

Predictors of Mpox Knowledge Among Residents of Akwa Ibom State Nigeria

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Research Article

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Posted Date: October 8th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-10702703/v1>

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Additional Declarations: No competing interests reported.

PREDICTORS OF MPOX KNOWLEDGE AMONG RESIDENTS OF AKWA IBOM STATE NIGERIA

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ABSTRACT

Background

Mpox remains a significant public health threat in Nigeria and a re-emerging zoonotic disease. Adequate public knowledge and effective risk communication are essential for prevention and control, yet knowledge levels and influencing factors vary across populations. This study assessed the relationship between socio-demographic characteristics, preferred information channels, and Mpox knowledge among residents of Akwa Ibom State, Nigeria, to inform targeted health communication strategies.

Methods

A cross-sectional study was conducted among 475 adult residents of Akwa-Ibom State, aged 18 years and above. A random sampling technique was used to recruit participants across local government areas. Data were collected using a structured, pretested questionnaire, administered electronically via Kobo Collect. The primary outcome was knowledge of Mpox. Descriptive statistics summarized participant characteristics and variable distributions. Multivariable binary logistic regression analysis identified independent predictors of Mpox knowledge, with results presented as adjusted odds ratios at 95% confidence intervals. Statistical significance was set at $p < 0.05$. Model fit was evaluated using likelihood ratio tests, pseudo-R-squared, AIC, and BIC.

Results

Of the 475 participants, females constituted 62.6% of the sample, with 62.8% being married and 48.2% employed as civil servants. Age (adjusted OR 1.54, 95% CI: 1.20–1.97) and being married (adjusted OR 2.00, 95% CI: 1.31–3.06) were significant demographic predictors. Among those aware of Mpox, 80.8% correctly identified skin rash and swollen lymph nodes as key symptoms; 69.1% reported knowledge of Mpox. Preference in traditional sources showed a negative association. Gender and occupation were not significant predictors.

Conclusions:

Mpox knowledge in the study population is moderate, with clear disparities influenced by demographic factors and information sources. Strengthening integrated risk communication strategies that leverage healthcare workers, digital platforms, and traditional media is essential for improving public knowledge and outbreak preparedness.

Keywords:

Mpox, monkeypox, public knowledge, health communication, information sources, Nigeria, infectious disease knowledge, risk communication. |

Background

Globally, emerging and re-emerging infectious diseases remain a major public health concern, with millions of lives being affected. Sub-Saharan Africa is unequivocally the most affected and vulnerable region, particularly due to the fragility and inequalities of its health system [1]. Mpox disease has re-emerged as a zoonotic viral infection, affecting the lives of vulnerable populations. First identified in the Democratic Republic of Congo in the '70s, the World Health Organization (WHO) declared Mpox a Public Health Emergency of International Concern (PHEIC) in 2022, due to its resurgence [2, 3]. |

The re-emergence of infectious diseases, such as Mpox, has clearly highlighted the threat posed by zoonotic pathogens [3]. In West Africa, Nigeria is one of the endemic countries for Mpox, since its resurgence in 2017, posing a health threat to the at-risk population [4]. The Federal Ministry of Health, in collaboration with key stakeholders and partners, has unanimously pooled resources to strengthen case management, surveillance, health information, and risk communication of Mpox. Despite this, knowledge of Mpox remains inadequate, which inversely affects the control and prevention of Mpox [5, 6]. Public and community understanding of Mpox, particularly its origin, mode of transmission, signs, symptoms, and prevention, remains a crucial aspect to controlling and managing cases [6, 7]. The lack of basic knowledge of Mpox, limited access to credible health information, and disparities in information distribution across demographic groups create fertile ground for misinformation and disinformation on social media. This infodemic delays health-seeking behaviors and erodes public trust in the healthcare system [8, 9]. Several key factors have been reported to influence behaviors and responses to Mpox, including demographic (gender, age range, status, occupation) and information from the community members, and preferred channel to receive health information [8]. Access to technology and exposure to risk communication messages have been reported as influential factors on how the community perceives and infers health information [6]. Understanding contextual nuances is crucial for developing evidence-based interventions that address specific community concerns, enhance knowledge, and promote protective behaviors. |

This study assessed the relationship between demographic characteristics, information channels, and the level of knowledge of Mpox among residents of Akwa Ibom State, Nigeria. The study further examined trusted sources of information and their impact on Mpox knowledge among residents. The findings may contribute to the growing body of knowledge on public health diseases and health communication, provide an improved framework for evidence-based interventions at the community level, and inform the review of national policies and guidelines on outbreak response.

Methods

Study Design

This study employed a cross-sectional, quantitative design to assess Mpox-related knowledge, information sources, and demographic determinants among residents of Akwa Ibom State, Nigeria.

Study Setting

The study was conducted in Akwa Ibom State, located in the South-South region of Nigeria. The state has 31 local government areas with a population of seven million people. It comprises a mix of urban and rural communities with diverse socio-demographic characteristics and varying levels of access to health information and services. Its socio-economic activity, population density, and communication landscape make it a relevant setting for examining patterns of infectious disease knowledge and information dissemination.

Study Population

The study population included adult men and women aged 18 years and above who were residents of Akwa Ibom State at the time of data collection. Participants represented a range of socio-demographic backgrounds, including variations in age, gender, marital status, education, and occupation.

Sample Size Determination

The sample size was calculated using the Cochran formula for cross-sectional studies:

$$n = (Z^2 \cdot p(1-p)) / d^2$$

Where:

n = minimum sample size

Z = standard normal deviation at 95% confidence level (1.96) |

p = estimated proportion of the population with adequate knowledge of Mpox
(assumed as 0.5 due to lack of prior data) |

d = margin of error (0.05) |

The minimum sample size calculated was 384 participants. To account for non-response and incomplete data, a 20% adjustment was applied, resulting in a final sample size of 475 participants. |

Sampling Technique |

A random sampling approach was employed. Local government areas within Akwa Ibom State were purposively selected based on documented Mpox case burden to ensure adequate representation of areas most affected by the outbreak. Before data collection, community entry and sensitization visits were conducted in each selected area, in collaboration with community leaders/gatekeepers, to inform residents of the study's purpose and the scheduled visit by data collectors. Within each selected area, households were randomly selected from a household/community list, and one eligible individual, defined as a resident aged 18 years and above, was invited to participate per household. A total of 520 individuals were approached, of whom 475 agreed to participate and complete the questionnaire (response rate: 91.3%). This approach ensured broader geographic representation while maintaining feasibility within available resources. |

Development of a Data collection instrument |

Data were collected using a structured questionnaire developed from a review of the relevant literature on Mpox, health communication, and infodemic management [7, 8, 11, 24]. Face and content validation were conducted by the research team

before pretesting. The questionnaire comprised sections on: |

Socio-demographic characteristics (age, gender, marital status, education, occupation) |

Knowledge of Mpox |

Recognition of signs and symptoms |

Trusted and preferred sources of health information |

Exposure to misinformation and disinformation |

The instrument was initially developed in Microsoft Word and subsequently digitized using the Open Data Kit (ODK) platform via Kobo Collect for electronic data capture.

Reliability Test

The questionnaire was pretested among 50 respondents outside the study population to assess clarity, relevance, and comprehension. Necessary revisions were made based on feedback. Internal consistency of knowledge-related items was assessed using Cronbach's alpha, with a threshold of ≥ 0.70 considered acceptable.

Data Collection

Data collection was conducted by trained data collectors operating across different local government areas. Data collectors were familiar with local contexts and languages, facilitating effective communication with participants.

The questionnaire was administered electronically by data collectors using hand-held mobile devices, enabling real-time data capture and secure storage. Participation was voluntary, and respondents could withdraw at any stage without consequence.

Study Variables

Outcome Variable

The primary outcome variable was knowledge of Mpox, measured as a binary variable:

1 = Yes

0 = No

Independent Variables

Independent variables included:

Socio-demographic factors (age, gender, marital status, occupation)

Information sources (healthcare workers, radio/TV, social media, town announcers, religious leaders, traditional sources, others)

Data Analysis

Data were analyzed using Stata (version 2). Descriptive statistics were computed to summarize participant characteristics and study variables using frequencies, percentages, means, and standard deviations.

A binary logistic regression analysis was conducted to identify predictors of Mpox knowledge. All independent variables were included in the multivariable model to control potential confounding effects.

Results were reported as odds ratios (ORs) with corresponding 95% confidence intervals (CIs). Statistical significance was set at $p < 0.05$.

Model fit and performance were assessed using:

Likelihood ratio chi-square test

Pseudo R-squared

Akaike Information Criterion (AIC)

Bayesian Information Criterion (BIC)

Ethics approval

Ethics approval for the study was obtained from the Akwa Ibom Health Research Ethics Committee with Approval Number AKHREC/26/03/26/442. The study adhered to the scientific requirements and research protocols outlined in the Declaration of Helsinki for the recruitment of human participants and was carried out in accordance with the institutional guidelines, rules, and regulations of the National Code for Health Research Ethics.

Consent to participate

All participants were provided with detailed information regarding the study's purpose and procedures. Informed consent was obtained electronically before participation. Confidentiality and anonymity were ensured by excluding personally identifiable information from the dataset and restricting access to authorized members of the research team only.

Results

This section presents comprehensive empirical findings from the analysis of knowledge level and factors influencing monkeypox (Mpox) knowledge among 475 respondents in Akwa Ibom State, Nigeria.

Descriptive Analysis

Demographic characteristics

The demographic characteristics are summarized in Table 1. The study sample included 475 participants, with females forming 62.6% (n=297) and males 37.6% (n=178). Age distribution showed 15.8% aged 19–29, 26.1% aged 30–39, 36.2% aged 40–49, 21.0% aged 50–59, and 5.0% aged 60+. Marital status revealed 62.8% married, 29.7% single, 5.9% widowed, and 1.8% divorced. Occupationally, civil servants comprised 48.2%, business owners 21.0%, students 11.8%, farmers 10.1%, and others 13.0%. This demographic profile reflects a middle-aged, predominantly female, married population with strong representation of civil servants and business owners, indicating higher education levels and relatively better socio-economic status.

Table 1 Demographic Characteristics

Characteristic	Categories/Values	N (%)
Gender	Female	297 (62.5)
	Male	178 (37.5)
Age Range	18–29 years	70 (14.7)
	30–39 years	119 (25.1)
	40–49 years	172 (36.2)
	50–59 years	95 (20.0)
	60 years and above	19 (4.0)
Marital Status	Married	298 (62.7)
	Single (never married)	141 (29.7)
	Widowed (Lost spouse)	28 (5.9)
	Divorced	8 (1.7)
Occupation	Civil servant	229 (48.2)
	Business owner	95 (20.0)

	Student	51 (10.7)
	Farmer	43 (9.1)
	Others	57 (12.0)
Knowledge of Mpox	Yes	328 (69.1)
	No	147 (30.9)

Note: Percentages for each information channel were calculated independently; respondents could indicate trust in multiple sources

In terms of information channels (Table 2), information source preferences revealed that healthcare workers were the most trusted source (61.1%). Conventional broadcast media, radio and television, were used by 49.7%. Social media platforms were trusted by 28.0%. Town announcers accounted for 27.4%, religious leaders 17.0%, traditional leaders/healers 12.9%, and 4.5% relied on alternative sources.

Table 2 Information Channels

istic	Cate	Characteristic	Cate	Characteristic	Categories/Values	N (%)
Information channels		Healthcare workers (doctor/nurse)			290 (61.1)	
		Radio/TV			236 (49.7)	
		Social media			133 (28.0)	
		Town announcer			125 (26.3)	
		Religious leaders			76 (16.0)	
		Traditional leaders/healers			56 (11.8)	
		Others			16 (3.4)	

Regarding the knowledge of Mpox (Table 3), the primary outcome variable revealed that 69.1% of respondents (n=328) reported knowledge of monkeypox, while 30.9% (n=147) indicated no knowledge of the disease. This prevalence shows a majority-informed population with a substantial minority remaining unaware of the disease.

Table 3 Knowledge of Mpox

istic	Cate	Characteristic	Cate	Characteristic	Categories/Values		N (%)
		Knowledge of Mpox	Yes		328 (69.1)		
			No		147 (30.9)		

Descriptive Statistics

Multivariate Logistic Regression Analysis

The multivariable logistic regression model incorporated all demographic and information source variables simultaneously to identify independent predictors while controlling for potential confounding effects. Model performance statistics are presented in Table 4. The logistic regression model demonstrated statistical significance (Likelihood Ratio $\chi^2 = 75.12$, $p < 0.0001$), indicating that the combined predictor variables significantly enhance the prediction of Mpox knowledge beyond chance levels. The model achieved a pseudo-R-squared of 0.1278, explaining approximately 12.8% of the variance in knowledge outcomes. Model complexity was balanced with fit quality (AIC = 536.63, BIC = 586.59).

Table 4 Multivariate logistic analysis

knowledge_monkeypox	Odds ratio	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Gender	.726	.1662	-1.40	.1618	.4635	1.137	
Age range	1.5371	.194	3.41	.0007	1.2003	1.9684	***
Maritalstatus	2.0019	.4332	3.21	.0013	1.3099	3.0595	***
Occupation	.898	.0821	-1.18	.2394	.7506	1.0743	
Radio_TV	1.9541	.4574	2.86	.0042	1.2351	3.0916	***
Town_anouncement	1.5879	.4713	1.56	.1192	.8875	2.841	
Social_media	3.3036	.9545	4.14	0	1.8753	5.8199	***
Health_care	3.188	.7471	4.95	0	2.0139	5.0465	***
Religious_org	.8009	.3247	-0.55	.5839	.3618	1.7728	

Traditional_sources	.414	.1997	-1.83	.0675	.1609	1.0654	*
Others	3.0656	2.0306	1.69	.0908	.837	11.2286	*
Constant	.0444	.0428	-3.23	.0012	.0067	.2934	***

Mean dependent var	0.6905	SD dependent var	0.4628	
Pseudo r-squared	0.1278	Number of obs	475	
Chi-square	75.1172	Prob > chi2	0.0000	
Akaike crit. (AIC)	536.6278	Bayesian crit. (BIC)	586.5876	

*** $p < .01$, ** $p < .05$, * $p < .1$

Demographic Determinants

Age Effects: Age emerged as a highly significant demographic predictor (OR = 1.537, 95% CI: 1.200-1.968, $p = 0.0007$). Each incremental age category increased the odds of Mpox knowledge by 53.7%, demonstrating a strong positive association between advancing age and disease knowledge.

Marital Status: Married respondents exhibited significantly higher knowledge odds compared to unmarried individuals (OR = 2.002, 95% CI: 1.310-3.060, $p = 0.0013$). Marriage doubled the likelihood of Mpox awareness, indicating the importance of social connectivity in information diffusion.

Gender and Occupation: Neither gender (OR = 0.726, 95% CI: 0.464-1.137, $p = 0.162$) nor occupation (OR = 0.898, 95% CI: 0.751-1.074, $p = 0.239$) demonstrated statistically significant associations with knowledge outcomes in the adjusted model.

Information Source Effects

Mass Media Channels: Trust in conventional media sources such as radio and television significantly predicted Mpox knowledge (OR = 1.954, 95% CI: 1.235-3.092, $p = 0.0042$), nearly doubling the odds of awareness among users of these traditional broadcast media.

Social media/digital platforms: Social media trust demonstrated the strongest association with knowledge (OR = 3.304, 95% CI: 1.875-5.820, $p < 0.001$), indicating that individuals trusting digital platforms had over three times higher odds of Mpox knowledge.

Healthcare Systems: Trust in healthcare workers showed a robust positive association (OR = 3.188, 95% CI: 2.014-5.047, $p < 0.001$), with trust in medical professionals tripling the likelihood of disease knowledge.

Community-Based Channels: Town announcer trust showed positive but non-significant effects (OR = 1.588, 95% CI: 0.888-2.841, $p = 0.119$). Religious leader trust demonstrated no significant association (OR = 0.801, 95% CI: 0.362-1.773, $p = 0.584$).

Traditional Sources: Trust in traditional leaders or healers exhibited a negative association approaching statistical significance (OR = 0.414, 95% CI: 0.161-1.065, $p = 0.068$), suggesting knowledge deficits among individuals relying primarily on traditional information networks.

Alternative Sources: The small subset trusting "other" information sources showed elevated knowledge odds (OR = 3.066, 95% CI: 0.837-11.229, $p = 0.091$), though this estimate carries substantial uncertainty due to limited sample size ($n=16$).

To further strengthen the empirical results, additional analysis was conducted on respondents who affirmed positive knowledge of Mpox. This revealed that out of 328 respondents who are aware of Mpox, 265 (80.8%) stated that a sign and symptom of Mpox is "A skin rash and swollen lymph node", 2 (0.7%) stated "Back pain", 45 (14.8%) stated "Fever", 2 (0.7%) stated "Headache", 2 (0.7%) stated "Low energy", while 7 (1.9%) mentioned "Muscle Aches". In all 7 (1.9%) stated : "I do not know".

Depth of Knowledge Assessment: Symptom Recognition Patterns

Among respondents who affirmed knowledge of mpox ($n = 328$), recognition of specific symptoms varied (Table 3). The majority (80.8%, $n = 265$) correctly identified "skin rash and swollen lymph nodes" as primary manifestations of the disease. Fever was the second most frequently cited symptom (13.7%, $n = 45$). Other symptoms such as muscle aches, headaches, and fatigue were reported less frequently. A small proportion of respondents (1.8%) indicated uncertainty ("I do not know").

Discussion

Our study provides important information on the determinants of Mpox knowledge among residents of Akwa Ibom State, Nigeria, showing the influence of demographic characteristics and

information channels on public knowledge. The overall knowledge level of 69.1% connotes a moderately informed population. However, the proportion of responses indicating no knowledge of Mpox is low, revealing persistent gaps in public health communication and outbreak preparedness. These findings are comparable to those from other parts of Nigeria, which reported moderate knowledge, with varying levels of understanding of Mpox transmission, symptoms, and prevention. For instance, Bakare et al. reported that 78.3% of primary healthcare workers across Lagos, Oyo, and Jigawa States were aware of Mpox. However, significant knowledge gaps remained about the disease transmission [10]. Similarly, Onyebuchi et al. found that, despite high awareness of Mpox among social media users in Southeast Nigeria, there exists a noticeable variation in Mpox knowledge and preventive practices [11].

The association observed between age and Mpox knowledge in our study is consistent with previous findings indicating that older individuals tend to have better health knowledge due to repeated, cumulative exposure to health information, increased healthcare utilization, and greater awareness [12-14]. Similarly, age-related knowledge trends have been reported in studies of infectious diseases in other countries [15]. Younger individuals are likely to have lower engagement with conventional public health messaging or to underestimate their vulnerability to infectious diseases, thereby limiting information uptake [16, 17]. This finding suggests the need for age-specific risk communication strategies, particularly those tailored to younger populations who increasingly rely on digital and peer-driven information platforms.

The marital status of the respondents has also emerged as a predictor of Mpox knowledge, with married respondents showing higher knowledge. This likely reflects the role of household interactions, social support systems, and shared decision-making in facilitating information exchange [14]. Comparable findings have been documented in studies of infectious disease knowledge, in which social cohesion and family structures influence health-seeking behavior and information dissemination [18, 12]. This indicates that unmarried individuals may be less exposed to interpersonal health communication and, therefore, require more targeted engagement approaches.

The study further highlights the role that information channels play in shaping public knowledge. We found that trust in healthcare workers was associated with higher Mpox knowledge,

reaffirming the role of healthcare professionals as credible sources of health information. This finding aligns with studies conducted among healthcare workers and communities in Nigeria, which demonstrated that healthcare professionals significantly influence public understanding and response to Mpox and other infectious diseases [10, 19]. The high level of trust in healthcare workers observed in this study supports the continued integration of healthcare providers into community-based risk communication and health promotion strategies.

We also observed a positive association between social media as a preferred source of information and Mpox knowledge, consistent with growing evidence that digital platforms play a major role in disseminating outbreak-related information. Studies conducted in Southeast Nigeria and among Nigerian health students similarly identified social media as a major source of Mpox information, particularly among younger and more educated populations [11]. Worldwide, digital platforms have become increasingly influential in shaping perspectives and behaviors during outbreaks, as seen during the COVID-20 pandemic and the 2022 global Mpox outbreak [20, 21]. However, despite social media's role in rapidly disseminating health information, it has also contributed to the spread of misinformation and infodemics [22, 23]. Globally, recent analyses of online Mpox discourse have demonstrated the widespread dissemination of toxic and misleading content, including stigma and misinformation [24, 25]. This calls for structured digital risk communication and infodemic management strategies.

The observed influence of radio and television in our study further portrays the continued relevance of traditional media in public health communication, particularly in settings with unequal digital access. Traditional broadcast media remain critical for reaching rural and underserved populations and continue to serve as trusted sources of health information in many African settings. The coexistence of strong traditional and digital media effects in this study suggests that integrated communication strategies that utilize multiple platforms are likely to achieve broader reach and greater effectiveness than relying on a single information source.

Conversely, the negative associations observed with traditional and religious information sources suggest that these community structures are not maximally utilized in Mpox communication efforts. This finding is particularly important within the Nigerian context, where religious and

traditional leaders often serve as influential gatekeepers and trusted intermediaries [26, 27]. The negative trend associated with traditional information sources may indicate the persistence of misconceptions or limited integration between traditional communication systems and formal public health messaging. Similar concerns regarding misinformation and low trust in official health communication have been reported in Nigeria and other settings during infectious disease outbreaks [28, 23]. Thus, reliance on traditional information sources without alignment to formal health messaging may perpetuate misinformation and weaken outbreak responses. To mitigate this, public health authorities and community leaders should collaborate to integrate traditional communication systems with official health communication strategies.

A notable contribution to this study is the assessment of the depth of knowledge of Mpox through symptom recognition analysis. The finding that many respondents who were knowledgeable of Mpox correctly identified characteristic symptoms such as skin rash and swollen lymph nodes suggests that knowledge extended beyond superficial familiarity to clinically meaningful knowledge. This is encouraging, as accurate symptom recognition supports early healthcare seeking, case detection, and timely response [29]. However, lower recognition of other symptoms indicates an incomplete understanding of the disease spectrum and highlights the need for more comprehensive public health messaging.

Our study findings have important public health and policy implications. First, they emphasize the need for targeted and evidence-based risk communication strategies that account for demographic disparities in knowledge. Younger populations, unmarried individuals, and persons relying on traditional information systems may require tailored communication interventions. Second, the influence of healthcare workers, social media, and traditional media highlights the importance of adopting integrated, multi-platform communication approaches during outbreak preparedness and response. Public health authorities should strengthen partnerships with media organizations, traditional and religious leaders, healthcare institutions, and digital communication platforms to ensure the dissemination of accurate and timely information.

The findings underscore the need to institutionalize risk communication and community engagement as core pillars of epidemic preparedness and response in Nigeria. Strengthening

infodemic management systems, improving digital health literacy, and proactively countering misinformation should become strategic priorities for outbreak control. Policymakers should also invest in training healthcare workers in interpersonal communication and community engagement, given their critical role as trusted intermediaries for information. Proactive and evidence-based communication approaches are essential for ensuring that accurate health information reaches all population groups and supports effective Mpox prevention and control efforts in Akwa Ibom, Nigeria. |

Study Limitations and Future Research |

First, the cross-sectional design limits causal inference about the relationships among demographic factors, information sources, and Mpox knowledge. This notwithstanding, the study investigated the association among the three. Second, the use of interviewer-administered questionnaires introduces the possibility of recall and social desirability bias, as respondents' answers may be shaped by memory limitations or a tendency to provide responses perceived as more favorable or acceptable. Third, the study was conducted within a single state, which may limit generalizability to other regions with different socio-cultural and communication contexts. In addition, the binary measurement of knowledge may not fully capture the complexity of respondents' understanding, although the supplementary symptom recognition analysis partially addressed this limitation. |

Despite these limitations, the study provides valuable evidence to guide public health communication and outbreak preparedness strategies in Akwa Ibom State and Nigeria at large. Future research should consider longitudinal and mixed-methods approaches to better understand behavioral drivers, trust dynamics, misinformation pathways, and changes in knowledge over time. Further studies exploring the effectiveness of specific communication channels and interventions across diverse populations would also strengthen evidence-based outbreak response planning. |

Conclusion |

Findings from this study demonstrate that demographic characteristics and information sources significantly influence Mpox knowledge among residents of Akwa Ibom State, Nigeria. Age, marital status, and access to trusted information channels were important predictors of knowledge and understanding of Mpox. Healthcare workers, social media, radio, and

television emerged as key drivers of knowledge, while gaps persisted among younger, unmarried populations relying mainly on traditional information systems. The findings reveal the need for targeted and integrated risk communication strategies that combine the credibility of healthcare workers, the broad reach of traditional media, and the rapid dissemination capacity of digital platforms. Strengthening community engagement, digital health literacy, and infodemic management will be critical to improving outbreak preparedness and response by all stakeholders.

Declarations:

Ethics approval

Ethics approval for the study was obtained from the Akwa Ibom Health Research Ethics Committee with Approval Number AKHREC/26/03/26/442. The study adhered to the scientific requirements and research protocols outlined in the Declaration of Helsinki for the recruitment of human participants and was carried out in accordance with the institutional guidelines, rules, and regulations of the National Code for Health Research Ethics.

Consent to participate

All participants were provided with detailed information regarding the study's purpose and procedures. Informed consent was obtained electronically before participation. Confidentiality and anonymity were ensured by excluding personally identifiable information from the dataset and restricting access to authorized members of the research team only.

Clinical trial number

Not applicable

Consent for publication

Not applicable

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests

Funding

The study received no funding

Authors' contributions

KI – Conceptualization, Methodology, Data collection, Writing, Review/Editing

OEN – Writing, Review/Editing, Coordination/Supervision

UGO – Writing, Review/Editing

ECJU – Formal Analysis, Writing, Review/Editing

EP – Writing, Review/Editing

VOO – Writing, Review/Editing

All authors read and approved the final manuscript

Acknowledgements

Not applicable

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