ijaiye LGA for at least 12 months prior to the study.

3. Be willing to participate and provide verbal informed consent.

2.5 Exclusion Criteria

Individuals were excluded from the study if they were:

1. Severely ill or mentally incapacitated to the extent that they could not respond to the questionnaire.

2. Healthcare workers directly involved in immunization service delivery (to avoid potential bias in responses related to service provision).

3. Temporary visitors or passersby in the area at the time of the study.

2.6 Sample Size Determination

The minimum sample size was calculated using Cochran's formula for cross-sectional studies:

$$n = \frac{Z^2 pq}{d^2} \; ;$$

where: `n` = minimum sample size, Z` = standard normal deviate (1.96 at 95% confidence level), p` = proportion of vaccine hesitancy.

A prevalence (p) of 48.2% (0.482) was used (`q` = 1 - p (0.518) and `d` = degree of precision (0.05).

To account for a potential 10% non-response rate, the final sample size (``nf``) was adjusted as follows:

nf $= \frac{n}{1-nr}$: where n =Minimum sample size = 384, nr= non-response rate = 10% and nf=Final minimum sample size.

$$nf \quad = \quad \frac{384}{1-0.10}$$

$$nf \quad = \quad \frac{384}{0.90} = 426.6 \approx 427$$

Therefore, a final sample size of 427 respondents was used for this study.

2.7 Sampling Technique

A multi-stage sampling technique was employed to ensure a representative sample of the study population.

Stage 1: Selection of Wards: Eight (8) wards were randomly selected from the 16 wards in Ifako-Ijaiye LGA using simple random sampling (balloting). The selected wards were Abule-Egba, Oko-Oba, Ijaiye-Ojokoro, Gbinrinmi, Wasimi, Ilupeju-Titun, Alagbado, and Alakuko.

Stage 2: Selection of Houses: Within each selected ward, houses were selected using systematic random sampling. The first house was chosen by simple random sampling (balloting), and subsequent houses were selected at predetermined intervals based on the number of houses per street.

Stage 3: Selection of Respondents: In each selected household, one eligible adult respondent was

selected using simple random sampling (balloting). If a household had no eligible respondent, the next household was selected. Approximately 54 respondents were recruited from each of the 8 wards to achieve the total sample size of 427.

2.8 Data Collection

Data were collected using a pre-tested, structured questionnaire administered by trained research assistants. The questionnaire was developed based on a comprehensive review of literature on vaccine knowledge, uptake, and hesitancy. It was divided into four sections: Section A: socio-demographic characteristics (age, sex, marital status, number of children, religion, ethnicity, education, occupation, income). Section B: Knowledge of vaccination and vaccine hesitancy (awareness, definition, information sources, knowledge of access points). Section C: Vaccination history and hesitancy (vaccines received, frequency). Section D: Suggestions and recommendations for mitigating vaccine hesitancy.

2.9 Validity and Reliability of Instrument

The questionnaire was pre-tested on 22 respondents (5% of the sample size) in Alimosho LGA, which has similar characteristics to the study area but was not included in the main survey. Cronbach's alpha was used to assess the internal consistency of the knowledge and perception scales; a value above 0.7 was considered acceptable.

2.10 Measurement of Variables

Knowledge of Vaccines: Assessed using 3 questions. A correct answer scored 1 point, and an incorrect answer scored 0. The total score ranged from 0 to 3. A score of ≥2 was classified as "good knowledge," and a score of <2 was classified as "poor knowledge."

Knowledge of Vaccine Hesitancy: Assessed using 3 questions, each scoring 1 point for a correct answer. Respondents scoring above the mean were classified as knowledgeable about vaccine hesitancy.

Prevalence of Vaccine Hesitancy: Calculated as the proportion of respondents identified as vaccine-hesitant from the relevant questions in the survey.

Perception towards Vaccination: Assessed using a 12-item scale. A score of 1 was given for a positive perception response. The total score ranged from 0 to 12. Respondents scoring above the mean were classified as having a "good perception," while those scoring at or below the mean were classified as having a "poor perception."

2.11 Data Analysis

Data were analyzed using IBM SPSS Statistics for Windows, Version 25.0 (Armonk, NY: IBM Corp). Descriptive statistics were used to summarize socio-demographic variables and key outcomes while inferential statistics were used to explore statistical associations between categorical variables at $p<0.05$. Logistic regression analysis was used to identify significant predictors of vaccine hesitancy.

2.12 Ethical Consideration

Ethical approval for this study was obtained from the Department of Community Medicine, Ahmadu Bello University, Zaria, and the Ifako-Ijaiye Local Government Health office. Verbal informed consent was obtained before questionnaire administration and confidentiality of data was maintained.

3.0 Results

The socio-demographic characteristics of respondents sampled in Ifako-Ijaiye LGA as presented in Table 1 shows that the mean age is 34.32±12.69 and the largest proportion of respondents was between 18 and 27 years (33.7%), with only 5.6% at 58 years or older. Regarding the gender distribution, the males represented were 206(48.2%) and females 221 (51.7%). The Yoruba ethnic group formed the majority (62.5%), followed by the Igbo (29.0%), Hausa (4.9%), and other minority groups (3.5%). The majority of the participants (47.9%) had no children, while 23.2% had 1–2 children, and 28.2% had 3–5 children. Only 0.7% had more than 5 children and above. The majority of the respondents had tertiary education (53.8%), followed by postgraduate education (18.5%) and secondary education (18.8%). A small proportion had primary education (4.0%) or no formal education (4.9%).

Table 1: Socio-demographic distribution of respondent

Variables	Items	Frequency
Age of Respondents (Years)	18-27	144(33.7)
	28-37	140(32.8)
	38-47	79(18.5)
	48-57	40(9.4)
	≥58	24(5.6)
Gender	Male	206(48.2)
	Female	221(51.8)
Tribe	Yoruba	267(62.5)
	Igbo	124(29.1)
	Hausa	21(4.9)
	Others	15(3.5)
Religion	Christianity	280(65.7)
	Islam	129(30.3)
	Traditional	10(2.4)
	Others	7(1.6)
Marital Status	Single	200(46.8)
	Married	171(40.1)
	Divorced	29(6.8)
	Separated	21(4.9)
	Widowed	6(1.4)
Number of Children	0	204(47.9)
	1-2	99(23.2)
	3-5	120(28.2)
	≥5	3(0.7)
Educational level	No formal education	21(4.9)
	Primary	17(4.0)
	Secondary	80(18.8)
	Tertiary	229(53.8)
	Postgraduate	79(18.5)
Occupation	Unemployed	45(10.6)
	Students	80(18.7)
	Self-employed	100(23.5)
	Private sector	85(20)
	Public sector	106(24.9)
	Retired	10(2.3)

Table 2: Knowledge of Vaccination among respondent

Items	Response	Frequency (%)
Vaccine awareness (n=426)	Aware of vaccination	392(92.0)
	Not aware	34(8.0)
Source of Information (n=392)	Healthcare providers	310(30.8)
	Media	181(18.0)
	Internet	184(18.3)
	Family and friends	155(15.4)
	School	161(15.9)
	Others	16(1.6)
What do you understand by vaccination (n=392)	Vaccination helps the body's immune system fight disease	323(45.4)
	Vaccination can prevent outbreaks of contagious disease	272(38.3)
	All vaccines guarantee 100% protection against illness	76(10.7)
	Vaccination is only necessary for children, not adults	27(3.8)
	Natural immunity is better than vaccine-induced immunity	13(1.8)
Knowledge Score (n=427)	Poor	157(36.8)
	Good	270(63.2)
Accessibility of Vaccines (n=420)	Vaccines are accessible	325(77.4)
	Not accessible	95(22.6)

Table 2 assesses respondents' knowledge of vaccination; 92.0% of the respondents reported being aware of vaccination, while only 8.0% indicated they were not aware. Healthcare providers were the most common source of vaccination information (30.8%), the internet (18.3%), media (18.0%), schools (15.9%), and family and friends (15.4%). Other sources were indicated by just 1.59%. The summed knowledge score of the respondents' knowledge of vaccination shows that 63.2% of the respondents had good knowledge, while 36.8% of the respondents had poor knowledge.

The majority of the respondents i.e. 64.7% correctly identified vaccine hesitancy as "the delay in accepting or outright refusal of a vaccine despite the availability of vaccination services.", while 120(23.3%) respondents wrongly indicated that vaccine hesitancy was the refusal of vaccines due to their unavailability (Figure 1).
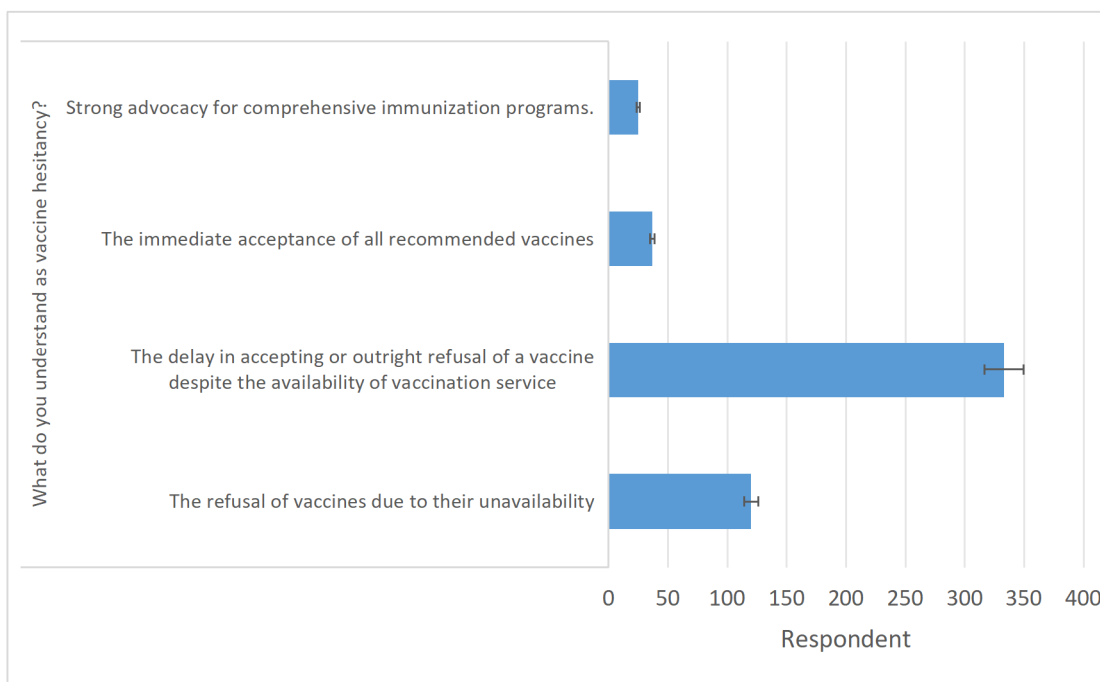
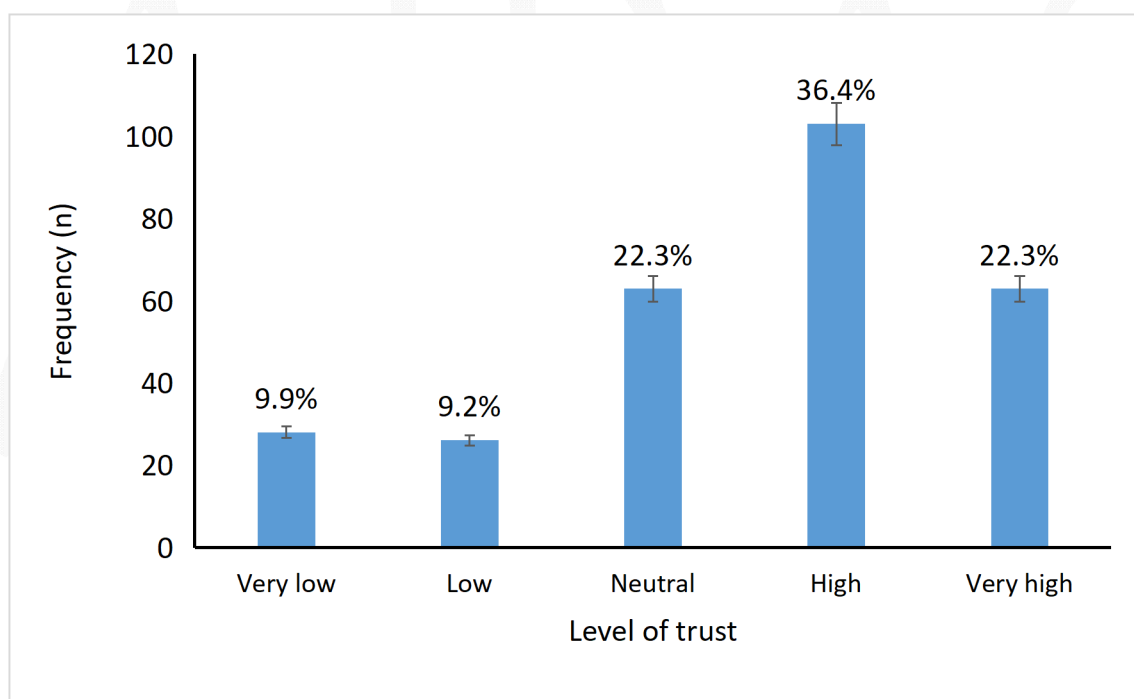**Fig 1:** Knowledge of Vaccine Hesitancy among respondent

Fig 2: Level of trust in the safety of vaccines among respondent

The results on trust in the safety of vaccines, presented in Figure 2, show the different levels of confidence respondents have in vaccines. Most of the 103 (36.4%) respondents said they have high trust in vaccine safety, and 63 (22.3%) reported having "very high" trust. Some respondents, 63 (22.3%), expressed a neutral stance regarding vaccine safety. However, 28 (9.9%) and 26 (9.2%) respondents reported very low and low trust, respectively, in vaccine safety.

Table 3 showed no significant statistical association between age and vaccine hesitancy (p=0.181) as well as for gender at p = 0.227. Among ethnic groups, hesitancy was highest among respondents from minority groups (p=0.062) categorized as "Others" (37.5%), followed by Igbo respondents (30.0%),

while Hausa participants reported no hesitancy. In terms of religion (p = 0.050), Christianity had the highest hesitancy (27.65%), compared to Islam (13.1%). Educational level showed a significant association with vaccine hesitancy (p=0.049). Respondents without formal education had the highest hesitancy rate (36.4%), while those with primary education demonstrated the lowest (9.1%). Occupation was strongly associated with vaccine hesitancy (p = 0.004).

Table 3: Factors associated with vaccine hesitancy

Variables		Have you ever exhibited vaccine hesitancy?		X^2	P
		Hesitant	**Non-hesitant**		
Age (years)	18-27	22(26.7)	71(76.3)	6.255	0.181
	28-37	25(27.2)	67(72.8)		
	38-47	9(18.8)	39(81.3)		
	48-57	5(22.7)	17(77.3)		
	≥58	0(0.0)	16(100.0)		
Gender	Male	24(19.2)	101(80.8)	1.457	0.227
	Female	37(25.3)	109(74.7)		
Ethnicity	Yoruba	34(19.7)	139(80.4)	7.318	0.062
	Igbo	24(30.0)	56(70.0)		
	Hausa	0(0.0)	10(100.0)		
	Others	3(37.5)	5(62.5)		
Religion	Christianity	47(27.7)	123(72.4)	9.453	0.050*
	Islam	11(13.1)	73(86.9)		
	Traditional	3(33.3)	6(66.7)		
	Others	0(0.0)	7(100.0)		
Marital Status	Single	40(29.4)	96(70.6)	9.364	0.053
	Married	15(16.3)	77(83.7)		
	Divorced	5(21.7)	18(72.3)		
	Separated	1(6.7)	14(93.3)		
	Widowed	0(0.0)	5(100.0)		
Number of children	Nil	37(26.8)	101(73.2)	6.780	0.079
	1-2	10(16.7)	50(83.3)		
	3-5	13(18.3)	58(81.7)		
	>5	1(100.0)	0(0.0)		
Education	No formal education	4(36.4)	7(63.6)	9.543	0.049*
	Primary education	1(9.1)	10(90.9)		
	Secondary	7(13.5)	45(86.5)		
	Tertiary	40(28.8)	99(71.2)		
	Post graduate	9(15.5)	49(84.5)		
Occupation	Unemployed	6(20)	24(80.0)	17.112	0.004*
	Student	4(7.6)	49(92.4)		
	Self-employed	14(20.6)	54(79.4)		
	Employed in the private sector	19(37.3)	32(62.7)		
	Employed in the Public sector	18(29.5)	43(70.5)		
Awareness of vaccination	Yes	58(22.8)	197(77.2)	0.726	0.394
	No	2(13.3)	13(86.7)		
Knowledge of vaccine hesitancy	Yes	50(28.9)	123(71.1)	10.960	0.001*
	No	123(58.9)	86(41.1)		
Trust in the safety of vaccines	Very low	5(35.7)	9(64.3)	18.267	0.003*
	Low	4(15.4)	22(84.6)		
	Neutral	12(19.1)	51(80.9)		
	High	28(27.7)	73(72.3)		
	Very high	8(13.1)	53(86.9)		

NB: X^2= Chi Square; P=pvalue; *significant at p<0.05

Private-sector employees (37.3%) and public-sector employees (29.5%) reported higher levels of hesitancy compared to students, who exhibited the lowest hesitancy (7.6%). Income also showed a highly significant association ($p < 0.001$). Respondents with higher income ($\geq$ ₦70,000) were more hesitant (31.3%) compared to those with lower income (12.1%). General awareness of vaccination did not show a significant association with hesitancy ($p = 0.394$). However, knowledge of vaccine hesitancy was significantly related ($p = 0.001$). Respondents who reported knowledge of vaccine hesitancy were themselves more hesitant (28.9%) compared to those without such knowledge (58.9%). Trust levels in vaccine safety showed a strong and significant association with vaccine hesitancy ($p = 0.003$). Individuals with very low trust had the highest hesitancy (35.7%), while those with very high trust showed the lowest (13.1%).

The multinomial logistic regression analysis shows the significant predictors of vaccine hesitancy (Table 4). Religion showed strong associations. Respondents identifying as Christians Exp. (β)= 7.03, $p < 0.001$) and Muslims Exp. (β)= 4.95, $p < 0.001$) were significantly more likely to exhibit vaccine hesitancy compared to those practicing traditional religion. Education also played a role. Individuals with no formal education were almost nine times more likely to be hesitant Exp. (β)= 8.84, $p = 0.017$. Respondents who had previously exhibited hesitancy towards any vaccine were three times more likely to be hesitant in this study (Exp. (β)= 3.03, $p = 0.008$) compared to those who had not.

Table 4: Predictors of Vaccine Hesitancy among respondent

Variable	B	SE	Sig	Exp (B)	95% Confidence interval for Exp (B)	
					Lower Boundary	Upper Boundary
Religion						
Christianity	1.95	0.62	<0.001	7.029	5.375	34.421
Islam	1.60	0.65	<0.001	4.953	2.515	15.151
Traditional[ref]	1					
Education						
No formal	2.179	0.917	0.017	8.840	1.466	53.308
Primary	0.149	1.182	0.900	1.160	0.114	11.763
Secondary	0.047	0.621	0.939	1.049	0.310	3.543
Tertiary	0.458	2.045	0.153	1.925	0.784	4.723
Postgraduate[ref]	1					
Occupation						
Unemployed	1.376	0.812	0.090	3.958	0.807	19.428
Student	1.198	0.785	0.127	3.313	0.712	15.428
Self-employed	1.415	0.762	0.063	4.115	0.925	18.316
Private sectors	0.683	0.764	0.372	1.980	0.443	8.856
Public sectors	0.677	0.752	0.368	1.968	0.451	8.591
Retired[ref]	1					
Knowledge of vaccine hesitancy						
Good	1.108	0.416	0.008	3.030	1.342	6.842
Poor	1					
Trust						
Very low	1.674	0.804	0.037	5.335	1.104	25.769
low	-0.213	0.803	0.791	0.808	0.167	3.902
Neutral	0.335	0.557	0.547	1.398	0.469	4.165
High	0.419	0.496	0.398	1.520	0.575	4.018
Very High[ref]	1					

SE: standard error; EXP(B) is the Exponential of β (Exp. β)

Trust in vaccines was another significant predictor. Those with very low trust in the safety of vaccines were over five times more likely to be hesitant (Exp. (β)= 5.34, p = 0.037) compared with respondents reporting "very high trust". while low, neutral, and high trust levels were not significant.

4.0 Discussion

Vaccine hesitancy continues to pose significant public health challenge in Nigeria. The knowledge and determinants of vaccine hesitancy was assessed among residents of Ifako-Ijaiye LGA, Lagos State.

The findings on vaccination awareness showed that a high proportion (92.0%) of respondents were aware of vaccination, a figure congruent with studies from Malaysia[8] and Nigeria [9]. The firsthand sources of vaccination information were healthcare providers (30.8%), the internet (18.3%), and traditional media (18.0%). This aligns with research emphasizing that the quality and source of information significantly impact vaccine-related knowledge and subsequent hesitancy, with "knowledge deficits" and misinformation being key drivers [2,10].

Assessment of general vaccination knowledge revealed that the majority (63.2%) had good knowledge. However, a substantial minority held misconceptions, such as believing that naturally acquired immunity is superior to vaccine-induced immunity or that vaccination is unnecessary for adults. This suggests that high awareness does not always equate to accurate understanding, a finding supported by studies in Lagos which also reported high knowledge levels alongside persistent gaps [11,12]. Effective communication is crucial to address these knowledge gaps[13]. Regarding the specific concept of vaccine hesitancy, a majority (64.7%) correctly identified it as a delay or refusal despite vaccine availability. However, a significant proportion (23.3%) mistakenly associated it with vaccine unavailability, reflecting a superficial understanding also observed in other studies, even among health workers[14]. This highlights the need for clear public education on the term, as also noted in a global review[2] and studies on COVID-19 misinformation in Nigeria[15].

Trust in vaccine safety was a major factor, where respondent that reported a very low trust level would be more hesitant that those that trust vaccine efficacy. This underscores the central role of confidence, as consistently shown in global and Nigerian contexts [10,16]. Furthermore, religion was a strong predictor, with Christians and Muslims being significantly more likely to exhibit hesitancy compared to those practicing traditional religion. This points to the influential role of religious teachings and leaders, as seen historically in Nigeria[17,18].

Educational attainment also played a role where respondents with no formal education were almost nine times more likely to be hesitant than those with postgraduate education. This posits that low literacy can exacerbate susceptibility to misinformation [19,20]. Counterintuitively, respondents with good knowledge of the concept of vaccine hesitancy were three times more likely to be hesitant. This paradoxical finding suggests that awareness can sometimes include exposure to negative narratives, indicating that the quality and framing of knowledge are critical[21]. Socioeconomic factors were significant. Occupation was associated with hesitancy, with employed individuals showing higher hesitancy than students. Higher income was also a predictor of hesitancy, which contrasts with patterns in high-income countries and may reflect greater access to alternative health information or practices among wealthier Nigerians.

5.0 Conclusion

The determinants of vaccine hesitancy identified are multifaceted, encompassing attitudinal factors like trust, socio-cultural factors like religion, and structural factors like education and socioeconomic status. These findings are consistent with the WHO's "3Cs" model of "Confidence", "Complacency",

"Convenience" while highlighting context-specific variables in Nigeria that emphasize the need for multifaceted, culturally sensitive interventions that include clear communication, trust-building, and engagement with community and religious leaders.

Reference

1. World Health Organization (WHO). (2024). Immunization Coverage. [Fact sheet]. Retrieved from https://www.who.int/news-room/fact-sheets/detail/immunization-coverage

2. Larson, H. J., Jarrett, C., Eckersberger, E., Smith, D. M. D., & Paterson, P. (2014). Understanding vaccine hesitancy around vaccines and vaccination from a global perspective: A systematic review of published literature, 2007–2012. *Vaccine,* 32(19), 2150–2159. https://doi.org/10.1016/j.vaccine.2014.01.081

3. MacDonald, N. E., & SAGE Working Group on Vaccine Hesitancy. (2015). Vaccine hesitancy: Definition, scope and determinants. *Vaccine,* 33(34), 4161–4164. https://doi.org/10.1016/j.vaccine.2015.04.036

4. Nigeria Centre for Disease Control and Prevention (NCDC). (2023). Diphtheria Situation Report. Retrieved from https://ncdc.gov.ng/diseases/sitreps/

5. World Health Organization (WHO). (2023). Measles – Nigeria. Disease Outbreak News. Retrieved from https://www.who.int/emergencies/disease-outbreak-news/item/2023-DON476

6. Gulumbe, B. H., Danlami, M. B., Yusuf, A. B., Shehu, A., & Chidiebere, O. (2024). Vaccine hesitancy under the lens: Nigeria's struggle against the worst diphtheria outbreak in decades. *Therapeutic Advances in Infectious Disease,* 11. https://doi.org/10.1177/20499361241242218

7. Lagos Ministry of Health, (2023). https://www.premiumtimesng.com/news/top-news/752735-lagos-has-1800-private-362-public-healthcare-facilities-commissioner.html?tztc=1

8. Voo, J. Y. H., Lean, Q. Y., Ming, L. C., Hanafiah, N. H., & Al-Worafi, Y. M. (2021). Vaccine Knowledge, Awareness and Hesitancy: A Cross Sectional Survey among Parents Residing at Sandakan District, Sabah. *Vaccines,* 9(11), 1348. https://doi.org/10.3390/vaccines9111348

9. Ibekwe, R., Nnabuihe, E., & Ukoha, K. (2024). Awareness and Determinants of COVID-19 Vaccine Acceptance in Nigeria: A Population-Based Study. J*ournal of Epidemiology and Global Health,* 14(1), 45-55. https://doi.org/10.1007/s44197-024-00230-8

10. Betsch, C., Wieler, L. H., & Habersaat, K. (2020). Monitoring behavioural insights related to COVID-19. *The Lancet,* 395(10232), 1255–1256. https://doi.org/10.1016/S0140-6736(20)30729-7

11. Sule, S. S., Onayade, A. A., Abayomi, O. O., & Fatusi, A. O. (2020). Knowledge, attitude and practice of childhood immunization among mothers in a primary health care centre in Lagos, Nigeria. *Nigerian Journal of Paediatrics,* 47(2), 45-51. https://doi.org/10.4314/njp.v47i2.1

12. Omomala, O. O., & Olorunsaiye, C. Z. (2020). Knowledge and uptake of childhood immunization among mothers in Ilorin, Nigeria. *Journal of Public Health in Africa,* 11(1), 1156. https://doi.org/10.4081/jphia.2020.1156

13. Rozario, S., Omer, M. D., Gallagher, K., Aregay, A. K., Sheikh, A., & Mohamoud, A. S. (2016). The Polio Communication Network's contribution to the polio outbreak response in Ethiopia's Somali Region, 2013–2015. *Global Health Communication,* 2(1), 39–49. https://doi.org/10.1080/23762004.2017.1330604

14. Dubé, È., Ward, J. K., Verger, P., & MacDonald, N. E. (2021). Vaccine hesitancy, acceptance, and anti-vaccination: trends and future prospects for public health. *Annual Review of Public Health,* 42, 175–191. https://doi.org/10.1146/annurev-publhealth-090419-102240

15. Adebisi, Y. A., Alaran, A. J., Bolarinwa, O. A., Akande-Sholabi, W., & Lucero-Prisno, D. E. (2021). When it is available, will we take it? Public perception of hypothetical COVID-19 vaccine in Nigeria. *Pan African Medical Journal,* 38(1), 230. https://doi.org/10.11604/pamj.2021.38.230.27325

16. Oduwole, E. O., Pienaar, E. D., Mahomed, H., & Wiysonge, C. S. (2021). Current tools available for investigating vaccine hesitancy. *Cochrane Database of Systematic Reviews*, 2021(3), CD013493. https://doi.org/10.1002/14651858.CD013493.pub2

17. Jegede, A. S. (2007). What led to the Nigerian boycott of the polio vaccination campaign? *PLoS Medicine*, 4(3),e73. https://doi.org/10.1371/journal.pmed.0040073

18. Olagoke, A. A., Olagoke, O. O., & Hughes, A. M. (2021). Intention to vaccinate against the novel 2019 coronavirus disease: The role of health locus of control and religiosity. *Journal of Religion and Health,* 60(1), 65–80. https://doi.org/10.1007/s10943-020-01090-9

19. Bish, A., & Michie, S. (2010). Demographic and attitudinal determinants of protective behaviours during a pandemic: A review. *British Journal of Health Psychology,* 15(4), 797–824. https://doi.org/10.1348/135910710X485826

20. Wang, Y., McKee, M., Torbica, A., & Stuckler, D. (2019). Systematic Literature Review on the Spread of Health-related Misinformation on Social Media. *Social Science & Medicine,* 240, 112552. https://doi.org/10.1016/j.socscimed.2019.112552

21. Betsch, C., Schmid, P., Heinemeier, D., Korn, L., Holtmann, C., & Böhm, R. (2018). Beyond confidence: Development of a measure assessing the 5C psychological antecedents of vaccination. *PLOS ONE,* 13(12), e0208601. https://doi.org/10.1371/journal.pone.0208601