

Monkeypox related knowledge, attitudes and practices among students in a tertiary institution in southwest, Nigeria: A cross-sectional study

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Abstract

Introduction: Monkeypox caused by monkeypox virus, a member of the *Orthopoxvirus* genus in the family *Poxviridae* is usually a self-limited disease, however severe cases can occur with case fatality ratio of 3–6% being reported in recent times. This study is aimed at assessing monkeypox related knowledge, attitudes and practices among students in a tertiary institution in Southwest, Nigeria

Methodology: The study utilized a cross-sectional design and semi-structured questionnaire to collect data from 278 respondents from August to October 2022.

Results: In this study, only 37.8% of respondents had good monkeypox related knowledge, 87.8% had good monkeypox related attitude while 96% had good monkeypox related practices. There was association between good monkeypox related knowledge and university education level ($p=0.002$) with 100 Level student having better knowledge. There was also association between good monkeypox related attitude and sex ($p=0.012$) with female respondents having better attitudes and there was association between monkeypox related practices and age ($p=0.028$) with respondents between the ages of 18-22 years having better practices. However, there was no association between monkeypox related knowledge, attitudes and practices and marital status, ethnicity and religion

Conclusion: Our findings revealed the crucial need for public health education on monkeypox infection to improve knowledge in order to prevent and protect students from monkeypox infection. Good monkeypox related attitudes and practices should be maintained and improved through measures for reduction of exposure to the virus and prompt detection and response

Keyword: Monkeypox, knowledge, attitudes, practices, tertiary institution

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Received: December 30, 2022

Accepted: April 17, 2023

Published: September 30, 2023

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<http://dx.doi.org/10.4314/rejhs.v11i3.3>

Connaissance, attitudes et pratiques concernant le monkeypox parmi les étudiants du sud-ouest du Nigéria

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Résumé

Introduction : Le monkeypox causé par le virus monkeypox, un membre du genre *Orthopoxvirus* de la famille *Poxviridae*, est généralement une maladie spontanément résolutive, mais des cas graves peuvent survenir avec un taux de létalité de 3 à 6% signalé ces derniers temps. Cette étude vise à évaluer les connaissances, les attitudes et les pratiques liées au monkeypox chez les étudiants d'une institution tertiaire du sud-ouest du Nigéria

Méthode de l'étude : L'étude a utilisé une conception transversale et un questionnaire semi-structuré pour collecter des données auprès de 278 répondants d'août à octobre 2022.

Résultat de l'étude: Dans cette étude, seuls 37,8 % des répondants avaient de bonnes connaissances sur le monkeypox, 87,8 % avaient une bonne attitude vis-à-vis du monkeypox tandis que 96 % avaient de bonnes pratiques liées au monkeypox. Il y avait une association entre de bonnes connaissances liées au monkeypox et le niveau d'éducation universitaire ($p = 0,002$) avec un étudiant de niveau 100 ayant de meilleures connaissances. Il y avait également une association entre une bonne attitude vis-à-vis du monkeypox et le sexe ($p = 0,012$) avec les répondantes ayant de meilleures attitudes et il y avait une association entre les pratiques liées au monkeypox et l'âge ($p = 0,028$) avec les répondants âgés de 18 à 22 ans ayant de meilleures pratiques. Cependant, il n'y avait aucune association entre les connaissances, les attitudes et les pratiques liées au monkeypox et l'état matrimonial, l'origine ethnique et la religion.

Conclusion: Nos résultats ont révélé le besoin crucial d'éducation en santé publique sur l'infection par le monkeypox pour améliorer les connaissances afin de prévenir et de protéger les étudiants contre l'infection par le monkeypox. De bonnes attitudes et pratiques liées au monkeypox doivent être maintenues et améliorées grâce à des mesures de réduction de l'exposition au virus et à une détection et une réponse rapides.

Mot-clé : Monkeypox, connaissances, attitudes, pratiques, établissement tertiaire

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<http://dx.doi.org/10.4314/rejhs.v11i3.3>

INTRODUCTION

Monkeypox is a rare zoonotic disease which is caused by a virus belonging to the family *Poxviridae* and genus *Orthopoxvirus*. The causative virus is divided into two clades: West African and Congo Basin clade. Monkeypox is transmitted to humans through close contact with an infected person or animal, or with items contaminated with the virus. Infection with monkeypox results in a smallpox-like disease in humans. Clinical manifestation may be symptomatic or asymptomatic with incubation period of 5-21 days, usually 6-13 days. Infection is usually mild-to-moderate in nature and clinical course comprises of the prodromal period and skin eruption period. Natural host of monkeypox virus includes rope squirrels, tree squirrels, Gambian pouched rats, dormice, non-human primates and other species (1).

Communities affected are known to be impoverished and generally have a background of high prevalence of parasitic infections, malnutrition and other significant health-compromising conditions with no racial or gender preference (2).

Curtailling animal to human transmission and human to human transmission by ensuring standard precaution plays a very important role in prevention and control of monkey pox transmission (3). The use of airborne precaution is recommended for examination and admission of patient due to the risk of airborne transmission of the disease (4).

History has it that small pox vaccination with vaccinia virus was approximately 85% protective against monkeypox (5).

Since 1970, human cases of monkeypox have been reported in west and central Africa countries. Nigeria has experienced a large outbreak since 2017, with more than 500 suspected cases and 200 confirmed cases and a case fatality ratio of approximately 3%. In May 2022, multiple cases of monkeypox were identified in several non-endemic countries. Monkeypox is usually self-limiting but may be severe in children, pregnant women or persons with immune suppression resulting from other health conditions. The case fatality ratio of monkeypox has historically ranged from 0 to 11 % in the general population and higher among young children but recently case fatality ratio of around 3–6% has been reported (1).

There is a need to conduct a study on the knowledge, attitudes and practice of monkeypox infection among the undergraduates, because undergraduate students can give a good insight on

the subject matter in the population. Results from this study will help to document the knowledge, attitudes and practices of monkeypox among undergraduates and by extension sensitize other undergraduates from other institutions nationwide. This study will also serve as a guide for policy development on prevention of monkeypox and the development of appropriate prevention and control programmes among the population, using health education as a tool for the desired change.

MATERIALS AND METHODS

This study was carried out at Adeleke University, Ede, Osun State, Nigeria. Osun State covers an area of approximately 14,875 square kilometre and lies between latitude 7° 30' 0" N and longitude 4° 30' 0" E. The capital city is Osogbo and is bounded in the north by Kwara State, in the east partly by Ekiti State and partly by Ondo State, in the south by Ogun State, and in the west by Oyo State. It lies within the tropical rain forest with abundance of resources and is blessed with presence of many rivers and streams which serves the water needs of the state (6). Osun State has a projected 2016 population of 4,705,600 (7).

Adeleke University is located in an ambient and serene environment at Loogun Ogberin, Ede North Ede, Osun State, Nigeria. Is a private faith-based learning institution located in a peaceful and friendly environment of about 520 acres of land in the historical town of Ede, Osun State, South-Western part of Nigeria.

Adeleke University comprises of six faculties, comprising of Faculty of Engineering (FOE), Faculty of Basic Medical Sciences (FBMS), Faculty of Sciences (FOS), Faculty of Law (FOL), Faculty of Arts (FOA); and Faculty of Business and Social Sciences (FBSS). It has an administrative (senate) building, residential buildings, university cafeteria and library

We utilized the cross-sectional study design to assess monkeypox related knowledge, attitudes and practices among students of Adeleke University. The study population comprised of undergraduate students. The inclusion criteria are: being a full-time undergraduate student of Adeleke University, availability at the time of carrying out the study, giving full consent for participation in the study and being healthy and not diagnosed with any kind of diseases. The exclusion criteria are: being a post-graduate student, part-time student, full-time undergraduate student on any form of medication, acutely ill or with known chronic

diseases or unwilling to participate in the study.

The sample size was determined using the formula for sample size determination for known single proportion $n = Z^2 p (1 - p) / d^2$, where n = Minimum desired sample size, Z = the standard normal deviate was set at 1.96 which corresponds to 5% level of significance (8). Utilizing proportion of 48% reported in a similar study and precision of 6%, a minimum sample size of 260 was computed. However, to account for anticipated non-response a total sample size of 278 was utilized for the study (9).

We utilized the purposive sampling method to select participants to cut across the six faculties, 23 departments and 100-500 levels of the Undergraduate education. We designed a semi-structured self-administered questionnaire consisting of four sections used for data collection. The first section aimed at determining the socio-demographic characteristics of the respondents had 7 questions, the second section aimed to determine knowledge on monkeypox had 14 questions; the third section was aimed at detecting attitude towards monkey pox disease had 8 questions, while the fourth section aimed at capturing practices regarding prevention of monkeypox had 6 questions. The instrument was administered to respondents by the researchers. The range of scores for Knowledge was 0-14 using Yes, No and Do not Know questions. The range of scores for Attitude was 5-40 using 5-point Likert Scale questions while the range of score for Practice was 0-6 using yes or No questions. Knowledge was classified into low (0-7) and high (8-14), Attitude was classified into low (8-25) and high (25-40) while practice was classified into low (0-3) and high 4-6)

Content validity of research instrument was determined through expert in the field of public health assessing the research questionnaire. Observations, corrections and suggestions made were used to revise the instrument before the final draft.

The data collected was entered and analyzed using the IBM Statistical Package for Social Sciences (IBM SPSS) Statistical software, version 26. Descriptive statistics (means, standard deviations, frequencies and percentages) were computed for socio-demographic variables and the dependent variables. Analysis of variance (ANOVA) test was used to test hypothesis for difference in dependent variables among different socio-demographic groups to determine presence of statistical association. The level of significance was set at 5%.

Written informed consent was obtained

from the respondents before commencement of the study.

RESULTS

There were 278 participants recruited into the study and there was 100% response rate. Age range was 18-27 years with mean age of 19.7 years and a standard deviation of ± 5.01 years. Majority (76.3%) of respondents were between 18-22 years, 14.7% were between 13-17 years while 9% were between 23-27 years. Fifty-Four (54%) percent of respondents are males while 46% are females. A bulk (96.4%) of respondents are single, 3.2% are married while 0.4% are separated. Most (67.3%) respondents are Yorubas, 27.7% are Igbos, 4.7% are Hausas while 0.4% are from other ethnic groups. A high proportion (80.6%) of respondents are Christians, 18.7% are Muslims while 0.7% are practicing Traditional Religion. A bulk (38.8%) are in 300 Level, 28.4% are in 400 Level, 25.2% are in 200 Level, 4.7% are in 500 Level while 2.9% are in 100 Level (Table I)

Monkeypox related knowledge score ranged from 0-14 with a mean score of 6.04 and standard deviation of ± 3.16 , monkeypox related attitude score ranged from 17-36 with a mean score of 28.7 and standard deviation of ± 3.34 while monkeypox related practice score ranged from 0-6 with a mean score of 5.49 and standard deviation of ± 0.91 (Table II)

A low proportion (37.8%) of respondents had high monkeypox related knowledge score while 62.2% had low monkeypox related knowledge score. A high proportion (54.3%) of respondents had high monkeypox related attitudes score while only 12.2% had low monkeypox related attitude score. Majority (96%) of respondents had high monkeypox related practice score while only 4% had low monkeypox related practice score (Table III)

Respondents between the ages of 18-22 years had higher monkeypox related practice mean score compared to other age groups ($p=0.028$), however there was no association between age and monkeypox related knowledge ($p=0.066$) and monkeypox related attitude ($p=0.249$)

Female respondents had higher monkeypox related attitude mean score compared to male respondents ($p=0.012$) but there was no association between sex and monkeypox related knowledge ($p=0.363$) and monkeypox related practice ($p=0.103$). Respondents in 100 level had higher monkeypox related knowledge mean score compared to other respondents in levels 200-500 ($p=0.002$)

however there was no association between university level and monkeypox related knowledge ($p=0.270$) and monkeypox related practice ($p=0.743$).

There was no association between marital status and monkeypox related knowledge ($p=0.727$), monkeypox related attitude ($p=0.111$) and monkeypox related practice ($p=0.229$). There was also no association between religion and monkeypox related knowledge ($p=0.317$), monkeypox related attitude ($p=0.091$) and monkeypox related practice ($p=0.532$). There was equally no association between ethnicity and monkeypox related knowledge ($p=0.808$), monkeypox related attitude ($p=0.693$) and monkeypox related practice ($p=0.380$) (Table V)

DISCUSSION

We observed that only 37.8% of respondents had high monkeypox related knowledge score. This means that a low proportion of students have good knowledge about monkeypox infection. This poor knowledge may be due to the fact that until the recent monkeypox outbreak of 2022, the last time cases of monkeypox were reported in Nigeria was in the 1970s resulting in low level of awareness (10). This finding is similar to that of a study in Nigeria in the general population with only 58.7% having good knowledge of Monkeypox infection (11). In addition, a study Saudi Arabia among the general population reported only 48% of the respondents with high knowledge of monkeypox (9). A survey of the United State general public also found almost half the respondents (47%) feeling that their knowledge level about Monkeypox is poor while a study in Indonesia reported only 36.5% with good knowledge (12,13). Also, a study in Kurdistan-region of Iraqi reported that participants had insufficient knowledge of monkeypox with a mean of 2.096 and standard deviation ± 1.359 and a study at Palembang Indonesia reported that respondents' knowledge of monkeypox was not very good with only 34.7% knowing that monkeypox was not transmitted sexually (14,15). In addition, a study among physicians in Saudi Arabia reported 55% with good knowledge about human monkeypox, while a study in a Malaysian dental school reported that 89.5% of preclinical students and 94.4% of clinical students were aware of the existence of monkeypox (16,17).

We also observed 87.8% of respondents with high monkeypox related attitude score. This deduces that respondents have good attitude about monkeypox infection. The reason may be

that people have fears that the recent monkeypox outbreak may mark the start of another pandemic like the COVID-19 pandemic and therefore wants to avoid getting infected bringing about good attitudes towards prevention.

In addition, a study in Kurdistan-region of Iraqi also reported participants positive attitude toward Monkeypox viral disease with mean score of 4.031 and standard deviation ± 1.645 while another study among undergraduates of a Malaysian dental school reported 95.2% preclinical and 96.8% clinical students demonstrating positive attitudes toward monkeypox (14,17).

Our study reported 96% of respondents with high monkeypox related practices score. This infers good monkeypox related practices among respondents. This is likely because majority of respondents have learnt about standard precaution prevention practices during the COVID-19 era which is also applicable for prevention of monkeypox infection culminating in good prevention practices. This finding is analogous to that of a study in Indonesia which observed 60% of respondents equipping themselves with personal protective equipment, 76% finding information about diagnosis and 77.3% willing to be vaccinated against monkeypox while a study among clinicians in Ohio reported only about 40% who had received smallpox vaccination (15,18).

This study revealed association between monkeypox related knowledge and university education level ($p=0.002$) with 100 level students having better knowledge. Monkeypox related attitude was associated with sex ($p=0.012$), with female respondents having better attitudes. Also, our study observed association between monkeypox related practices and age ($p=0.028$) with respondents between the ages of 18-22 years having better practices. We did not find any association between monkeypox related knowledge, attitudes and practices and marital status, religion and ethnicity. This finding is similar to observation in a study which reported that demographic factors were not associated with monkeypox knowledge, attitude and practice (18). However, another study reported association between monkeypox related knowledge and religion with $p<0.001$ and marital status with $p\text{-value}<0.009$ (14). A similar study reported association between monkeypox related knowledge and marital status with $p<0.01$ (9).

A limitation of this study is the use of purposive sampling method which means that generalization of the findings should be done with caution.

CONCLUSION

We found that overall monkeypox related knowledge was poor while overall monkeypox related attitude and practices were good among students of Adeleke University, Ede in Nigeria.

Better monkeypox related knowledge was associated with lower university education level. Also, better monkeypox related attitude was associated with being female while better monkeypox related practices was associated with being young (18-22 years).

We did not observe any association between monkeypox related knowledge, attitudes and practices and marital status, ethnicity and religion

Our findings revealed the crucial need for public health education on monkeypox infection to improve knowledge in order to prevent monkeypox infection among students and to empower them to protect themselves against monkeypox infection. Good monkeypox related attitudes and practices should be maintained and improved through measures for reduction of exposure to the virus and prompt detection and response

Conflict of Interest: Authors declare no conflict of interest.

Acknowledgments: There are no acknowledgments

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Table I: Frequency distribution of respondents by socio-demographic characteristics

Variable	Category	Frequency	Percent
Age Group	13-17 years	41	14.7%
	18-22 years	212	76.3%
	23-27 years	25	9.0%
	Total	278	100.0%
Gender	Male	150	54.0%
	Female	128	46.0%
	Total	278	100.0%
Marital Status	Single	268	96.4%
	Married	9	3.2%
	Separated	1	0.4%
Ethnicity	Total	278	100.0%
	Yoruba	187	67.3%
	Hausa	13	4.7%
	Igbo	77	27.7%
	Others	1	0.4%
Religion	Total	278	100.0%
	Christian	224	80.6%
	Muslim	52	18.7%
	Traditional	2	0.7%
Level of Education	Total	278	100.0%
	100	8	2.9%
	200	70	25.2%
	300	108	38.8%
	400	79	28.4%
	500	13	4.7%
	Total	278	100.0%

Table II: Descriptive statistics of respondent’s monkeypox related knowledge, attitude and practice score

Variable	N	Possible Scores	Actual Score	Mean	Std. Deviation
KnowledgeScore	278	0-14	0-14	6.04	±3.16
AttitudeScore	278	5-40	17-36	28.70	±3.34
PracticeScore	278	0-6	0-6	5.49	±0.91

Table III: Distribution of monkeypox related knowledge, attitude and practice score

Variable	Score	Frequency	Percent
Knowledge	Low (0-7)	173	62.2%
	High (8-14)	105	37.8%
	Total	278	100.0%
Attitude	Low (8-24)	34	12.2%
	High (25-40)	244	87.8%
	Total	278	100.0%
Practice	Low (0-3)	11	4.0%
	High (4-6)	267	96.0%
	Total	278	100.0%

Table IV: Association between monkeypox related knowledge, attitude and practice and Age, Sex and University Level (ANOVA Test)

Variable	Score	Category	N	Mean	F	Sig.	
Age Group	Knowledge Score	13-17 years	41	5.37	2.745	0.066	
		18-22 years	212	6.28			
		23-27 years	25	5.08			
		Total	278	6.04			
	Attitude Score	13-17 years	41	29.02	1.399	0.249	
		18-22 years	212	28.76			
		23-27 years	25	27.68			
		Total	278	28.70			
	Practice Score	13-17 years	41	5.22	3.624	0.028	
		18-22 years	212	5.57			
		23-27 years	25	5.24			
		Total	278	5.49			
Sex	Knowledge Score	Male	150	5.88	0.829	0.363	
		Female	128	6.23			
		Total	278	6.04			
	Attitude Score	Male	150	28.24	6.350	0.012	
		Female	128	29.24			
		Total	278	28.70			
	Practice Score	Male	150	5.41	2.672	0.103	
		Female	128	5.59			
		Total	278	5.49			
	University Level	Knowledge Score	100	8	8.38	4.264	0.002
			200	70	5.69		
			300	108	6.39		
400			79	6.09			
500			13	3.31			
Total			278	6.04			
Attitude Score		100	8	29.75	1.301	0.270	
		200	70	29.36			
		300	108	28.55			
		400	79	28.25			
		500	13	28.54			
		Total	278	28.70			
Practice Score		100	8	5.25	0.490	0.743	
		200	70	5.44			
		300	108	5.49			
	400	79	5.51				
	500	13	5.77				
	Total	278	5.49				

Table V: Association between sociodemographic characteristics and Monkey-pox related knowledge, attitude and practice (ANOVA Test)

Variable	Knowledge Score P value	Attitude Score P value	Practice Score P value
Age	0.066	0.249	0.028
Sex	0.363	0.012	0.103
Marital Status	0.727	0.111	0.229
Religion	0.317	0.091	0.532
Ethnicity	0.808	0.693	0.380
University Level	0.002	0.270	0.743