Monkeypox in Focus: Knowledge, Attitudes, and Practices in Southeastern Nigeria during the Post-2022 Outbreak Era

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ABSTRACT

Recent global health events such as the COVID-19 pandemic and Monkeypox (Mpox) outbreaks have highlighted the need for proactive public health preparedness. Although Mpox did not reach pandemic status, its rapid transboundary spread from Nigeria to other continents raised concern. Effective disease response relies heavily on an informed population, especially in endemic regions. This study aimed to assess the knowledge, attitudes, and practices (KAP) regarding Mpox among residents of Southeastern Nigeria to examine the demographic factors associated with their KAP levels. A cross-sectional online survey was conducted among 392 residents across Abia, Anambra, Ebonyi, Enugu and Imo States. A validated structured questionnaire was distributed via Google forms through online platforms (WhatsApp, Telegram e.t.c) over a three-month period adopting purposive and snowballing sampling techniques. Data generated were analyzed using SPSS version 23, with statistical significance set at $p \leq 0.05$. Respondents were predominantly aged 18–37 (49.5%), female (58.9%), and had tertiary education (96.9%). Enugu State had the highest representation (33.4%). Overall, good knowledge, attitude, and practice levels were observed in 91.5%, 84.1%, and 67.4% of respondents, respectively. Knowledge and practice levels showed no significant association with sociodemographic variables. However, attitude level was significantly associated with state of residence ($\chi^2 = 10.795$, $df = 4$, $p = 0.023$). Binary logistic regression showed that residents of Ebonyi State were three times more likely to have a positive attitude towards Mpox (OR = 3.288, $p = 0.038$). Enhanced public enlightenment campaigns are essential to sustain and improve KAP regarding Mpox and other infectious diseases in Southeastern Nigeria.

Keywords: *Monkeypox, KAP survey, HBM Framework, Southeastern Nigeria, public health awareness*

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INTRODUCTION

Mpox has evolved from a historically localized zoonotic disease into a significant global public health concern, with marked epidemiological changes in recent years (Naga *et al*., 2025). Previously characterized mainly by sporadic animal-to-human spillover events in Central and West Africa, the disease entered a new phase during the 2022 multi-country outbreak marked a major turning point in its global relevance (Parker *et al*., 2025), when sustained human-to-human transmission was reported across more than 100 countries and territories (Srivastava *et al*., 2025). By August 2024, over 100,000 laboratory-confirmed cases and more than 220 deaths had been reported globally, with widespread transmission across non-endemic regions highlighting the virus's capacity for sustained human-to-human spread through close physical contact and interconnected social networks (Bogacka *et al*., 2025). The World Health Organization (WHO) through the Director-General Dr Tedros Adhanom Ghebreyesus declared Mpox as a Public Health Emergency of International Concern (PHEIC) twice in 2022 and 2024 (WHO, 2024). The first outbreak was largely associated with the Clade IIb lineage and prompted substantial expansion of global surveillance systems, vaccination programs, and preparedness strategies (Gao *et al*., 2023; Bogacka *et al*., 2025).

The global epidemiological landscape became more complex in 2024 with the emergence and rapid spread of the Clade Ib lineage in the Democratic Republic of the Congo and neighboring countries (Marty *et al*., 2024). This lineage has been associated with increased transmissibility and broader demographic involvement, including pediatric infections, prompting renewed international concern (Brüssow, 2025; Zamani *et al*., 2025). Globally, between January 2022 and March 2026, a total of 181,164 confirmed mpox cases and 492 deaths were reported across 144 WHO Member States, demonstrating the continuing international burden of the disease (PAHO, 2026). These developments have shifted public health priorities from viewing Mpox as a rare regional disease to addressing challenges related to viral evolution, genomic surveillance, vaccine equity, response preparedness, and non-stigmatizing risk communication (Aggarwal *et al*., 2023; Rahi *et al*., 2023; Akingbola *et al*., 2025; Jadhav *et al*., 2025). Effective control now depends on coordinated international action together with strengthened healthcare systems in heavily affected settings.

Nigeria remains central to the epidemiology of Mpox as one of the endemic countries in West Africa (Ogunleye *et al*., 2024; Daodu *et al*., 2026). The 2017 re-emergence of Mpox in Nigeria, after decades of limited reporting, demonstrated the potential for sustained outbreaks in urban and peri-urban communities and highlighted vulnerabilities in disease detection and response systems (Schmidt-Sane & Wilkinson, 2025; Aribi *et al*., 2026). Since then, recurrent outbreaks and continued case notifications have reinforced the need for stronger surveillance, early detection, and community-based prevention strategies (Ebede *et al*., 2025; Pathela *et al*., 2026). Public knowledge and behavior are critical determinants of outbreak control, particularly in low-resource settings where healthcare infrastructure may be limited (Otuh *et al*., 2018; Alhumaid *et al*., 2023; Olawade *et al*., 2024). In Nigeria, evidence suggests that disease surveillance and reporting mechanisms remain weak at the community level, while inadequate awareness and misconceptions regarding symptoms, transmission routes, and preventive practices may delay diagnosis and timely healthcare seeking (Olawade *et al*., 2024). Such gaps can facilitate continued community transmission and undermine containment efforts.

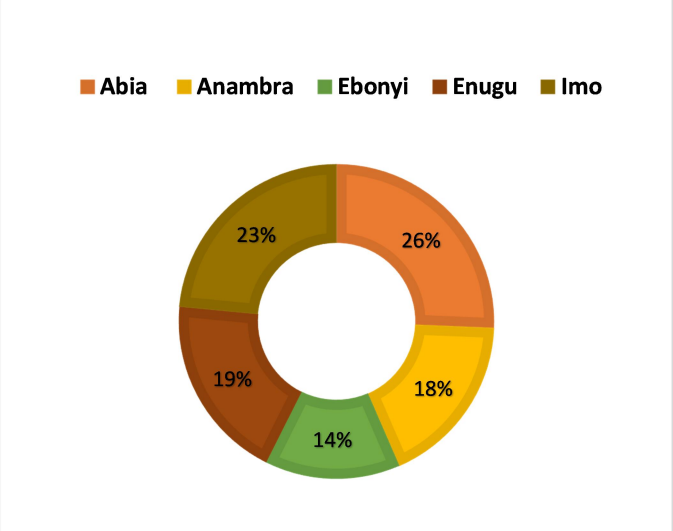
Knowledge, Attitude, and Practice (KAP) studies are valuable epidemiological tools for assessing how communities understand and respond to infectious disease threats. They help identify misinformation, evaluate behavioral risks, and guide the development of targeted health education and risk communication interventions (Otuh *et al*., 2019; Duval *et al*., 2023; Zarei *et al*., 2024). KAP surveys have contributed meaningfully to outbreak control efforts during previous epidemics such as Ebola, COVID-19, and Lassa fever by informing culturally appropriate public health responses (Reuben *et al*., 2021; Lewis, 2023; Jonah *et al*., 2024).

Despite the growing importance of mpox in Nigeria, limited published evidence exists on community awareness and preventive behaviors in southeastern Nigeria, comprising Abia, Anambra, Ebonyi, Enugu, and Imo States. These states remain vulnerable to infectious disease transmission because of population mobility, urbanization, and unequal access to health information. Understanding community-level knowledge and behaviors in this region is therefore essential for identifying exposure risks and improving preparedness.
This study therefore aims to assess the knowledge, attitudes, and practices related to mpox among residents of southeastern Nigeria and to examine the association between demographic characteristics and KAP outcomes. The findings are expected to provide evidence-based guidance for policymakers and public health authorities to design effective health promotion interventions, strengthen surveillance systems, improve risk communication, and enhance Nigeria's preparedness and response to future mpox outbreaks.

METHODOLOGY

Study location

Nigeria is traditionally segmented into six geo-political zones, designed to reflect the country's cultural diversity. The South-East (SE) region, comprising five states (Abia,



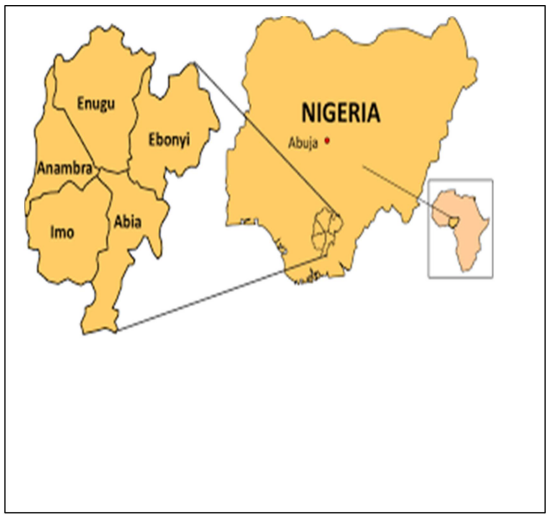


Figure 1: Population distribution in southeastern states of Nigeria. **Figure 2:** Map of Nigeria highlighting 5 Southeastern States (Osuafor & Ude, 2021).

Anambra, Ebonyi, Enugu, and Imo), is predominantly inhabited by the Igbo ethnic group and covers an estimated area of 76,358 km² with a population of about 36 million (Anejionu *et al*., 2013; Osuafor & Ude 2021). Each of the five states was profiled individually as represented in (Figures 1 and 2).

Study Design and Setting

A descriptive, cross-sectional survey design was adopted to assess knowledge, attitudes, and practices (KAP) regarding Monkeypox disease among residents of Southeastern Nigeria where the index case of the 2022 Mpox outbreak in Nigeria was identified.

Study Population and Sampling

The study population consisted of adults aged 18 years and above residing in the selected states. A combination of purposive and snowball sampling techniques was employed to recruit participants via online platforms. The survey link was directly sent to targeted groups via, WhatsApp, Telegram, forums, or social media pages. Initial participants were encouraged to send the link to their networks who met up with the study criteria. The inclusion criteria were residence in one of the five states, age ≥18 years, and willingness to participate.

Data collection tool and procedure

Questionnaire Validation followed Aithal and Aithal (2020) guidelines with Cohen's Kappa index of 0.78 (face validity) and inter-rater reliability of 0.81, indicating excellent agreement. Data were collected using the validated, structured questionnaire developed in Google Forms. The instrument comprised five sections: demographic information, knowledge of Monkeypox, attitudes towards the disease, practices, and risk-related behaviors. The form link was distributed over a 3-month period from March to June 2023 via online platforms, leveraging community and professional networks to enhance wide reach. Responses were stored in an excel spreadsheet on the Google forms.

Sample Size calculation

The sample size was determined using Cochran's formula for cross-sectional studies as described by Cochran (1977) and supported by recent methodological literature (Sadiq et al., 2025)

$$N = Z^2 \times P(1 - P) / d^2$$

Where: Z = 1.96 (95% confidence level); P = 50% (assumed prevalence due to unknown exact value); d = 5% (desired precision)

$$N = (1.96^2 \times 50(100 - 50)) / 5^2 = 384$$

Ultimately a total of 393 respondents were surveyed to ensure adequate representation.

Data Analysis

Data were exported from google forms into Statistical Package for Social Sciences (SPSS) software version 23 for statistical analysis. Descriptive statistics (frequencies,

percentages, means) were used to summarize demographic variables and KAP levels. Chi-square tests were applied to determine associations between demographic characteristics and KAP variables at a significance level of $p \leq 0.05$. Binary logistic regression was conducted to identify predictors of attitude and practice levels while Likert-scale scoring (1 = very poor; 4 = excellent) was applied to attitudes and practices. Cut-offs: ≤2 = poor; ≥3 = good.

Study Limitation

Online-only participation limited inclusivity, potentially excluding older or less technologically savvy individuals. Self-selection and response bias were anticipated limitations. A key limitation of this study is the potential for sampling bias associated with its online-based design. Since data were collected using an online survey platform, participation was limited to individuals with internet access, digital literacy, and availability of electronic devices. This inherently excludes segments of the population such as individuals in rural or low-resource settings with limited or no internet access, thereby reducing the representativeness of the sample. In addition, this online survey is susceptible to self-selection bias, as individuals who are more interested in health-related issues or Mpox may have been more likely to participate. This may have led to an overrepresentation of respondents with higher awareness or stronger opinions about Mpox hence may potentially influence estimates of knowledge, attitudes, and preventive practices. Furthermore, the inability to control the survey environment may have introduced variability in how questions were interpreted or answered, despite efforts to design clear and standardized instruments. Despite these limitations, this online approach allowed for rapid data collection and broader geographic reach within Southeast Nigeria, providing useful insights into behavioral risk patterns in a timely and resource-efficient manner.

Ethical Consideration

Ethical approval was obtained from the Michael Okpara University of Agriculture Umudike Research Ethics Committee, College of Veterinary Medicine; **(**Ref: MOUAU/CVM/REC/202314).

RESULTS

Demographic Characteristics of Respondents

Of the 392 individuals approached, 390 consented to participate (99.5% response rate). The majority (49.5%) were aged 18–37 years, and females accounted for 59.7%. Most participants (96.9%) had tertiary education. Respondents were evenly split between healthcare and non-healthcare workers (44.4% each), while students constituted 10.7%. Enugu State had the highest representation (33.4%), followed by Ebonyi (26.8%) and Abia (15.1%) as presented in (Table 1).

Table 1: Socio-demographic characteristics of Respondents.

Variable	Category	Frequency (N=392)	Percentage (%)
Consent	No	2	0.5
	Yes	390	99.5
Age	18-37	194	49.5
	38- 47	171	43.6
	48-57	18	4.6
	58 and above	7	1.8
Gender	Female	234	59.7
	Male	156	39.8
Education	No formal	2	0.5
	Secondary	8	2.0
	Tertiary	380	96.9
Occupation	Healthcare worker	174	44.4
	Non-healthcare worker	174	44.4
	Student	42	10.7
State of residence	Abia State	59	15.1
	Anambra State	47	12.0
	Ebonyi State	105	26.8
	Enugu State	131	33.4
	Imo State	48	12.2

Knowledge of Monkeypox Disease

Respondents demonstrated a generally high level of awareness and sound background knowledge of Mpox, particularly regarding its existence, causation, clinical presentation, and transmission dynamics. Nearly all respondents (98.5%) correctly identified Mpox as a real disease, while 96.7% recognized its viral origin, indicating strong basic biomedical awareness of the infection. Knowledge of clinical manifestations was also notably high. Most respondents correctly identified fever (96.2%) and generalized raised skin rashes (98.5%) as key symptoms, suggesting a good understanding of the disease's characteristic presentation. This level of recognition is important for early detection and timely health-seeking behavior. With respect to transmission pathways, respondents showed a relatively strong grasp of both zoonotic and human-to-human spread. A substantial proportion (93.1%) acknowledged animal-to-human transmission (zoonosis), while an even higher proportion (98.5%) recognized transmission through human contact. This indicates that respondents are largely aware of the dual transmission routes, which is critical for preventive behavioral practices. Despite this overall strong knowledge profile, notable gaps were observed in preventive awareness. Approximately 33.8% of respondents were unaware that a vaccine for Mpox exists, reflecting a significant deficiency in knowledge regarding available preventive interventions. This gap is particularly important as it may contribute to vaccine hesitancy or low uptake of preventive services. Awareness of recent Mpox outbreaks was also high, with 88.3% reporting awareness of the outbreak in Nigeria and 93.6% aware of global occurrences, suggesting that respondents are relatively well-informed about the disease's current epidemiological relevance both locally

Table 2: Responses on the knowledge of Monkeypox disease.

Questions on Knowledge of Monkey pox disease	Responses	
	True (%)	False (%)
Monkeypox disease exists?	386(98.5)	4(1.5)
Monkeypox disease is a disease of animals only?	75 (19.2)	315 (80.8)
Monkeypox disease is caused by a virus?	377(96.7)	13(3.3)
Fever is a sign of Monkeypox disease?	375(96.2)	15(3.8)
Monkeypox disease presents with raised big rashes on the skin?	386(98.5)	4(1.5)
Monkeypox disease can be transferred from animals to humans and vice versa?	363(93.1)	27(6.9)
Monkeypox disease can occur through contact with infected person?	386(98.5)	4 (1.5)
Monkeypox disease can be treated?	353(90.1)	37 (9.9)
Monkeypox disease can cause death?	372(95.4)	18 (4.6)
Monkeypox disease can be transmitted through eating of bush meat?	332(85.1)	58(14.9)
There is available vaccine for Monkeypox disease?	285(66.2)	132(33.8)
Monkeypox disease occurred recently in Nigeria?	346(88.3)	44(11.7)
Monkeypox disease occurred in other parts of the world?	365(93.6)	25(6.4)

Table 3: Respondents' attitude towards Monkeypox disease.

Questions in terms of associated risks, health seeking behavior and concern on control of Monkeypox disease	Responses respondents(N=390)			
	SD (%)	**D** (%)	**A** (%)	**SA** (%)
I am concerned about contracting Monkeypox disease	96 (24.6)	66 (16.9)	81 (20.8)	147 (38.7)
I am afraid that eating bush meat can expose me to Monkeypox disease	66 (16.9)	71(18.2)	65(16.7)	188(48.2)
I am afraid that touching wild animals can expose me to Monkeypox disease	82(21.0)	71(18.2)	63(16.2)	174(44.6)
I will seek help from the hospital if I have signs of Monkeypox disease	30 (7.7)	10(2.6)	18(4.6)	332(85.1)
I will take vaccination against Monkeypox disease if available	42(10.8)	26(6.7)	60(15.4)	262(67.2)
Monkeypox is a serious concern to healthcare system in Nigeria	40(10.3)	45(11.5)	64(16.4)	241(61.8)
I have confidence that the government of my State is ready to implement strategies to prevent and control Monkeypox disease	78(20.0)	115(29.5)	86(22.1)	111(28.4)
I am concerned that Monkeypox disease is spreading around the world	38(9.8)	80(20.6)	101(26.0)	169(43.6)

**Strongly disagree = SD, *Disagree = D, *Agree = A, *Strongly agree = SA*

and internationally. Overall, while the findings indicate strong general knowledge of Mpox especially regarding its identity, symptoms, and transmission; important deficiencies remain in preventive knowledge, particularly concerning vaccination, which may have implications for effective disease control and behavioral compliance (Table 2).

Attitude towards Monkeypox Disease

As presented in (Table 3), respondents generally exhibited a moderate to high level of perceived risk and concern regarding Mpox infection. A majority (59.5%) reported being concerned about contracting monkeypox, indicating a considerable level of perceived personal vulnerability within the study population. Similarly, a substantial proportion (64.9%) expressed fear regarding exposure through bush meat consumption and contact with wild animals, reflecting awareness of key zoonotic transmission pathways. Health-seeking behavior appeared favorable, as most respondents (85.1%) indicated that they would seek care at a hospital if they developed symptoms suggestive of Mpox. This suggests a strong inclination toward formal healthcare utilization, which is important for early detection and disease management. In terms of perceived severity, a high proportion (78.2%) regarded monkeypox as a serious public health problem, demonstrating recognition of its broader population-level impact beyond individual risk. However, trust in institutional response was comparatively lower, with only 50.5% of respondents expressing confidence in their state government's ability to effectively control the disease. This indicates a notable gap in institutional trust, which may influence adherence to public health interventions and compliance with outbreak control measures. Overall, the findings suggest that while concern, perceived severity, and health-seeking intentions are relatively strong, trust in government response remains moderate and may represent a key area for public health strengthening.

Practices Related to Monkeypox Disease

Figure 3 illustrates respondents' behavioral practices related to monkeypox exposure risk. Overall, avoidance of direct animal-related exposure was high, with the majority reporting that they were very unlikely to have contact with monkeys (85.1%) and to allow pets to roam in bush environments (83.0%). In contrast, exposure-related behaviors such as contact with rodents (25.4%) and consumption of bush meat (40.8%) showed more variability, with a noticeable proportion of respondents indicating some level of engagement in these practices. Vaccination-related responses displayed a distinct pattern, with a higher proportion of respondents indicating strong encouragement or willingness toward vaccination (86.2%) compared to other behavioral domains. This contrasts with the mixed risk behaviors observed in zoonotic exposure practices. Overall, the figure highlights a clear pattern of low direct wildlife exposure but persistent moderate engagement in indirect zoonotic risk behaviors, particularly bush meat consumption and

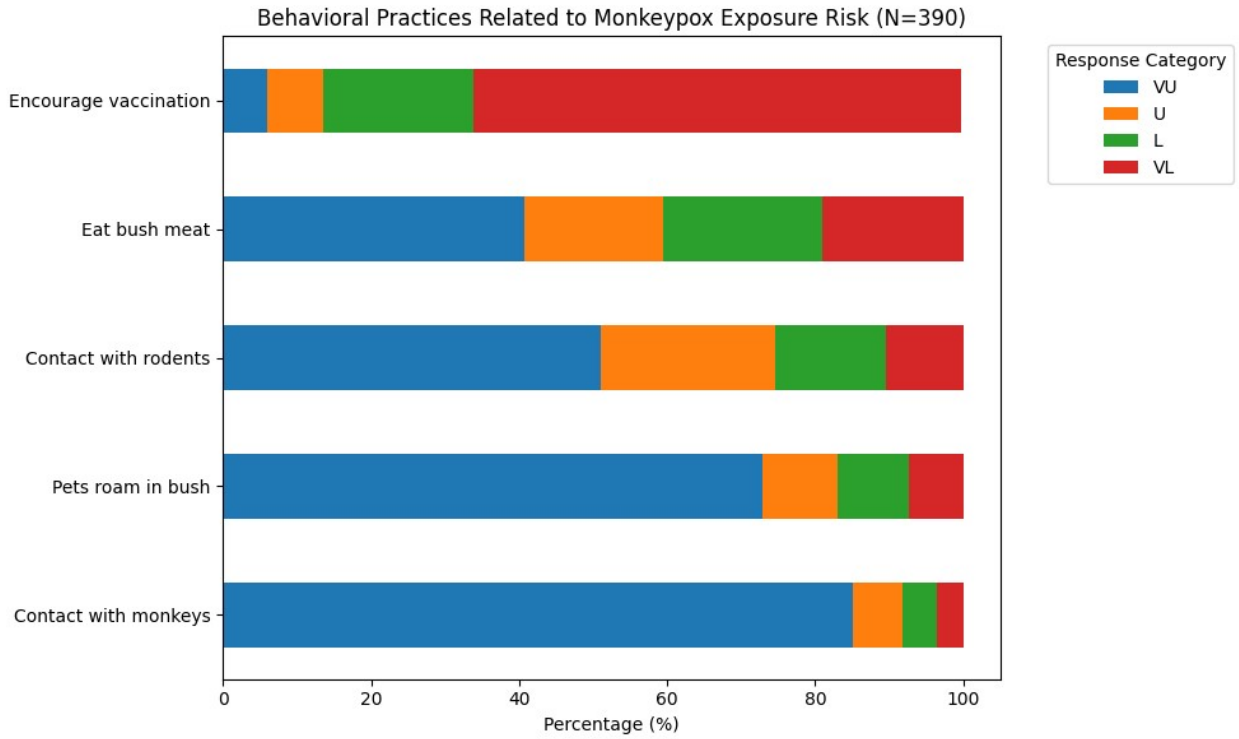


Figure 3: Distribution of practices related to mpox prevention and exposure

Table 4: Knowledge status, Attitude status and Practice status of respondents.

Variable	Status/Level	Frequency (N=390)	Percentage (%)
Knowledge	Good	357	91.5
	Poor	33	8.5
Attitude	Good	328	84.1
	Poor	62	15.9
Practices	Good	263	67.4
	Poor	127	32.6

Behavioral practices related to monkeypox exposure risk among respondents (N = 390). The figure presents the distribution of responses across four categories: Very Unlikely (VU), Unlikely (U), Likely (L), and Very Likely (VL) rodent contact (Figure 3).

Overall KAP Status

The distribution of respondents' knowledge, attitude, and practice (KAP) levels the participants (N=390), is shown using three pie charts and a comparative bar summary. For knowledge status, the majority of respondents demonstrated good knowledge. Precisely, 357 respondents (91.5%) achieved scores classified as good (≥7 correct answers), while only 33 respondents (8.5%) fell into the poor knowledge category. This indicates a very high level of awareness and understanding among the study population. In terms of attitude, a strong trend is observed, though slightly lower than knowledge, 328 respondents (84.1%) exhibited a positive attitude, whereas 62 respondents (15.9%) had poor attitude. This suggests that most participants not only understand the subject but also hold favorable perceptions toward it. However, the pattern shifts at the practice status section. While a majority still demonstrated good practices, the proportion is lower compared to knowledge and attitude; 263 respondents (67.4%) reported good practices (≥3 appropriate responses), while a substantial 127 respondents (32.6%) engaged in poor practices. This highlights a gap between knowledge/attitude and actual behavioral implementation.

The bar chart at the bottom reinforces these findings by directly comparing the proportions across the three domains. It clearly shows a declining trend from knowledge (91.5%) to attitude (84.1%) to practice (67.4%), indicating that although awareness and perceptions are high, they do not fully translate into appropriate practices. Overall, the figure illustrates a classic knowledge/practice gap, where high levels of knowledge and positive attitudes are not consistently reflected in behavior/action (Table 4 and Figure 4). Figure 4 shows that high knowledge (91.5%) and positive attitudes (84.1%) but comparatively lower good practices (67.4%).

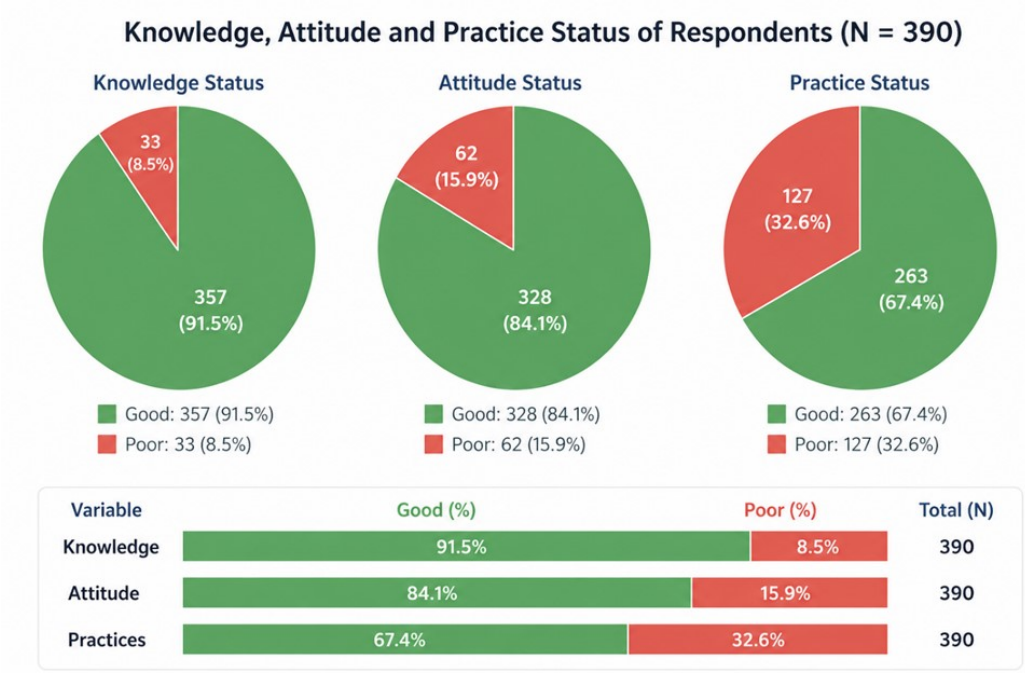


Figure 4: Distribution of respondents' knowledge, attitude, and practice (KAP) levels.

Table 5: Association between socio-demographic characteristics and knowledge, attitude, and practice (KAP) levels, highlighting a significant relationship between state of residence and attitude.

Variable	Category	Attitude Level		Total	X^2	df	a-value
		Good	Poor				
Age	18-37	165(42.3)	29(7.4)	194(49.7)	1.424	3	**0.700**
	38- 47	142(36.4)	29(7.4)	171(43.8)			
	48-57	16(4.1)	2(0.5)	18(4.6)			
	≥58	5(1.3)	2(0.5)	7(1.8)			
Gender	Female	202(51.8)	32(8.2)	234(60)	2.161	1	**0.142**
	Male	126(32.3)	30(7.7)	156(40)			
Education	No formal	2(0.5)	0(0)	2(0.5)	1.940	2	**0.379**
	Secondary	8(2.1)	0(0)	8(2.1)			
	Tertiary	318(81.5)	62(15.8)	380(97.4)			
Occupation	Healthcare worker	143(36.7)	31(7.9)	174(44.6)	0.865	2	**0.649**
	Non-healthcare worker	149(38.2)	25(6.4)	174(44.6)			
	Student	36(9.2)	6(1.5)	42(10.8)			
State of residence	Abia State	46(11.8)	13(3.3)	59(15.1)	10.795	4	**0.029****
	Anambra State	34(10.5)	13(3.3)	47(12.1)			
	Ebonyi State	95(24.4)	10(2.6)	105(26.9)			
	Enugu State	110(28.2)	21(5.4)	131(33.6)			
	Imo State	43(11)	5(1.3)	48(12.3)			

Association between respondents' demography and KAP Levels

No statistically significant associations were found between respondents' age, gender, level of education, or occupation and their knowledge, attitude, or practice levels ($p > 0.05$), indicating that these socio-demographic factors did not implicitly influence KAP outcomes in this study. However, a significant association was observed between state of residence and attitude ($\chi^2 = 10.795$, $p = 0.029$). Logistic regression analysis further clarified this relationship, showing that respondents residing in Abia State were approximately 2.4 times more likely (OR = 2.43) and those in Ebonyi State about 3.3 times more likely (OR = 3.29) to exhibit positive attitudes compared to respondents from the reference state. This suggests that geographical location plays a significant role in shaping attitudes, even though other demographic factors do not (Table 5).

DISCUSSION

The present study reveals a remarkably high level of awareness (98.5%) among respondents, consistent with findings from recent studies in Malaysia, Indonesia, and other settings where extensive media coverage and

global health alerts have significantly enhanced disease visibility (Lin *et al*., 2022; Harapan *et al*., 2020). This heightened awareness likely reflects the ripple effect of the 2022 and 2024 declarations of Mpox as a Public Health Emergency of International Concern (PHEIC), alongside increased access to digital information platforms (WHO, 2024). From the perspective of the Health Belief Model (HBM) framework, this finding indicates strong perceived susceptibility and perceived severity, suggesting that respondents recognize Mpox as a credible public health threat (Mohamed *et al*., 2025). This is further supported by respondents' accurate identification of key clinical features such as fever (96.2%) and raised rashes (98.5%) which aligns with established clinical profiles reported by the Centers for Disease Control and Prevention, reflecting the effectiveness of existing health communication strategies in symptom recognition (Gupta *et al*., 2023; CDC, 2022). Despite this high level of awareness, a notable communication gap persists regarding biomedical prevention, as only 66.2% of participants were aware of the Mpox vaccine. This reveals a disconnect between general disease awareness and knowledge of available preventive measures, indicating weak perceived benefits and limited cues to action within the HBM framework, despite strong threat perception. Similar awareness and intervention gaps have been documented in European countries, where knowledge of vaccination options remained limited despite extensive media exposure, particularly among high-risk groups such as Men who have Sex with Men (MSM) populations (ECDC, 2022; Nimbi *et al*., 2023; Burdi *et al*., 2024). This pattern suggests that public health messaging may disproportionately emphasize disease recognition rather than actionable prevention strategies. Comparable findings have also been reported in Nigeria, where studies on COVID-19 prevention and vaccination revealed gaps between awareness and uptake of preventive interventions, particularly vaccination (Sanda *et al*., 2023).

In terms of risk perception, while more than half of respondents (59.5%) expressed concern about Mpox, a substantial proportion (24.6%) demonstrated apathy, a trend that mirrors findings from Italy and the United States, where Mpox was not consistently perceived as an immediate or serious threat (Nimbi *et al*., 2023; Farahat *et al*., 2022). Although a substantial proportion of respondents (93.1%) correctly identified Mpox as a zoonotic disease, consistent with evidence describing its animal reservoirs, including rodents and non-human primates (Domán *et al*., 2022), high-risk practices such as bushmeat consumption (40.5%) and contact with rodents (25.4%) remain prevalent. This highlights a critical knowledge/practice gap, suggesting that awareness alone is insufficient to drive sustained behavioral change. Similar patterns have been documented in zoonotic disease studies across sub-Saharan Africa, where cultural norms, livelihood dependence, and food insecurity often outweigh biomedical risk perception (Ogoina *et al*., 2020; Bongomin *et al*., 2023). Within the HBM, this indicates that perceived barriers likely outweigh perceived benefits, reinforcing the need for interventions that extend beyond information dissemination to address underlying socio-cultural and economic determinants of behavior (Alyafei & Easton-Carr, 2024). Irrespective of these behavioral gaps, attitudinal responses were generally positive. Most respondents expressed willingness to adopt preventive measures and accept vaccination, with 86.2% indicating acceptance of Mpox vaccination and 83% supporting preventive practices such as restricting pets' access to bushy environments. In the HBM, this reflects favorable perceived benefits and a relatively strong readiness to engage in protective health behaviors. However, a notable proportion of respondents still expressed apathy or low perceived risk, indicating variation in perceived susceptibility, consistent with findings from Europe and North America where Mpox was initially not perceived as an immediate public health threat (Farahat *et al*., 2022; Nimbi *et al*., 2023). This variation is also suggestive of differences in perceived severity, which may weaken motivation for sustained preventive action. Overall, these differences in risk perception highlight an important barrier in the translation of positive attitudes into consistent preventive behavior, despite the presence of potential cues to action through increasing public health awareness.

State-specific differences were also observed, with respondents from Ebonyi State demonstrating significantly more favorable attitudes, being approximately three times more likely to exhibit positive disposition compared to other states. This may be attributed to intensified public health engagement and surveillance activities linked to previous Lassa fever outbreaks in the region (MSF, 2022). Such repeated exposure to outbreak response systems may strengthen community awareness, trust, and responsiveness to health interventions, reflecting a possible lasting impact of prior epidemic control efforts. Nevertheless, high-risk behaviors such as bushmeat consumption and rodent contact remain significant public health concerns due to their role in zoonotic spillover risk (Ogoina *et al*., 2019). In contrast, the relatively high willingness to accept vaccination and engage in preventive practices suggests a potentially favorable foundation for future intervention efforts, provided that existing barriers are adequately addressed.

Interestingly, no significant association was observed between socio-demographic characteristics and either knowledge or practice levels. This finding is consistent with several recent Mpox KAP studies that also reported weak or inconsistent relationships between demographic variables and disease knowledge, particularly in populations with high exposure to mass and digital media (Harapan *et al*., 2020; Lin *et al*., 2022). Similar patterns have been documented during other infectious disease

outbreaks, including COVID-19, where information exposure often outweighed traditional socio-demographic predictors in shaping knowledge levels, especially in digitally connected populations. This may suggest that digital media and widespread information dissemination have contributed to more uniform access to Mpox-related information across different population groups. In this context, digital platforms have functioned as a cue to action serving as a knowledge standardizing factor, enhancing exposure to health messages irrespective of age, education, or occupational status. This aligns with findings from global outbreak communication studies which highlight the increasing role of social media and online health campaigns in reducing traditional knowledge disparities during emerging infectious disease events (Terry *et al*., 2023). However, this interpretation must be viewed alongside important methodological considerations. The reliance on online data collection likely excluded individuals in rural and underserved communities with limited digital access, thereby introducing selection bias and limiting generalizability. This limitation is also reflected in similar studies conducted in low-resource settings, where online-based surveys tend to over-represent urban, educated, and digitally literate populations, potentially masking true socio-demographic inequalities in health knowledge and practices (Hasan *et al*., 2025; Mwansa *et al*., 2025)

The significant association between state of residence and attitude ($p = 0.029$) underscores the influence of local health system engagement and previous outbreak experiences on public perceptions and responsiveness to Mpox prevention. This study highlights the importance of shaping contextual behavioral outcomes, consistent with evidence from previous outbreak settings where local epidemiological experience and health system engagement strongly influenced public attitudes (Nimbi *et al*., 2023). Similar patterns have been reported in Mpox KAP studies in Malaysia and Europe, where variations in attitudes were more strongly associated with information environment and exposure context than with socio-demographic characteristics (Harapan *et al*., 2020; Lin *et al*., 2022). In particular, respondents from Ebonyi State demonstrated more favorable attitudes, which may reflect stronger health system engagement and a residual effect of past outbreak response activities, especially Lassa fever interventions. This is comparable with findings from Ebola- and Lassa fever–endemic settings in West Africa, where repeated exposure to outbreak preparedness systems improved community responsiveness, trust, and compliance with public health interventions (Iyare *et al*., 2023; Onyekuru *et al*., 2023). Such evidence suggests that prior outbreak experience can enhance perceived self-efficacy and institutional trust, thereby improving readiness for emerging infectious disease threats.

Despite these positive linked influences, overall trust in government response capacity remained relatively low (49.5%), reflecting persistent public skepticism. This distrust may be rooted in negative experiences during the COVID-19 pandemic in Nigeria (Abayomi, 2024). This is particularly important because trust has been consistently identified as a key determinant of compliance and vaccine uptake during outbreaks, shaping both perceived benefits and willingness to engage in preventive behaviors (Abayomi, 2024; Lazarus *et al*., 2022). Reduced institutional trust may therefore weaken the effectiveness of risk communication and limit the translation of awareness into preventive action.

Connecting from a policy perspective, these findings highlight the need to move beyond conventional awareness campaigns toward more integrated, trust-sensitive, and context-specific interventions as proposed by Hassan *et al*., (2025). Strengthening community-based surveillance systems, such as those observed in Ebonyi State, may enhance early detection and outbreak response capacity. Behavioral change communication should be co-designed with community stakeholders to address culturally embedded practices, particularly those related to zoonotic exposure such as bushmeat consumption (Efoua *et al*., 2025; Oketch *et al*., 2025). In addition, rebuilding public trust through transparent communication, inclusive engagement, and consistent risk communication is essential for improving compliance with preventive measures (Lee & Li, 2021). Expanding vaccine literacy and ensuring equitable access to accurate information at community level will also be critical for bridging the observed knowledge and practice gap (AL-Eitan *et al*., 2025).These findings within the HBM, underscore the need to strengthen all key constructs: perceived benefits should be reinforced through vaccine education, perceived barriers addressed through culturally sensitive alternatives to risky practices, and cues to action enhanced through trusted community and traditional communication channels (Wada & Ajijir, 2026). Strengthening institutional trust is also essential to improving self-efficacy and facilitating sustained behavioral change during outbreaks (Baldé *et al*., 2024).
Global response frameworks emphasize coordinated surveillance, risk communication, and community engagement as key pillars for Mpox control, particularly as the disease has transitioned from localized outbreaks to a sustained global public health challenge (WHO, 2025). In Nigeria, especially in the South-East region, recurrent outbreaks since 2017 and resurgence in 2022 and 2024 highlight ongoing vulnerability and the need for continuous assessment of community knowledge, attitudes, and practices to guide targeted interventions (Oyebanji *et al*., 2023; NCDC, 2024). In 2024, confirmed Mpox cases were reported across Abia, Anambra, Ebonyi, Enugu, and Imo States, with Enugu recording the highest burden (eight cases), while Abia, Anambra, and Imo each reported two cases, and Ebonyi reported one case (Cadmus *et al*., 2024; Amuzie *et al*., 2025). These state-level figures contributed to 67 confirmed and 1,031 suspected Mpox cases nationwide across 23 states, with no reported fatalities (NCDC, 2024). Furthermore, reports indicate continued spread across all five South-Eastern

Table 6: Comparative Table: Mpox survey studies (2023–2026).

Study (Year, Location)	Methods	Key Findings	Scientific Contribution	Differences from current Study (SE Nigeria)
Lawal et al. (Mpox KAP Nigeria One-Health study; 2025, Nigeria)	Cross-sectional KAP survey among One Health stakeholders	High knowledge (90%), but gaps in zoonotic understanding and animal reservoirs	Demonstrates knowledge/practice gap in professionals	Current study shows behavioral risks (rodents, bush meat) more explicitly quantified
Cho et al. (Systematic Review of Mpox KAP Studies; 2026, Korea)	Systematic review of KAP studies (PRISMA)	Knowledge (40%) moderate; attitudes fair; poor translation to practice	Establishes global high awareness/low practice pattern	Current study confirms this gap with low vaccination advocacy (65.9%, VL)
CDC: https://wwwnc.cdc.gov/eid/article/30/9/24-0135_article# (Ogoina et al. Mpox Risk Factors Nigeria Study; 2024, Nigeria)	Epidemiological case-control (n=265 suspected cases)	Transmission linked to sexual contact, close contact, and animal exposure	Identifies biomedical vs behavioral risk pathways	Current study focuses more on community behaviors (bush meat, pets, rodents)
Ogoina et al. (Mpox Clinical Cohort Nigeria; 2023, Nigeria)	Cohort study of confirmed cases	Adult males most affected; clinical severity varies	Links clinical outcomes to epidemiology	Current study is population-based (non-clinical)
Iroezindu et al. (Mpox and HIV Nigeria; 2023, Nigeria)	Epidemiological analysis in PLWH	22.5% Mpox patients had HIV; co-infection risk significant	Highlights intersection of Mpox with HIV burden	Current study did not assess comorbidities
UKHSA: https://www.gov.uk/ (GBMSM Mpox Behavioral Survey; 2023, United Kingdom)	Online behavioral survey (n=1333)	53% behavior change; 69% vaccine uptake when offered	Demonstrates impact of targeted vaccination campaigns	Current study shows low vaccination support, contrasting with high uptake in UK
Thakur et al. (Global Mpox Twitter Perception Study; 2023, USA)	Topic modeling of 600k+ tweets	Public discourse shaped by misinformation, stigma, LGBTQ narratives	Elucidates role of infodemics in shaping attitudes	Current study provides empirical behavioral data vs online perceptions
Fan et al. (Mpox Toxicity and Misinformation Study; 2024, USA)	Computational analysis of 1.6M tweets	High levels of misinformation, racism, and stigma	Explains social drivers behind poor practices	Current study indirectly reflects this through poor vaccination acceptance
Cadmus et al. (Nigeria Mpox Epidemiology Meta-analysis; 2024, Nigeria)	Systematic review & meta-analysis	Mpox rising post-2022; zoonotic + human transmission patterns	Provides macro-level epidemiological trends	Current study adds micro-level behavioral evidence

Table 7: Synthesis of comparative insights from Mpox studies (2023–2026).

Thematic Area	Evidence from Previous Studies (2023–2026)	Findings from current study (Southeast Nigeria)	Key Difference/Insight	Scientific Contribution
Knowledge vs Practice Gap	Moderate/high knowledge but poor preventive practices widely reported	High awareness coexists with risky behaviors (rodent contact, bush meat consumption)	Confirms global high awareness/low action pattern at community level	Strengthens evidence for knowledge/behavior disconnect in Mpox control
Behavioral Risk Factors	Focus mainly on sexual transmission and close human contact	Identifies zoonotic and environmental risks (rodents, bush meat, pet exposure)	Broader behavioral spectrum beyond dominant transmission narratives	Expands Mpox research into community-level exposure pathways
Vaccination Attitudes	Higher acceptance in high-income settings (e.g., UK uptake 69%)	Lower vaccination advocacy (65.9%)	Major disparity in vaccine perception and acceptance	Highlights vaccine hesitancy gap in low-resource settings
Role of Misinformation	Studies show misinformation, stigma, and infodemics shape attitudes	Poor vaccination support and risky practices suggest misinformation influence	Provides indirect empirical support for misinformation impact	Links infodemic research to real-world behavioral outcomes
Regional Differences	Global North shows stronger response systems and behavior change	Persistent risky cultural practices in Nigerian context	Socio-cultural context strongly influences Mpox prevention	Emphasizes context-specific intervention design
One Health Perspective	Increasing recognition of zoonotic transmission but limited behavioral quantification	Clear evidence of animal-human interaction risks (rodents, bush meat, pets)	Provides measurable indicators of zoonotic exposure	Strengthens One Health application in Mpox research
Public Health Response	Emphasis on surveillance, vaccination, and awareness campaigns	Awareness present but weak translation into preventive actions	Gap between public health messaging and behavior change	Supports need for behavior-focused intervention strategies
Clinical vs Community Focus	Many studies focus on clinical cases and epidemiology	Community-based behavioral risk assessment	Shifts focus from disease outcomes to risk generation	Contributes preventive epidemiology perspective
Socio-cultural Determinants	Cultural and social drivers acknowledged but not deeply quantified	Cultural practices (e.g., bush meat consumption) clearly influencing risk	Provides concrete behavioral evidence of socio-cultural influence	Advances behavioral modeling in African settings
Policy Implications	Calls for integrated interventions combining education and vaccination	Demonstrates that knowledge alone is insufficient for behavior change	Need for culturally tailored, behavior-driven interventions	Supports Health Belief Model and integrated frameworks

states, reinforcing the need for strengthened surveillance and preparedness, especially as over 33 states reported confirmed infections by late 2025 (Djuicy *et al*., 2025). This evolving burden underscores the urgency of sustained public health monitoring and justifies ongoing assessment of peoples' preparedness and behavioral response. A comparative review of Mpox-related studies (2023–2026) reveals a consistent pattern of moderate-to-high awareness but suboptimal preventive practices. However, the present study uniquely contributes detailed behavioral risk profiling within a Southeast Nigerian context, highlighting zoonotic exposure pathways and low vaccination advocacy not extensively quantified (Table 6). Table 7 synthesizes key comparative insights from Mpox-related studies between 2023 to 2026, highlighting critical similarities and divergences with the present study in Southeast Nigeria. The findings underscore a persistent knowledge/behavior gap and emphasize the importance of socio-cultural and behavioral determinants in shaping Mpox risk and prevention. Table 8 shows a comparative synthesis of key insights from Mpox studies (2023–2026) and the present study in Southeast Nigeria,

Table 8: Key Comparative insights from Mpox Studies and current study (Southeast Nigeria).

Thematic Area	Evidence from Previous Studies	Findings from Present Study (SE Nigeria)	Key Insight	Scientific/Policy Implication
Consistent Global Pattern (Knowledge–Behavior Gap)	Moderate to high knowledge levels reported, but poor translation into preventive practices	High awareness observed, yet risky behaviors (rodent contact, bush meat consumption) persist	Confirms the global "knowledge–behavior gap" in Mpox prevention	Supports need for behavior-focused interventions beyond awareness campaigns
Unique Contribution of Present Study	Limited quantification of everyday behavioral risk factors	Provides granular data: rodent exposure (49%), bush meat consumption (59.2%), lower vaccination advocacy (65.9%), pet exposure pathways	Offers detailed, community-level behavioral risk profiling	Expands Mpox literature with context-specific behavioral epidemiology
Regional Contrast (Africa vs Global North)	Higher vaccine uptake and acceptance in high-income settings (e.g., UK 69%)	Low vaccination encouragement and acceptance among respondents	Highlights disparities driven by access, trust, and communication gaps	Emphasizes need for contextualized vaccine communication strategies
Bridging Biomedical and Social Models	Focus on sexual transmission, clinical risk, and case-based epidemiology	Identifies cultural (bush meat consumption) and environmental (rodents, pets) exposure pathways	Broadens understanding of Mpox transmission beyond biomedical factors	Strengthens integration of One Health and socio-behavioral frameworks
Policy-Relevant Insight	Evidence shows information alone does not lead to behavior change; influence of misinformation and social factors	Persistent risky behaviors despite awareness; low vaccination advocacy	Social determinants (culture, trust, misinformation) strongly influence outcomes	Supports application of HBM and behavioral intervention frameworks

highlighting the knowledge–behavior gap, behavioral risk factors, and policy-relevant implications**.**

CONCLUSION

This study identified and validated a significant gap in mpox-related perceptions, demonstrating that biomedical knowledge is often shaped and, in some cases, outweighed by socio-cultural determinants in post-PHEIC global contexts. This finding is further supported by comparative analysis with earlier studies conducted in Nigeria and other regions, as presented in Tables 5, 6, and 7. The application of the Health Belief Model (HBM) framework highlights that effective interventions must extend beyond simple information dissemination to address the complex and multidimensional behavioral drivers that persist in low-resource settings such as southeastern Nigeria. Although awareness and attitudes toward mpox are generally high in the region, important gaps remain in preventive practices and vaccine-related knowledge. These deficiencies underscore the need for targeted, culturally sensitive, and trust-based public health strategies that address both behavioral and structural determinants of health. Strengthening community preparedness and improving outbreak response will therefore require interventions that integrate risk communication with context-specific behavioral change approaches. We recommend that future research adopt an expanded scope incorporating mixed-methods designs, predictive modeling, and established behavioral frameworks to further enhance the understanding of mpox-related behaviors and to strengthen preparedness for future public health emergencies.

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