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Research Article

Knowledge, Attitudes and Prevention Practices of the Populations of Tchaourou and Parakou (Benin) Regarding Monkeypox

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Abstract

Introduction: *Monkeypox* is a re-emerging viral zoonosis that poses a serious threat to public health, particularly in West Africa. A precise understanding of the Knowledge, Attitudes, and Practices (KAP) of the population is essential for designing effective community-based responses. This study aimed to assess the level of KAP in the population and to identify factors independently associated with good KAP. Methods: A cross-sectional, descriptive, and analytical study was conducted in Tchaourou and Parakou, in the Borgou department of Benin, between February and April 2025. A total of 427 people were included. Cumulative scores for knowledge, attitudes, and preventive practices regarding monkeypox were calculated. Three linear regression models were used to identify factors associated with good knowledge, attitudes, and practices. Results: Mean score of knowledge was 56.0%, mean score of attitude 67.0%, and mean score of practice only 44.3%. Factors significantly associated with an increase in the level of knowledge were higher education level (coefficient = 3.22; 95% CI: [1.98; 5.24]) and access to media (coefficient = 1.95; 95% CI: [1.19; 3.21]). Positive attitude was related to good knowledge (coefficient = 1.88; 95% CI: [1.26; 2.80]) and age (coefficient = 1.65; 95% CI: [1.09–2.50]). Regarding good practices, a positive attitude (coefficient = 2.85; 95% CI: [1.97; 4.13]) and female sex (coefficient = 1.62; 95% CI: [1.11; 2.37]) were significant predictors. Conversely, being a farmer/livestock breeder (coefficient = -0.35; 95% CI [-0.74; -0.22]) and living in a rural area (coefficient = -0.59; 95% CI [-0.81; -0.37]) were associated with poor practices. Conclusion: Although the overall attitude is relatively positive, this study reveals significant gaps in knowledge and, especially, in the adoption of effective preventive practices. Targeted interventions are recommended, including the use of communication channels adapted to low-education populations and communication strategies for behavioral change.

Keywords

MPOX, KAP, Population, Northern Benin

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1. Introduction

Monkeypox (Mpox) is a zoonotic infection caused by the Monkeypox Virus (MPOXV), a member of the genus *Orthopoxvirus* [1]. Historically endemic in West and Central Africa, with a high incidence reported in the Democratic Republic of Congo [2], Mpox gained global notoriety following the 2022 multi-country outbreak which affected previously non-endemic regions [3, 4]. While cases were noted outside Africa prior to this, such as in the United States in 2003 [5], the current state of knowledge highlights the need for continued research [6].

Benin, which shares borders with Nigeria—a country considered a frequent source of Mpox outbreaks [7] —is directly exposed to the risk of importation. This makes genomic surveillance [8] and adaptation to new threats as recommended by the Africa CDC [9] paramount. The virus spreads primarily through direct contact with infected animals (rodents, primates), particularly during hunting, slaughter, or consumption of bushmeat [10]. Socio-cultural practices in rural settings further facilitate these transmission dynamics [11].

In the context of emerging infectious diseases, the effectiveness of the health response largely depends on public adherence and compliance with preventive measures, often analyzed using the KAP (Knowledge, Attitudes, Practices) model [12]. Studies on other outbreaks, such as COVID-19, have shown that community awareness is critical [13]. Gaps in community practices can exacerbate transmission, generate stigmatization and psychological distress [14], and undermine control efforts due to poor risk perception [15]. Conversely, good health literacy is a factor in community resilience [16].

Parakou and Tchaourou are important economic and commercial hubs in northern Benin. Consequently, they are places of high mobility and exchange, where pervasive urban poverty challenges public health efforts [17]. Socio-economic drivers in these regions significantly influence health outcomes [18]. The present study aimed to assess the level of KAP regarding monkeypox among the population of Parakou and Tchaourou and to identify the sociodemographic and socioeconomic factors independently associated with good KAP scores, in order to inform future communication for social and behavioral change strategies in Benin.

2. Materials and Methods

2.1. Study area, Type and Duration

The study was conducted in Parakou and Tchaourou, two cities in the Borgou department of northern Benin. It was a cross-sectional, descriptive, and analytical study. Data collection took place over three months, from February to April 2025.

2.2. Study Population and Sampling

The study population consisted of people aged 18 and over, residing in Parakou and Tchaourou. A total of 427 participants were included, through a 4-stage cluster sampling, with random selection at each stage (district, villages, neighborhoods, households).

2.3. Data Collection

The data were collected via a structured questionnaire administered during an interview. The questionnaire was developed based on World Health Organization (WHO) guidelines and the standard KAP model described by Launiala [28]. The variables collected were:

Sociodemographic and socioeconomic information: age, sex, education level, profession, place of residence, access to media.

Knowledge (K): Assessment of knowledge about the pathogen, mode of transmission, signs and paraclinical aspects, contributing factors and means of prevention.

Attitude (A): Measure of risk perceptions, acceptance of measures, and stigmatization. Attitudes were evaluated to determine the population's willingness to adopt preventive measures.

Practices (P): Assessment of hygiene behaviors, animal handling practices (bushmeat) and seeking care.

2.4. Data Analysis

In the descriptive section, the variables were presented with their frequencies and percentages. A cumulative score was calculated for each component (K, A, P). These scores represent the mean percentage of correct answers achieved by the population out of the total possible score for each section (e.g., a mean practice score of 44.3% indicates that, on average, participants performed less than half of the recommended preventive actions). Each component was considered a dependent variable for the linear regression.

Student 's t-tests were performed in univariate analysis. To identify the factors independently associated with good Knowledge, good Attitude, and good Practice, a linear regression model was developed for each component, including variables with a p-value $\leq 20\%$ in the univariate analysis. A backward stepwise procedure was then conducted to select the final model. The significance level was set at $p < 0.05$.

2.5. Ethical and Administrative Aspects

The study received administrative authorization from the Ministry of Health. All study participants gave their free and informed consent. The data were processed in accordance with anonymity and confidentiality requirements.

3. Results

3.1. Characteristics of the Study Population

The mean age was 37.12 years (SD 6.9). The majority were male (52.7%), and 45.7% had a secondary education. Most were traders (22.48%) or farmers/livestock breeders (41.70%). Rural residence was the predominant factor (68.60%). Over 80% had access to information via television, radio, and the internet. Table 1 presents the characteristics of the 427 participants.

Table 1. *Characteristics of the study population.*

Characteristic	Mean (SD)	n	%
Sex			
Male		225	52.7
Female		202	47.3
Age (years)	37.12 (6.9)		
Education Level			
Primary or none		107	25.1
Secondary		195	45.7
Superior		125	29.2
Occupation			
Unemployed		46	10.77
Students		39	9.13
Executives		68	15.92
Merchants		96	22.48
Farmers / Livestock Breeders		178	41.70
Residence			
Rural environment		293	68.60
Urban environment		134	31.40
Access to Television/Radio/Internet (at least one)			
Yes		345	80.8
No		82	19.2

3.2. Level of Knowledge

The cumulative knowledge score was 69.72%. The items assessed are shown in Table 2.

Table 2. *knowledge level regarding Mpox.*

Knowledge Subcomponent	Item	% of Correct Answers
Causes and transmission	Mpox is a zoonosis (originates from animals)	71.40%
	Human-to-human transmission through close contact	82.90%
	Transmission via aerosols/droplets	45.70%
	Transmission via bushmeat	58.50%
Symptoms	Main symptom: skin rash	91.10%

Knowledge Subcomponent	Item	% of Correct Answers
	Differential symptom: lymphadenopathy	52.00%
Prevention	Prevention through handwashing/hygiene	87.60%
	Isolating cases is a preventative measure	68.60%
Cumulative score		69.72%

3.3. Attitude Level

The cumulative attitude score was 68.15%. The items assessed are shown in Table 3.

Regarding stigmatization, we assessed whether participants believed contact cases should be socially shunned. A positive response in the scoring indicates a non-stigmatizing attitude.

Table 3. *Attitude level regarding Mpox.*

Subcomponent of Attitude	Item Evaluated	% of Correct Answers
Risk Perception	The Mpox is a risk to my community	78.50%
Acceptance of the Measures	Isolation in case of illness	72.10%
	I would agree to be vaccinated if available	81.30%
Intention to report	I would report a suspected case to the authorities.	88.00%
Stigmatization	Cases of Mpox should not be stigmatized	49.90%
	Disagreed that "People who have been in contact with others should be avoided".	39.10%
Cumulative score		68.15%

3.4. Practices Level

The cumulative practice score was 56.58%. The items assessed are shown in Table 4.

Table 4. *Practices level regarding Mpox.*

Subcomponent of Practices	Item Evaluated (Reported Practice)	% of Positive Responses
Hygiene	Wash your hands frequently with soap	76.80%
	Avoiding the sharing of personal items	61.10%
Animal/Food Behavior	Avoid raw/undercooked bushmeat	35.60%
	Avoid handling dead or sick animals	48.00%
Care Search	Consult a doctor immediately if a skin rash develops.	65.30%
	Use of a hospital/health center	52.70%
Cumulative score		56.58%

These scores are summarized in Figure 1.

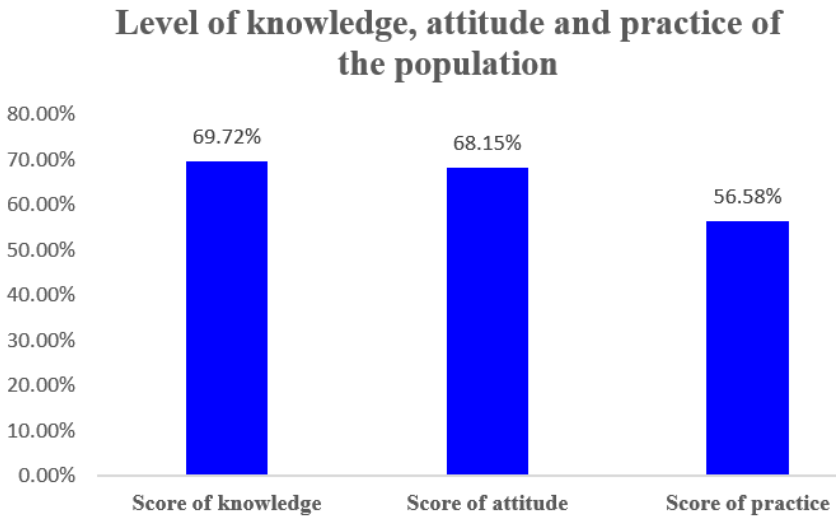

Figure 1. *KAP scores regarding Mpox.*

3.5. Factors Associated with Knowledge, Attitude and Practice (Multivariate Analysis by Linear Regression)

Following the multivariate analysis, the factors significantly associated with an increase in knowledge level were higher education level (coefficient = 3.22; 95% CI: [1.98; 5.24]) and access to media (coefficient = 1.95; 95% CI: [1.19; 3.21]). The factors we identified as increasing the attitude score were good knowledge (coefficient = 1.88; 95% CI: [1.26; 2.80]) and age (coefficient = 1.65; 95% CI: [1.09–2.50]). The factors associated with an increase in the practice score were a good attitude (coefficient = 2.85; 95% CI: [1.97; 4.13]) and female sex (coefficient = 1.62; 95% CI: [1.11; 2.37]). Conversely, the profession of farmers/livestock breeders (coef = - 0.35; 95% CI [-0.74; -0.22]) and residence in rural areas (coef = -0.59; 95% CI [-0.81; -0.37]) were associated with a decrease in the practice score.

All of these results are summarized in Table 5.

Table 5. *Factors associated with knowledge, attitude, and practice. Multivariate analysis by linear regression.*

Covariates	Score of knowledge			Score of attitudes			Score of practice		
	Coefficient	95% CI	p-Value	Coefficient	95% CI	p-Value	Coefficient	95% CI	p-Value
Constant	56.20			53.46			47.14		
Age (in year)	NA	-		1.65	1.09-2.50	0.017	NA	-	-
Female gender	NA	-	-	NA	-	-	1.62	1.11; 2.37	0.012
Higher Education Level	3.22	1.98; 5.24	0.007	NA	-	-	NA	-	-
Media Access	1.95	1.19; 3.21	0.009	NA	-	-	NA	-	-
Good knowledge	NA	-	-	1.88	1.26; 2.80	0.002	NA	-	-
Good attitude	NA	-		NA	-	-	2.85	1.97; 4.13	0.0001
Farming/livestock farming profession	NA	-	-	NA	-	-	- 0.35	-0.74; -0.22	0.0001
Residence in a rural area	NA	-	-	NA	-	-	-0.59	-0.81; -0.37	0.005

4. Discussion

This study aimed to analyze and research the factors associated with the knowledge, attitudes, and practices of the populations of Parakou and Tchaourou in northern Benin regarding Mpox.

Level of Knowledge and Information Inequalities The knowledge score for Mpox (69.72%) was satisfactory. This finding aligns with recent WHO data suggesting increased awareness following the 2022 global outbreak, although it remains insufficient to guarantee optimal community involvement. For this to happen, the community must have a very good understanding of the disease. This is not always the case, even among specific target populations; for instance, a study regarding healthcare workers in Nigeria highlighted gaps in knowledge despite their professional role [19].

Higher education levels and access to media were associated with good knowledge. Indeed, these are factors that facilitate a good understanding of the information disseminated to the population. Similar results have been found in other West African countries, such as in Guinea regarding Lassa fever [20] and in Ibadan regarding general prevention behaviors [21]. These results highlight the need to provide accurate health information to populations, but also the importance of adapting this information for people who are unschooled or have low levels of education. This includes disseminating messages in local languages and using community engagement strategies learned from past outbreaks [22] and broader public health communication strategies [23].

Nowadays, communication strategies must also integrate internet communication to counter the impact of rumors and disinformation, which can severely hinder epidemic responses [24]. Furthermore, the involvement of traditional healers and community leaders is essential for crisis management in this cultural context [25].

Attitude Level The attitude score (68.15%) reflects a general willingness to accept preventive measures. This result is encouraging, as a positive attitude is, according to the Social Cognitive Theory, an essential gateway to action [26]. Unsurprisingly, having good knowledge of a disease is a significant predictor of a positive attitude, validating the need for information and awareness campaigns.

The positive association between age and a favorable attitude is relevant. It was more pronounced in the 18–25 age group. This group is generally more willing to adopt new behaviors. However, it is crucial to note that attitudes are fragile, particularly in the face of diseases that can be stigmatizing, leading to underreporting.

Practices Level and One Health Context Despite good scores for knowledge and attitudes, we observed a relatively low practice score (56.58%). This represents a significant gap between what the population knows and the actions they take. This gap can be explained by cultural, social, and religious beliefs, as well as the lifestyle habits of these populations. It is crucial to analyze these results through the "One Health" concept. In Tchaourou and Parakou, close interactions between humans, livestock, and wildlife create a high-risk interface, often exacerbated by environmental changes and poverty [27].

Our findings show that farmers and those in rural areas have significantly lower practice scores. This suggests that environmental and occupational constraints in these communities may override health knowledge. Populations still struggle to change their lifestyles despite the risks this could entail. These are material, socio-cultural, or economic barriers that affect the cost-effectiveness of interventions [28].

We also identified female sex as a factor independently associated with better practices. In Africa, women are more involved in household activities and hygiene [29]. As a result, they are more attentive to actions that can reduce the risk of transmission. The response to Mpox must therefore integrate a "One Health" approach, addressing both human behaviors and environmental and animal interactions.

5. Conclusion

This study highlighted an acceptable level of knowledge and attitudes, contrasting with a insufficient level of preventive practices. Inequalities in education and access to information are the main obstacles to adequate knowledge. Positive attitudes are the primary driver of these practices, but the low adoption rate indicates the persistence of significant sociocultural and socioeconomic barriers. Public health strategies must adopt a One Health approach, strengthen health education through community channels for populations with low levels of education, reinforce hygiene practices, and integrate gender considerations into campaigns to capitalize on the role of women as promoters of hygiene in the home, in line with the global strategy for the future [30].

Abbreviations

MPOX	Monkeypox
KAP	Knowledge, Attitudes, and Practices
WHO	World Health Organization
CDC	Centers for Disease Control and Prevention
SD	Standard Deviation
CI	Confidence Interval

Author Contributions

Padonou Setondji Geraud Romeo: Conceptualization, Formal Analysis, Investigation, Methodology, Supervision, Validation, Writing – original draft, Writing – review & editing

Azandjeme Colette: Conceptualization, Formal Analysis, Investigation, Methodology, Supervision, Validation, Writing – original draft, Writing – review & editing

Adegbite Romeo: Conceptualization, Formal Analysis, Investigation, Methodology, Supervision, Validation, Writ-

ing – original draft, Writing – review & editing

Olofindji Jennifer: Investigation, Supervision, Writing – original draft

Conflicts of Interest

The authors declare no conflicts of interest.

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