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ORIGINAL ARTICLE

PARENTAL WILLINGNESS TO VACCINATE CHILDREN AGAINST MPOX AMONG HEALTHCARE WORKERS IN SOUTHEASTERN NIGERIA.

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Keywords

Parental Willingness,

Children,

Mpox vaccines,

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ABSTRACT

Background: The success of childhood vaccination programmes depends on parental willingness, which is influenced by several factors. Understanding these determinants is essential for designing effective communication and uptake strategies. We assessed the prevalence and predictors of parental willingness to vaccinate children against mpox in Abia State, Nigeria.

Methods: A cross-sectional study was conducted among 630 parents from May to July 2025, with eligible participants selected using a multistage sampling technique. An interviewer-administered structured questionnaire using the validated 7C scale of vaccination readiness was used to collect data. The primary outcome was parental willingness to vaccinate their children against mpox when the vaccine becomes available. Ethical approval was obtained before the study. Descriptive, bivariate, and multivariate analyses were conducted using IBM SPSS version 26. Statistical significance was set at 5%.

Results: The mean age was 44.3±8.5 years. The prevalence of parental mpox vaccine intentions among respondents was 93.7% (95% CI: 91.5% - 95.4%). High confidence was the highest-scoring psychological domain (72.7%). Predictors of parental willingness to vaccinate children against mpox included low educational attainment (AOR =3.06; 95 % CI = 1.04 – 9.02), prior COVID-19 vaccination (AOR =8.18; 95 % CI = 2.54 – 26.37) and high complacency (AOR =0.28; 95 % CI = 0.08 – 0.95).

Conclusion: The study demonstrates high parental willingness towards mpox vaccination, driven largely by confidence and reinforced by prior vaccination experience. Complacency remains a key barrier for some parents. Sustaining vaccine uptake will require strategies that reinforce trust, address complacency, and deliver inclusive, clear communication across educational groups.

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INTRODUCTION

Mpox has emerged as a growing public health concern with implications for both adult and paediatric populations. The burden of mpox infection highlights the risk of household and community transmission in certain settings.¹ In Abia State, reported cases of mpox have included children and the implications of severe complications.² Vaccination remains a key preventive strategy to reduce the spread of mpox and protect susceptible populations, including children. However, the success of paediatric vaccination programs will depend largely on parents' willingness to consent to vaccination for their children. Parental decision-making regarding childhood vaccination is complex and influenced by several contextual factors such as vaccine safety, disease risk perception and socioeconomic factors.^{3,4} Parents' perceptions of disease risk, vaccine safety, and trust in health authorities play a critical role in shaping vaccine decisions.⁵⁻⁷ In the context of mpox, an evolving public health threat, uncertainty, misinformation, and limited prior experience with the vaccine may further affect parental willingness.⁸ Focusing on healthcare workers (HCWs) as respondents is particularly important because they are not only parents but also trusted sources of health information in their communities.⁹ Their knowledge, attitudes, and beliefs about vaccination may directly influence their own children's immunization and indirectly shape broader community perceptions and acceptance of the mpox vaccine. By studying HCWs, the findings can highlight both personal and professional factors affecting parental willingness, thereby informing strategies that leverage HCWs as advocates for child vaccination. The 5C model is a well-established psychological framework developed to explain why people choose to vaccinate (or not) and comprises five main person-level determinants of vaccine readiness: confidence, complacency, constraints, risk calculation, and collective responsibility.¹⁰ This earlier work was further improved by incorporating two additional constructs to assess compliance and conspiracy beliefs.¹¹ The 7C psychological antecedents of vaccination help explain a broader range of vaccination behaviors, especially those arising from the COVID-19 pandemic and subsequent vaccine rollouts.¹¹ The 7C model of vaccination readiness used in this study provides a framework for assessing the factors influencing parents'

willingness to vaccinate their children. Understanding parental willingness to vaccinate children against mpox is essential for designing effective risk communication and vaccination strategies. This study intends to generate insights to support child-focused mpox vaccination policies and programs in Abia State. Evidence on the key drivers of willingness can guide targeted interventions aimed at addressing parental concerns, strengthen trust, and promoting collective responsibility. Therefore, this study assessed the prevalence and predictors of parental willingness to vaccinate their children against mpox.

METHODS

A facility-based cross-sectional analytical study was conducted among HCWs between May and July 2025. Abia State is one of the five states in the South-East zone of Nigeria. It had a population of 4,701,518 in 2025, projected from the 2006 national population census using an annual growth rate of 2.7%.¹² The state shares a boundary with Rivers, Akwa-Ibom, Enugu, and Imo States, all of which have reported outbreaks of mpox. Abia State has 17 Local Government Areas (LGAs) with health facilities that provide primary, secondary, and tertiary levels of care. The state has 749 public primary healthcare centres, 16 General Hospitals, two tertiary health facilities, and 188 private health facilities offering Routine Immunisation. Primary healthcare facilities provide basic preventive and curative services at the community level, secondary facilities offer more specialized services, while tertiary institutions serve as referral centres with advanced care and specialist services. Healthcare workers included in this study were drawn from these levels of care. Routine childhood immunisations are available and accessible in some of the health facilities. Mpox vaccination is yet to be introduced in Abia State. Immunisation activities in the state are guided by the National Programme on Immunisation (NPI) through the National Primary Health Care Development Agency (NPHCDA).

STUDY POPULATION

The study population comprised HCWs who were parents or guardians of at least one child. Healthcare workers were selected as respondents because of their frequent interactions with parents and caregivers in both clinical and community settings. Eligible respondents were HCWs employed in facilities within the study area for at least six months preceding the study period, being an adult aged 18 years and above at the time of data collection as

Table 1: Sociodemographic characteristics for respondents

Variables	Frequency	Percentage (%)
Age		
20 – 29	35	5.6
30 – 39	139	22.1
40 – 49	249	39.5
≥ 50	207	32.9
Mean ± SD	44.3±8.5	
Sex		
Male	141	22.4
Female	489	77.6
Marital Status		
Single	67	10.6
Married	515	81.7
Others	48	7.6
Religion		
Christianity	558	88.6
Islam	2	0.3
Others	70	11.1
Denomination (n =558)		
Catholic	120	21.5
Orthodox	116	20.8
Pentecostal	207	37.1
Others	115	20.6
Cadre		
Clinical	284	45.1
Allied Staff	300	47.6
Non-clinical	46	7.3
Highest Educational attainment		
Post-graduate	90	14.3
University Degree	340	54.0
OND/HND	173	27.5
WAEC O level	10	1.6
Others	17	2.7
Income (Naira ₦)		
<100,000	113	17.9
100,000 – 199,999	363	57.6
200,000 – 499,999	133	21.1
≥500,000	21	3.3
Facility Ownership		
Public	612	97.1
Private	18	2.9
Years of practice		
Less than 15	352	55.9
15 years and above	278	44.1
Mean±SD	14.6±8.0	
Number of living children		
<4	385	61.1
≥ 4	245	38.9
Mean±SD	3.17±1.3	

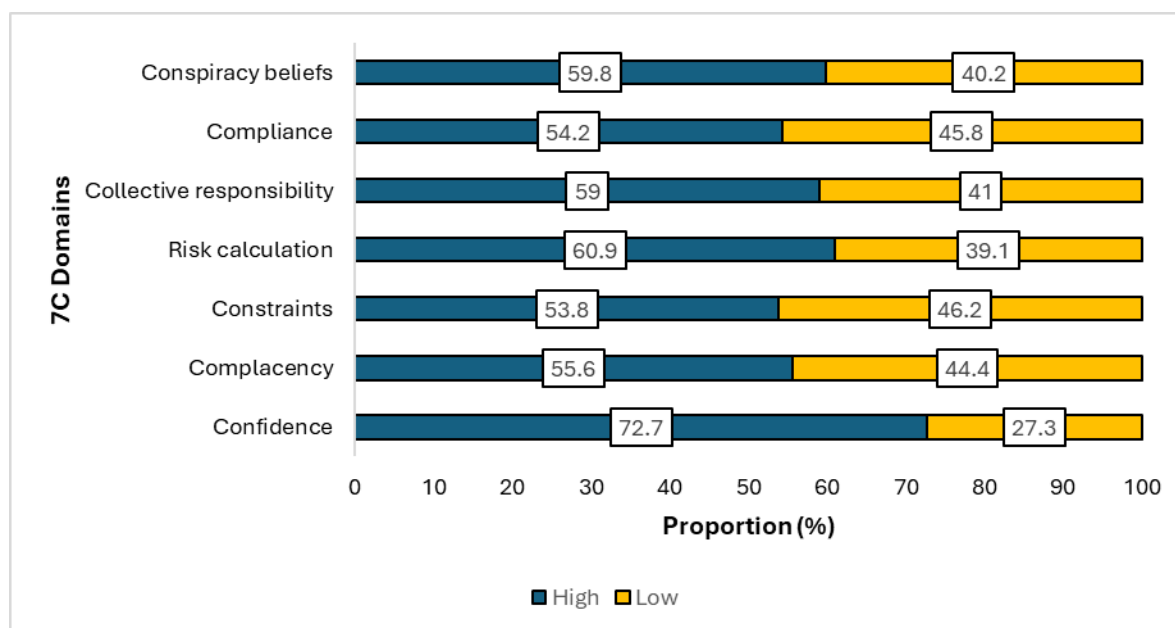


Figure 1: Distribution of 7C vaccine readiness among respondents

as well as having at least one child under 18 years of age. Those on annual leave during the study period, those who were severely ill, or those who were unavailable at the time of data collection were excluded.

SAMPLE SIZE DETERMINATION

The sample size was estimated using the sample size formula for cross-sectional studies 13. A minimum sample size of 628 was determined at a 95% confidence level, a design effect of 1.5, and a margin of error of 5%. This was based on the pooled estimated prevalence of parental acceptance of vaccinating their children with the COVID-19 vaccine (57%) reported in a systematic review of studies from 69 countries.¹⁴ A non-response rate of 10% was assumed.

SAMPLING TECHNIQUE

A multi-stage sampling technique was employed. **In the first stage**, six out of 17 LGAs were selected using the balloting technique. **In the second stage**, health facilities within each local government area (LGA) were first listed and then stratified by level of care into primary, secondary, and tertiary. Each health facility served as a cluster for the study. Subsequently, from each stratum, the number of facilities to be selected was determined using proportionate allocation based on the total number of

facilities within an equal probability of selection. **In the final stage**, within each selected facility, eligible respondents were identified. The total sample size was proportionately allocated across the selected facilities based on the estimated number of healthcare workers. When the number of eligible respondents exceeded the facility's allocated sample size, simple random sampling was used to recruit the required number of respondents. In facilities with fewer eligible respondents, all eligible healthcare workers present during the data collection period were consecutively recruited until the required number was attained.

DATA COLLECTION TOOL

Data were collected using a structured, interviewer-administered questionnaire adapted from previous studies.^{10,11,15,16} The questionnaire had three sections and captured information on sociodemographic, workplace characteristics, parental willingness to vaccinate children against mpox, and the seven psychological constructs of the 7C model: confidence, complacency, constraints, calculation, collective responsibility, compliance, and conspiracy beliefs. The finalized questionnaire was transferred to tablets and Android phones using ODK Collect and synced with a central database (Kobo Collect Server).

Cronbach's alpha (α) was applied to measure the internal consistency and reliability of the questionnaire. The overall Cronbach's alpha index was 0.76. The Cronbach's alpha indices for the 7C psychological domains were confidence (0.88), complacency (0.76), constraints (0.92), risk calculation (0.82), collective responsibility (0.85), compliance (0.80), and conspiracy beliefs (0.94). This was calculated from the pre-test dataset.

DATA COLLECTION PROCEDURE

Six research assistants were recruited and trained for data collection. The estimated time of the interview with each respondent was 15 minutes

MEASUREMENT OF VARIABLES

The primary outcome was parental willingness to vaccinate children against mpox, measured as intention to accept the mpox vaccine for their children when it becomes available. Willingness was dichotomized into 'Yes' and 'No' based on their response to the question, 'Are you willing to vaccinate your child with the mpox vaccine when it is available?' The independent variables included the socio-demographic factors, vaccine and psychological/social factors.

The psychological and social factors were assessed using the 7C Psychological Antecedents of Vaccination in the domains of confidence, complacency, constraints, risk calculation, collective responsibility, compliance and conspiracy beliefs.¹¹ Each domain was addressed using three questions that were measured on the 5-point Likert scale of 'strongly disagree', 'disagree', 'uncertain', 'agree' and 'strongly agree'. The domains of Confidence, Risk calculations, Collective responsibility and compliance were scored from '1' to '5', while Complacency, Constraints and Conspiracy beliefs were reverse scored from '5' to '1'. For each domain, the maximum attainable score was 15, and the minimum was 5. For each domain, scores above the respondents' mean cumulative score were categorized as high, and scores below the mean were categorized as low.

STATISTICAL ANALYSIS

The data was downloaded from the KoboCollect server. Data cleaning, coding, and analysis were performed using IBM SPSS version 26 for Windows. Descriptive statistics were used to summarize respondents' characteristics and levels of parental willingness. Bivariate analyses were conducted to

examine associations between parental willingness and the 7C constructs as well as other independent variables. Variables that were statistically significant at the bivariate level ($p < 0.2$) were entered into a multivariable logistic regression model to identify independent predictors of parental willingness to vaccinate children against mpox. Statistical significance was set at $p < 0.05$, with a 95% confidence level.

ETHICAL APPROVAL AND CONSENT TO PARTICIPATE

Ethical approval was obtained from the Ethics and Research Committee of the Federal Medical Centre, Umuahia, with reference number (FMC/QEH/G.596/Vol.10/877). Participation was voluntary, and implied consent was assumed when participants voluntarily proceeded to complete the questionnaire after acknowledging the introductory consent form. Also, data confidentiality and anonymity were strictly maintained.

RESULTS

The study included 630 respondents. Most respondents were females (77.6%). The mean age was 44.3 ± 8.5 years. The majority were married (81.7%). Almost all were Christians (88.6%). Among the Christians, the denominations were predominantly Pentecostal (37.1%), followed by Catholic (21.5%). Most of the respondents were allied health professionals (47.6%). Educational attainment varied, with more than half (54.0%) holding a university degree and a few (14.3%) having a post-graduate degree.

More than half (57.6%) earned between ₦100,000 - ₦199,999, followed by a fifth of the respondents (21.1%) earning ₦200,000 - ₦499,999. More than half (55.9%) had fewer than 15 years of work experience, and up to two-thirds had fewer than 4 living children. The mean number of living children was 3.17 ± 1.3 . [Table 1]

The 7C Readiness Assessment showed that the highest proportion of participants was classified in the high category for confidence (72.7%), followed by calculation (60.9%). Conspiracy beliefs and collective responsibility were reported at 59.8% and 59.0%, respectively. Complacency and compliance had 55.6% and 54.2% of participants in the high category, respectively. The lowest proportion of participants in the high category was observed for constraints (53.8%). [Figure 1]

Table 2: Bivariate analysis of factors associated with parental willingness to mpox vaccination.

Variables	Parental willingness		COR	95% CI	P value
	Yes (%)	No (%)			
Age					
<=39	167 (96.0)	7 (4.0)	1.73	(0.68 – 4.39)	0.248
40 – 49	230 (92.4)	19 (7.6)	0.89	(0.43 – 1.80)	0.722
>=50	193 (93.2)	14 (6.8)	1		
Sex					
Male	131 (92.9)	10 (7.1)	0.86	(0.41 – 1.80)	0.681
Female	459 (93.9)	30 (6.1)	1		
Marital Status					
Single	64 (95.5)	3 (4.5)	1.46	(0.44 – 4.90)	0.537
Married	482 (93.6)	33 (6.4)	1		
Highest Education attainment					
Below University	178 (97.3)	5 (2.7)	3.15	(1.22 – 8.19)	0.013
University & above	395 (91.9)	35 (8.1)	1		
Cadre					
Clinical	263 (92.6)	21 (7.4)	1.53	(0.55 – 4.28)	0.420
Allied	286 (95.3)	14 (4.7)	2.49	(0.85 – 7.28)	0.095
Non-clinical	41 (89.1)	5 (10.9)	1		
Years of practice					
< 15	332 (94.3)	20 (5.7)	1.50	(0.57 – 3.92)	0.440
≥15 years	258 (92.8)	20 (7.2)	1		
Income					
<200,000	450 (94.5)	26 (5.5)	1.73	(0.88 – 3.41)	0.108
≥200,000	140 (90.9)	14 (9.1)	1		
Prior COVID-19 vaccination					
Yes	560 (96.7)	19 (3.3)	20.6	(10.03 – 42.43)	<0.0001
No	30 (58.8)	21 (41.2)	1		
Confidence					
High	434 (97.5)	11 (2.5)	5.37	(2.51 – 11.47)	<0.0001
Low	147 (88.0)	20 (12.0)	1		
Complacency					
High	248 (91.2)	24 (8.8)	0.22	(0.09 – 0.51)	<0.0001
Low	248 (91.2)	24 (8.8)	1		
Constraints					
High	260 (91.9)	23 (8.1)	0.28	(0.12 -0.64)	0.001
Low	321 (97.3)	8 (2.4)	1		
Risk calculation					
High	351 (94.1)	22 (5.9)	0.62	(0.28 – 1.38)	0.241
Low	230 (96.2)	9 (3.8)	1		
Collective responsibility					
High	350 (97.0)	11 (3.0)	2.76	(1.29 – 5.86)	0.006
Low	231 (92.0)	20 (8.0)	1		
Compliance					
High	326 (97.9)	7 (2.1)	4.35	(1.84 – 10.26)	<0.0001
Low	256 (91.4)	24 (8.6)	1		
Conspiracy beliefs					
High	223 (90.7)	23 (9.3)	0.22	(0.10 – 0.49)	<0.0001
Low	358 (97.8)	8 (2.2)	1		

P values less than 0.05 are statistically significant

The proportion of respondents willing to vaccinate their children with the mpox vaccine was 93.7% (95% CI: 91.5 – 95.4). Respondents with less than a university degree were more willing to vaccinate their children (OR = 3.15, 95% CI: 1.22 – 8.19). Similarly, those who had previously received a COVID-19 vaccine were more likely to accept vaccination for their children (OR = 20.6, 95% CI 10.03 – 42.43). Both were statistically significant. Among the 7C domains, high complacency (OR = 0.22, 95% CI: 0.09 – 0.51), high constraints (OR = 0.28, 95% CI: 0.12 – 0.64), and high conspiracy (OR = 0.22, 95% CI: 0.10 – 0.49) were associated with a reduced willingness to vaccinate children. Conversely, high collective responsibility (OR = 2.76, 95% CI: 1.29 – 5.86) and high compliance (OR = 4.35, 95% CI: 1.84 – 10.26) was associated with higher odds of parental willingness to vaccinate their children with the mpox vaccine. [Table 2] After adjusting for confounders in the multiple logistic regression analysis, the independent predictors of parental willingness to vaccinate children with the mpox vaccine included low educational attainment (aOR = 3.06; 95 % CI = 1.04 – 9.02), prior COVID-19 vaccination (aOR = 8.18; 95 % CI = 2.54– 26.37) and high complacency (aOR = 0.28; 95 % CI = 0.08 – 0.95). [Table 3]

DISCUSSION

The mpox parental willingness rate for mpox vaccination was very high; confidence in vaccines was the most prevalent psychological antecedent, and the predictors for parental willingness were identified. The present study found that 93.7% of parents expressed willingness to vaccinate their children against mpox. In a national survey conducted in China, researchers reported a parental hesitancy rate of 24.5% for vaccinating children against mpox, which translates to approximately 75.5% acceptance, substantially lower than our observed rate.¹⁷ Similarly, a Saudi Arabian study of parents and caregivers found that 28.5% of parents refused mpox vaccination for their children, corresponding to approximately 71.5% acceptance.¹⁸ The discrepancy between our findings and those from China and Saudi Arabia may reflect several underlying factors. Our study population was healthcare workers; this could have enhanced confidence in the healthcare system, vaccine safety and effectiveness. Additionally, the timing of data collection in relation to global mpox outbreak peaks and the intensity of media coverage may have influenced parental perceptions and decision-making, particularly among healthcare

workers. Heightened parental acceptance would enhance the mpox vaccination coverage in pediatric populations, contributing substantially to reducing community transmission, protecting vulnerable individuals, and preventing outbreak escalation. In this study, confidence in vaccines was the most prevalent psychological antecedent, followed by risk calculation. The predominance of high confidence in our sample aligns with findings from systematic reviews and large-scale studies that have consistently identified confidence as a core determinant of vaccine acceptance.^{19,20} However, this ordering is not homogeneous across all studies. In a survey among university students in Syria, the highest mean score was for calculation, followed by confidence.²¹ This means that in conflict-compromised settings, information seeking and risk-benefit analysis take precedence over trust. This high lights the role of contextual factors in shaping the determinants of vaccine hesitancy. High confidence indicates that this population is likely to accept vaccines when access and communication are reliable, consistent with the observed high willingness rate in this study. Constraints were the least commonly reported domain among participants. This finding is consistent with findings among Shanghai nurses, who also observed that constraints were the least endorsed dimension, though concentrated in a smaller subgroup.²² This pattern signals that many healthcare workers do not perceive practical obstacles to vaccination services within healthcare settings. In contrast, studies have documented that major constraints exist in underserved communities and low-resource settings.^{23,24} When the constraints domain is low, as observed in our sample, non-uptake is unlikely to be driven by access and logistical barriers, but rather by attitudinal factors. Sustaining low constraints by minimising logistical and access barriers is essential for ensuring equitable and sustained uptake of the mpox vaccine when it becomes available. In this study, lower educational status was independently associated with greater parental willingness to vaccinate their children with mpox vaccine. The majority of published studies on mpox vaccination report that education levels are associated with greater vaccine acceptance, uptake, or confidence.^{25,26} However, our finding is consistent with a previous study in which parents with lower educational levels demonstrated higher readiness to vaccinate their children compared with those with higher educational levels.²⁷

Table 3: Independent predictors of parental willingness to mpox vaccination among the respondents.

Variable	aOR	95% CI	P value
Age			
<=39	3.03	(0.86 – 10.72)	0.085
40 – 49	0.64	(0.25 – 1.62)	0.342
>=50	1		
Highest Education attainment			
Below University	3.06	(1.04 – 9.02)	0.042
University & above	1		
Cadre			
Clinical	6.29	(0.63 - 6.25)	0.113
Allied	2.93	(0.30 – 28.57)	0.352
Non-clinical	1		
Income			
<200,000	3.08	(0.95 – 10.00)	0.061
≥200,000	1		
Prior COVID-19 vaccination			
Yes	8.18	(2.54 – 26.37)	<0.0001
No	1		
Confidence			
High	2.44	(0.86 – 6.96)	0.095
Low	1		
Complacency			
High	0.28	(0.08 – 0.95)	0.041
Low	1		
Constraints			
High	0.57	(0.15 – 2.15)	0.406
Low	1		
Collective responsibility			
High	1.06	(0.39 – 3.12)	0.914
Low	1		
Compliance			
High	1.39	(0.39 – 4.95)	0.608
Low	1		
Conspiracy beliefs			
High	0.61	(0.19 – 2.00)	0.113
Low	1		

P values less than 0.05 are statistically significant

A study of Czech healthcare workers found that despite high levels of formal education, lower factual knowledge about mpox was associated with lower vaccine acceptance, suggesting that formal educational credentials do not automatically translate into disease-specific knowledge or vaccine confidence.²⁸ It has also been documented that parents with higher education have greater vaccine hesitancy.^{29,30} Higher education is sometimes linked to improved awareness but also to greater scrutiny or selective acceptance of new vaccines. Highly

educated individuals may seek additional information sources and feel empowered to question or delay vaccination recommendations. However, parents with lower educational attainment may prioritize practical health protection over complex risk assessments. Highly educated people may be more exposed to anti-vaccine misinformation that appears scientific. There is a need for context-appropriate risk communication strategies that customize messages for both lower- and higher-education groups, aimed at bridging their specific information gaps. Our study

found that respondents who had previously received a COVID-19 vaccine were more likely to be willing to vaccinate their children against mpox. Our finding aligns with a mixed-methods study in Kano, Nigeria, which found that respondents who had been vaccinated in adulthood and those who had received COVID-19 vaccines had significantly higher odds of mpox vaccine acceptance compared with their unvaccinated counterparts.⁸ Similarly, studies in Ghana have reported that individuals who previously refused or did not receive COVID-19 vaccination were less likely to accept the mpox vaccine.^{31,32} Prior vaccination history has been identified as a key determinant of subsequent vaccine acceptance in other settings, with individuals who have received COVID-19 or other vaccines being more likely to accept new vaccines, including mpox. Parents who developed trust in health authorities during the COVID-19 pandemic response maintain this trust when evaluating mpox vaccination. Parents who have received the COVID-19 vaccine are more likely to belong to social networks that support pro-vaccine norms and to place high value on vaccination. This underscores the importance of sustaining high-quality vaccination programs that foster positive experiences and build long-term trust to support the acceptance of current and future vaccines. In this study, higher levels of complacency were significantly associated with lower parental willingness to accept mpox vaccination. This finding aligns with evidence from studies across different theoretical frameworks. Among Nigerian healthcare workers assessed with adapted 5C measures, complacency was associated with lower vaccine acceptance.²⁸ Another study comprising healthcare workers in the Gulf region reported that barriers (including complacency-related beliefs) predicted hesitancy.³³ Furthermore, a Saudi Arabian study observed that complacency about COVID-19 was associated with unwillingness to vaccinate older children.³⁴ When healthcare workers underestimate mpox risk due to limited knowledge, complacency increases and acceptance decreases.³⁵ Likewise, if mpox is seen as a mild illness, the benefit of vaccination appears minimal. Parents with high complacency rationally conclude that mpox vaccination is unnecessary given the low perceived threat. Reducing complacency may increase the perceived necessity of mpox vaccines, improve uptake, and ultimately enhance community protection against outbreaks. Public health messaging should aim to strengthen perception of disease risk and

vaccine relevance by communicating clear, evidence-based information about mpox transmission, severity, and potential complications, particularly in children and vulnerable groups. Some limitations should be considered when interpreting the findings. The cross-sectional design excludes causal inferences between identified predictors and parental willingness. Willingness to vaccinate was self-reported and may not necessarily translate into actual vaccination behaviour, raising the possibility of social desirability bias. Furthermore, the context-specific nature of the study population may limit the generalisability of the findings to other settings or populations. Nevertheless, several strengths were observed in this study. The use of the established 7C psychological domains enabled a deeper understanding of the factors influencing parental willingness beyond simple sociodemographic characteristics. In addition, the key findings provide practical insights that can guide targeted context-specific vaccination strategies and public health messaging. Also, the selection of respondents from each level of care within LGAs ensured adequate representation, contributing to the external validity of the study.

CONCLUSION

This study shows very high parental willingness to accept mpox vaccination, with confidence as the strongest domain, highlighting trust in vaccine safety and effectiveness as key drivers of acceptance. High complacency had lower odds of willingness, reflecting gaps in perceived risk. Prior COVID-19 vaccination was a positive predictor, suggesting that favorable past experiences reinforce trust in new vaccines. Lower educational status also predicted willingness, indicating acceptance extends beyond highly educated groups. To sustain willingness, there is a need for continuous communication efforts to maintain high levels of acceptance and address emerging concerns. The high confidence in vaccines among healthcare workers should be leveraged to strengthen trust through clear and transparent communication, while the low reporting of constraints should be further explored to identify unrecognized potential systemic or workplace barriers. Also, there is a need to deliver tailored messages across educational groups, address complacency by highlighting disease risk and community benefits, and leverage positive past vaccination experiences to reinforce acceptance.

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CONFLICT OF INTEREST

None

AUTHORS'

CIA: Study conceptualization and design, data

collection, analysis and interpretation, and drafting of manuscript.

UN, KUK, MI and PO: Study design, data collection, interpretation of results and revision of manuscript.

CA, CU and APB: Study design, data collection, analysis, interpretation, and revision of manuscript.

All authors read and approved the final manuscript.

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