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Human-monkey interactions and zoonotic disease risk in an urban Nigerian community: A cross-sectional study

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Abstract

Zoonotic diseases, transmitted between animals and humans, pose a growing threat to public health, particularly in regions where urbanization increases human-wildlife interactions. This study assessed public awareness and risk perception regarding zoonotic disease transmission between humans and monkeys in Awka, Anambra State, Nigeria— a region where such encounters are increasingly common. Using a cross-sectional design, data were collected via a structured online questionnaire administered to 448 residents representing diverse age groups, occupations, and education levels.

Findings revealed that 89.1% of participants had encountered monkeys, mainly in residential areas, farms, and schools. Although 85.9% were aware of zoonotic diseases, knowledge was concentrated on high-profile infections such as monkeypox (72.9%) and Ebola (35.6%), with limited awareness of tuberculosis (11.9%) and HIV (3.4%). Most respondents correctly identified direct transmission routes such as contaminated food, contact with saliva or urine, and bites or scratches, but only 14.1% recognized airborne transmission.

Risk perception was moderate, with 56.3% acknowledging a significant threat of zoonotic transmission. However, preventive behaviours were often limited to avoidance, and only 42.9% of those attacked by monkeys sought medical treatment. A majority (59.4%) expressed dissatisfaction with government and health authority interventions, although 75% showed willingness to participate in public health campaigns.

This study underscores the need for intensified public health education and intersectoral collaboration to address zoonotic risks. Effective community-based interventions are essential to bridge knowledge gaps and promote proactive health-seeking behaviour in the face of increasing human-wildlife contact.

Keywords: Zoonotic diseases; Human-monkey interaction; Public health; Monkeypox; Nigeria; Disease transmission

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1. Introduction

Zoonotic diseases—diseases transmitted between animals and humans—pose significant public health concerns worldwide (1). Disease transmission between humans and non-human primates is particularly relevant due to their close genetic relationship, frequent interactions, and shared ecosystems (2). In various parts of Nigeria, including Awka in Anambra State, human-monkey interactions are increasingly common due to urban expansion, deforestation, and cultural practices that bring people into close contact with wildlife (3). These interactions increase the risk of zoonotic disease transmission, which may include infections such as monkeypox, Ebola, tuberculosis, and rabies (4). Despite the potential risks, public awareness of zoonotic disease transmission remains limited (5). Many individuals engage with monkeys for cultural, economic, or recreational reasons without understanding the associated health hazards (6). This study aims to assess the level of awareness and risk perception of zoonotic disease transmission between humans and monkeys in Awka, with a view to informing public health interventions.

With increasing urbanization and deforestation, human-monkey encounters have become more frequent in Awka (7). This has led to rising concerns about the potential spread of zoonotic diseases, particularly in areas where monkeys scavenge for food in urban spaces or interact closely with residents. However, there is limited research on how much the local population understands these risks and the preventive measures they employ (8). The absence of adequate public health education and policy measures to mitigate disease transmission poses a significant threat (4). If not addressed, the situation could lead to outbreaks that strain public health resources and endanger both human and animal populations. Therefore, this study seeks to investigate public knowledge, attitudes, and practices regarding human-monkey interactions and the risks of zoonotic disease transmission in Awka.

The primary objective of this study is to assess public awareness and risk perception regarding zoonotic disease transmission between humans and monkeys in Awka, Anambra State. Specifically, the study aims to examine the extent of human-monkey interactions in Awka, evaluate the level of awareness regarding zoonotic diseases among the local population, identify common misconceptions about disease transmission from monkeys, assess risk perception and preventive measures adopted by residents, and provide recommendations for improving public health awareness and policy interventions.

Understanding the level of public awareness and risk perception regarding zoonotic diseases is crucial for designing effective public health interventions (2). This study will contribute to enhancing knowledge and awareness of zoonotic diseases in the study area, informing policymakers and health authorities on the need for targeted educational campaigns, providing baseline data for future research on zoonotic disease prevention in Nigeria (3), and supporting the development of community-based strategies to mitigate human-monkey conflicts and associated health risks. This research focuses on Awka, the capital of Anambra State, where human-monkey interactions are increasingly observed (7). The study will assess residents' awareness, risk perception, and behavioral practices related to zoonotic diseases. The research will involve surveys and interviews with individuals from various demographic backgrounds to ensure a comprehensive understanding of the issue.

2. Methods

2.1. Study Design

This cross-sectional study used a structured questionnaire to collect data on public awareness, knowledge, and preventive practices related to zoonotic diseases among residents of Awka.

2.2. Participants

The target population comprises residents of Awka who are likely to interact with monkeys, including traders, students, farmers, and health professionals. A stratified random sampling method is used to ensure diverse representation across different demographics.

2.3. Sample Size Determination

The sample size(n) was determined using $n=Z^2pq/d^2$. With a 95% confidence level (Zscore, 1.96), a 50% estimated prevalence (P, 0.5) and a margin of error (d) of 5%, a value of 423 was obtained.

2.4. Data Collection

Data for this study were collected using a 20-item, pretested, structured questionnaire administered online through Google Forms from consenting residents of Awka. The questionnaire captured the following information on participants:

- Sociodemographic details.
- Awareness of Human-Monkey Interactions.
- Knowledge of Zoonotic Diseases.
- Risk Perception and Preventive Measures.

Participants completed the survey using their mobile devices, and their responses were automatically and instantly stored on the principal investigator's Google Drive.

2.5. Data Analysis

Descriptive statistics were used to analyze the responses in order to summarize the results and spot trends. Cross-tabulations were used to assess relationships between knowledge levels and demographic characteristics.

3. Results

3.1. Socio-Demographic Characteristics

The study surveyed a total of 448 participants, with a majority (59.4%) being female. The age distribution showed that most respondents (45.3%) were between 18-30 years, followed by 31-45 years (42.2%), 46-60 years (10.9%), and a minimal percentage (1.6%) above 60 years. Notably, all participants had at least a secondary education, with 98.4% having completed tertiary education, highlighting a well-educated sample group. In terms of occupation, civil servants formed the largest proportion (42.2%), followed by students (26.6%), traders (14.1%), health workers (9.4%), and other professions (7.7%).

3.2. General Awareness of Human-Monkey Interactions

A significant majority (89.1%) of respondents had encountered monkeys in Awka, with most sightings occurring in residential areas (51.6%), farms (42.2%), schools (34.4%), and markets (6.3%). However, only 6.3% of participants reported having direct contact with monkeys, such as feeding, petting, or being bitten. Human-monkey interactions were observed occasionally by 40.6% of respondents, with an equal proportion reporting rare encounters, while 10.9% had never seen such interactions.

3.3. Knowledge of Zoonotic Diseases

Approximately 85.9% of participants were aware of diseases transmissible between monkeys and humans. Among the known diseases, monkeypox was the most recognized (72.9%), followed by Ebola (35.6%), rabies (16.9%), tuberculosis (11.9%), HIV (3.4%), and local wound infections (1.7%). Interestingly, 11.9% of respondents admitted to having no knowledge of any zoonotic diseases. Regarding transmission routes, 70.3% believed that eating food contaminated by monkeys posed a risk, while 67.2% cited direct contact with monkey saliva or urine. Other known transmission routes included monkey bites/scratches (65.6%) and airborne transmission (14.1%).

3.4. Risk Perception and Preventive Measures

More than half (56.3%) of respondents considered the risk of zoonotic disease transmission from monkeys to humans as significant, whereas 34.4% were unsure, and 9.4% dismissed any risk. Direct monkey attacks, bites, or scratches were reported by 10.9% of participants, yet only 42.9% of those affected sought medical treatment. Most respondents (57.8%) preferred avoiding monkeys when encountered, while 26.6% attempted to chase them away. A minority (1.6%) fed the monkeys, but no respondents reported capturing or keeping them as pets.

Perceptions of government and health authorities' efforts in educating the public were predominantly negative, with 59.4% stating that not enough was being done. Preventive measures suggested by participants included public awareness campaigns (90.6%), government regulations on wildlife interactions (62.5%), vaccination programs for atrisk individuals (50%), urban monkey population control (53.1%), and improved waste management (40.6%). Encouragingly, 75% of respondents expressed willingness to participate in public health programs aimed at increasing awareness of zoonotic diseases.

Table 1 Social demographics of the Participants

Social demographics of participants			
	Category	Frequency	Percentage (%)
Age Groups	< 18 years	0	0
	18-30 years	203	45.3
	31-45 years	189	42.2
	46-60 years	49	10.9
	> 60 years	7	1.6
Gender	Male	182	40.6
	Female	266	59.4
Occupation	Student	119	26.6
	Civil servant	189	42.2
	Health Worker	42	9.4
	Trader	63	14.1
	Others	35	7.7
Level of Study	No Formal Education	0	0
	Primary Education	0	0
	Secondary Education	7	1.6
	Tertiary Education	441	98.4
Length of Residence in Awka	< 1 year	14	3.1
	1-5 years	182	40.6
	6-10 years	133	29.7
	> 10 years	119	26.6

Table 2 General Awareness of Human-Monkey Interactions

Awareness of human-monkey interactions			
	Variable	Frequency	Percentage
Have you ever encountered monkeys in Awka?	Yes	399	89.1
	No	49	10.9
If yes, where do you mostly see them?	Markets	28	6.3
	Residential areas	231	51.6
	Schools	154	34.4
	Farms/Plantations	189	42.2
	Forested areas	189	42.2
Have you ever had direct contact with a monkey (e.g., feeding,	Yes	28	6.3
petting, being bitten)?	no No	420	93.8
How often do you see monkeys interacting with humans in Awka?	Daily	14	3.1

	Weekly	21	4.7
	Occasionally	182	40.6
	Rarely	182	40.6
	Never	49	10.9

Table 3 Knowledge of Zoonotic Diseases

Knowledge of Zoonotic Diseases			
	Variable	Frequency	Percentage
Have you heard of diseases that can be transmitted between monkeys and humans?	Yes	385	85.9
	No	63	14.1
If yes, which diseases do you know?	Monkeypox	301	72.9
	Ebola	147	35.6
	Rabies	70	16.9
	Tuberculosis	49	11.9
	HIV	14	3.4
	Local wound infections	8	1.7
	I don't know any	49	11.9
What do you think are the ways diseases can be	Monkey bites/scratches	294	65.6
transmitted from monkeys to humans?	Eating food contaminated by monkeys	315	70.3
	Direct contact with monkey saliva or urine	301	67.2
	Air-borne transmission	63	14.1
	I don't know	21	4.7
Do you believe that people in Awka are at risk of contracting diseases from monkeys?	Yes, very much	252	56.3
	No risk at all	42	9.4
	Not sure	154	34.4

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Table 4 Risk Perception and Preventive Measures

Risk Perception and Preventive Measures			
	Variable	Frequency	Percentage
Have you or anyone you know ever been attacked,	Yes	49	10.9
bitten, or scratched by a monkey?	No	399	89.1
If yes, was any medical treatment received after the	Yes	21	42.9
incident?	No	28	57.1
How do you react when you see monkeys around?	Avoid them	259	57.8
	Try to chase them away	119	26.6
	Feed them	7	1.6
	Capture or keep them as pets	0	0
	No reaction	63	14.1
Do you think the government and health authorities are doing enough to educate people about zoonotic diseases from monkeys?	Yes	35	7.8
	No	266	59.4
	VariableFrequenceked,Yes49No399theYes21No28Avoid them259Try to chase them away119Feed them7Capture or keep them as pets0No reaction63areYesYes35No266Not Sure147ventPublic awareness campaigns406Vortisite interactions63Vaccination programs for atrisk individuals224Controlling monkey populations in urban areas238Improved waste management to prevent monkey scavenging182alth YesYes336No112	147	32.8
What measures do you think should be taken to prevent	Public awareness campaigns	406	90.6
the spread of diseases between humans and monkeys in Awka?	Government regulations on wildlife interactions	280	62.5
	Vaccination programs for at- risk individuals	224	50
	Controlling monkey populations in urban areas	238	53.1
	Improved waste management to prevent monkey scavenging	182	40.6
Would you be willing to participate in a public health	Yes	336	75
program to increase awareness of zoonotic diseases in Awka?	No	112	25

4. Discussion

This study highlights the high frequency of human-monkey interactions in Awka, Anambra State, and the associated zoonotic disease risks. An overwhelming 89.1% of participants reported encountering monkeys, predominantly within residential areas, farms, and schools—settings that reflect increasing habitat overlap driven by rapid urbanization and environmental encroachment. As urban sprawl pushes deeper into forested areas, such encounters are becoming increasingly common in Nigeria and similar ecological zones globally. These findings are consistent with patterns observed globally, where urban expansion into forested areas has intensified human-wildlife interfaces and increased zoonotic risk (6,8).

Despite widespread encounters, direct contact with monkeys was reported by only 6.3% of respondents. While this may appear low, indirect transmission pathways—such as contaminated food or surfaces—remain significant yet often underappreciated. Importantly, 85.9% of participants were aware that diseases could be transmitted from monkeys to humans. Awareness was highest for diseases receiving considerable media attention, notably monkeypox (72.9%) and Ebola (35.6%). Lower recognition of diseases like tuberculosis (11.9%) and HIV (3.4%) suggests that public knowledge is shaped more by outbreak-driven communication than by comprehensive health education (7,9,10).

Knowledge of transmission routes revealed positive trends: a majority correctly identified contaminated food (70.3%), contact with saliva or urine (67.2%), and bites or scratches (65.6%) as potential routes. However, only 14.1%

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recognized airborne transmission as a risk—a critical gap given emerging evidence linking respiratory routes to pathogen spread among primates (2,5). Underestimating indirect transmission channels could undermine preventive behaviors, particularly in environments where direct monkey-human interaction is minimal but shared spaces abound.

Risk perception in the community was moderate; although 56.3% perceived a significant risk, a sizeable proportion (34.4%) remained unsure. This ambivalence could reflect a lack of visible disease outbreaks directly linked to monkeys in the area, leading to a mismatch between actual exposure risks and perceived vulnerability (3,5). Similar patterns have been observed in other zoonosis-endemic regions where familiarity with wildlife paradoxically reduces perceived threat levels (4).

Behavioral responses largely reflected passive strategies: avoidance (57.8%) was preferred over proactive measures like reporting sightings or seeking professional advice. Notably, only 42.9% of those bitten or scratched by monkeys sought medical attention, echoing previous findings on low health-seeking behavior following zoonotic exposures (5). Cultural beliefs, limited access to healthcare, or perceptions that monkey-related injuries are minor could all contribute to this trend, further exacerbating disease transmission risks.

Public dissatisfaction with government and health authority efforts was a recurring theme, with 59.4% perceiving current educational initiatives as inadequate. This finding underscores a persistent gap between national zoonotic disease prioritization strategies and effective community-level engagement (1,3). Nevertheless, the willingness of 75% of respondents to participate in awareness programs signals a strong community foundation upon which targeted interventions can be built.

Participants' recommendations—prioritizing public awareness campaigns (90.6%), regulating human-wildlife interactions (62.5%), controlling urban monkey populations (53.1%), and improving waste management (40.6%)— align closely with global One Health strategies. These integrated interventions are critical in settings like Awka, where ecological disruption, urbanization, and wildlife adaptation converge to heighten zoonotic risks (1,8).

The study's strengths include its robust sample size and demographic diversity, enhancing the reliability of the findings. However, limitations such as potential selection bias due to the online survey method and reliance on self-reported behaviors must be acknowledged. These limitations may have led to overrepresentation of educated, digitally literate individuals, possibly inflating overall awareness levels compared to the broader population.

It is important to note that, while awareness of zoonotic diseases linked to monkey interactions in Awka is relatively high, significant knowledge gaps, moderate risk perception, and inconsistent preventive behaviors persist. Addressing these gaps through culturally sensitive, community-engaged public health initiatives is urgently needed to mitigate future zoonotic outbreaks. Integrating these efforts within a One Health framework that connects human, animal, and environmental health will be critical to safeguarding the health of both residents and urban wildlife in Awka and similar urbanizing settings.

5. Conclusion

This study highlights the increasing prevalence of human-monkey interactions in Awka, Anambra State, and the corresponding risk of zoonotic disease transmission in a rapidly urbanising environment. While the majority of respondents demonstrated general awareness of zoonotic diseases, particularly monkeypox, the study revealed significant knowledge gaps concerning less publicized diseases and indirect transmission routes such as airborne spread. Moreover, the mismatch between perceived risk and actual preventive behaviour, particularly the low rate of medical response after monkey encounters, underscores the urgent need for targeted health education and community engagement.

The study also revealed public dissatisfaction with current governmental and health sector efforts to educate residents, despite widespread willingness among community members to participate in awareness programs. This presents a valuable opportunity for policymakers, healthcare providers, and environmental agencies to collaborate using a One Health approach—linking human, animal, and environmental health strategies—to mitigate zoonotic threats.

To prevent potential outbreaks and safeguard public health, it is essential to prioritize sustained public awareness campaigns, regulate wildlife-human interactions, and invest in community-based interventions tailored to the sociocultural dynamics of the region. Without proactive efforts, the growing interface between humans and wildlife in urban centres like Awka could evolve from a nuisance into a full-blown public health crisis.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

References

- [1] Karesh WB, Dobson A, Lloyd-Smith JO, Lubroth J, Dixon MA, Bennett M, Aldrich S, Harrington T, Formenty P, Loh EH, Machalaba CC, Thomas MJ, Heymann DL. Ecology of zoonoses: natural and unnatural histories. Lancet. 2012;380(9857):1936–1945. https://doi.org/10.1016/S0140-6736(12)61678-X
- [2] Jiang X, Fan Z, Li S, Yin H. A review on zoonotic pathogens associated with non-human primates: understanding the potential threats to humans. Microorganisms.2023;11(2):246. https://doi.org/10.3390/microorganisms11020246
- [3] Ihekweazu C, Michael CA, Nguku PM, Waziri NE, Habib AG, Muturi M, Olufemi A, Dzikwi-Emennaa AA, Balogun MS, Visa TI, Dalhat MM, Atama NC, Umeokonkwo CD, Mshelbwala GM, Vakuru CT, Kabir J, Okolocha EC, Umoh JU, Olugasa B, Babalobi O, Nigeria Zoonotic Diseases Prioritization Group. Prioritization of zoonotic diseases of public health significance in Nigeria using the one-health approach. One Health. 2021;13:100257. https://doi.org/10.1016/j.onehlt.2021.100257
- [4] World Health Organization (WHO). Emerging zoonotic diseases and global health implications. WHO Reports. 2023 Edition.
- [5] Majiwa H, Bukachi SA, Omia D, Fèvre EM. Knowledge, perceptions, and practices around zoonotic diseases among actors in the livestock trade in the Lake Victoria crescent ecosystem in East Africa. Front Public Health. 2024;11:1199664. https://doi.org/10.3389/fpubh.2023.1199664
- [6] Cui Q, Ren Y, Xu H. The escalating effects of wildlife tourism on human-wildlife conflict. Animals. 2021;11(5):1378. https://doi.org/10.3390/ani11051378
- [7] Ekpunobi N, Akinsuyi O, Ariri T, Ogunmola T. The reemergence of monkeypox in Nigeria. Challenges. 2023;14(2):22. https://doi.org/10.3390/challe14020022
- [8] Hassell JM, Begon M, Ward MJ, Fèvre EM. Urbanization and disease emergence: dynamics at the wildlife-livestockhuman interface. Trends Ecol Evol. 2017;32(1):55–67. https://doi.org/10.1016/j.tree.2016.09.012
- [9] Ekpunobi NF, Agu KC. Emergence and re-emergence of arboviruses: when old enemies rise again. Cohesive J Microbiol Infect Dis. 2024;7(2):CJMI.000658.
- [10] Osarumwense OI, Nkechukwu IM, Favour EN, Izuchukwu I, George CO, Umale AM, Okechukwu EC. The prevalence of Dengue virus and malaria co-infection among HIV-infected patients within South Eastern Nigeria. Adv Infect Dis. 2022;12(1):106–117.