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Original Research Article

Knowledge, perception and safety practices of monkeypox infection among healthcare workers in a tertiary health facility in southwest Nigeria

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ABSTRACT

Background: Monkeypox is a self-limiting disease first reported in 1970 in Zaire. It is characterised with small pox like eruptions and presently there is no approved anti–viral drug yet, clinical management of human monkey pox cases is mainly by supportive treatment and symptomatic treatment. This study assessed the knowledge, perception and safety practices of monkey pox disease among healthcare workers in a tertiary facility in Southwest state, Nigeria.
Methods: The study was a descriptive cross-sectional study, web-based conducted among 402 healthcare workers in a tertiary health centre in Southwestern Nigeria. The 38-item survey instrument for the quantitative study was adapted from a similar study on COVID-19 among healthcare workers. Data was analysed using SPSS software version 20.0. Level of significance was pre-determined at p value <0.05 at a confidence level of 95%.
Results: Female respondents constituted 241 (60%) while 161 (40%) were males. Mean age was 35.4±6.5 years with age group 26-35 years (49.0%) being the majority. Majority, 311 (77.4%) had poor knowledge of monkeypox while 69.9% had good perception. There was statistically significant association between age (α- 0.001), work experience (α- 0.001), tribe (α- 0.001), and average monthly income (α- 0.001) with perception about monkey pox infection among the respondents.
Conclusions: Monkeypox is endemic in Nigeria and the knowledge and perceptions of healthcare workers towards the disease is a critical epidemiological determinant of its transmission rate, it is therefore imperative that intensive training be targeted among all cadres of healthcare professional including non-medical workers in healthcare setting.

Keywords: Healthcare, Knowledge, Monkey pox, Perception, Workers

INTRODUCTION

Monkey pox is a zoonotic disease caused by monkey poxvirus, which is a DNA virus, of the genus Orthopoxvirus, which also includes other pathogenic viruses such as the variola virus (the causative agent of smallpox).[1] Monkey pox was first discovered in 1958 in an animal facility in Copenhagen, Denmark, among Asian monkeys, weeks after their importation from Singapore.[2] The first documented human monkey pox case was in an infant from the Zaire now Democratic Republic of Congo (DRC)) in1970 who presented with smallpox-like eruptions.[3,4] The natural reservoir of the monkey pox virus remains unknown, although rodents are believed to be the main source of its introduction into human populations.[1,5]

There are two known clades of monkey pox known to cause disease namely the West African and Congo Basin Clades. The Congo Basin clade is known to cause

epidemics in the DRC and sporadic outbreaks in many parts of Central Africa while the west Africa clade is responsible for outbreaks in West Africa (including Sierra Leone, Nigeria, Cote d'voire), as well as in the United States of America. The Congo Basin clade of the virus is responsible for more severe outbreaks that have been reported in most parts of Central Africa while the West Africa Clade accounts for milder outbreaks and has been reported from other parts of the world.[6,7]

Human monkey pox has a similar but milder clinical presentation to smallpox. The incubation period varies between5 to 21 days. It often presents with non-specific features such as fever, rash, chills, back pain, pruritus, myalgia, headache, lethargy, sore throat and lymphadenopathy followed by vesiculo-pustular rash which is more concentrated on the face and extremities than other parts of the body.[8,9] The disease is usually self-limiting and presently there is no approved anti–viral drug yet, clinical management of human monkey pox cases is mainly by supportive treatment and symptomatic treatment. Transmission can be from animal to human or human to human.[5,8]

Although human monkey pox was rare in the last century, sporadic cases were reported from different parts of Africa. The frequency of reported cases and the geographical spread of cases has, however, expanded over the last twenty (20) years (with more cases reported than in the first 30 years of its discovery) in several African countries such as Nigeria, Central African Republic, DRC, Cameroon, Liberia, Republic of the Congo, Gabon, Sudan and SierraLeone.[5,6]

The first reported outbreak of monkey pox outside Africa was reported in 2003 in the United States of America (USA), since then cases have been reported in Israel, United Kingdom, Singapore etc. Similarly, in May 2022 multiple cases of monkey pox was reported from several non-endemic countries such as Canada, Spain, Portugal, and Germany.[8] Case fatality rate (CFR) ranges between 1% and 10% for different outbreaks with more deaths being reported in children.[8,9] As at 28th June, 2022 a total of 4769 cases have been confirmed in 49 countries with the United Kingdom 1076, Germany 838 and Spain 800 having the three highest confirmed cases respectively worldwide.[10]

With increasing number of monkey pox cases being reported and its rapid spread to non-endemic countries highlighting the importance of both primary and secondary prevention particularly among healthcare workers. Despite this, a report by World Health Organization (WHO) showed that one of the challenges faced in preventing and controlling monkey pox outbreak was a poor knowledge of monkey pox, among healthcare workers.[11] In addition, Nigeria is one of the endemic countries for monkey pox and cases has been exported from Nigeria to other countries.[9-12] Healthcare Workers therefore needs to be informed and knowledgeable to adequately assist in mitigating the outbreak. This knowledge can be used not only to identify suspected cases but also to prevent health facility-related transmission and community transmission likewise.

The Objective of this study therefore is to access the knowledge, perception and safety practices of monkey pox disease among Healthcare workers in a tertiary facility in Southwest state, Nigeria. In addition, this study is important to inform the government and policy makers on the state of vigilance among frontline HCWs and to also provide basic information to assist in formulating strategies and policies to mitigate the outbreak.

METHODS

Study design

The study was a descriptive cross-sectional study, web-based among healthcare workers in Federal Medical Centre, Idi-Aba, Abeokuta, Ogun State.

Study area

Ogun state is one of the states in Southwest Nigeria. She is blessed with categories of health facilities including the federal, state, faith based hospitals and primary health care centres with good representation of all cadres of health care workers (HCW).

The study will be conducted at Federal Medical Centre, Abeokuta (FMCA), Ogun State. FMCA is a tertiary health facility under the purview of Federal Ministry of Health with large attendance of patients within and outside Ogun State.

Study population

Respondents composed of healthcare workers in the health institution including medical doctors, nurses, pharmacist, community healthcare works, laboratory scientist etc. They were broadly divided into junior and senior staff.

Inclusion criteria

All staff both medical (doctors, nurses, community health extension workers, environmental health workers etc.) and non-medical (administrative, cleaners etc.) who were employed in the services FMC, Abeokuta at the period of the research were included.

Exclusion criteria

All medical and non-medical staff who refused consent to participate in the study and all medical and non-medical staff who do not meet 6-months minimum working experience in the facility were excluded from study.

Sampling technique

Respondents for the study were selected through a hybrid method of data collection. A Google-Form was design to capture 50% of calculated sample size through web-based self-administered questionnaire while the remaining 50% of the sample size were recruited through physical Interviewer administered questionnaire- this captured all none doctors in the facility.

For the 50% physical interviewer administered questionnaire a proportional allocation of samples was done to cover all none doctors in the facility. Multistage sampling technique was done with final participants selected through systematic randomized sampling technique. The remaining 50% for medical doctors utilized web-based Google-form and participants were recruited through an on-line link sent to individuals' e-mail addresses and group social media until the sample size was completed. The web-based online recruitment was done for medical doctors because of ease of access to all cadre of medical professionals.

Sample size estimation

A proportion (62.0%) was used to calculate the sample size, this represent the knowledge of outbreak of Monkey pox infection among health workers in Bayelsa State, South south; Nigeria.[13] The minimum sample size for this study was determined using the Fischer formula for studying proportions with population less than 10,000.

$nf = n/1 + n/N$

Where, nf = the desired sample size when the population is less than 10,000; n = the sample size when the population is more than 10,000; N = the estimate of the population.

$$N=\frac{z^2pq}{d^2}$$[14]

Where, Z- standard normal deviate set at 1.96 which corresponds to the 95% confidence interval; P- proportion in the population estimated to have a characteristic of interest (62.0%).[13] q=1-p; D-degree of accuracy desired (0.05). Therefore, calculating for n

$$n=\frac{z^2pq}{d^2}$$
$$=\frac{1.96^2\times0.62\times0.38}{0.05^2}$$
$$=\frac{3.8416\times0.62\times0.38}{0.0025}$$
$$=\frac{0.90508096}{0.0025}$$

$= 362.03$

$nf = n/1 + n/ N$

Where, n=362, N=3,061 (total population of health workers in the service of FMC, Abeokuta). Therefore,

$nf = 362/1 + 362/3,061 = 362.120$

To adjust the estimated minimum sample size for non-response.

$Ns = n/\text{expected response rate}$

Expected response rate is 90%

$Ns = 366.12/0.9 = 402.26 = 402$

A total sample population of 402 were involved in this study to cut across all cadres of healthcare workers.

Survey instruments

The 38-item survey instrument for the quantitative study was adapted from a similar study on COVID-19 among healthcare workers in FMC, Abeokuta, Southwest, Nigeria.[15-17]

The instruments consisted of 38-close ended questions and took approximately 7-12 minutes to be completed. It was divided into four parts including participant characteristics (8-items), knowledge about Monkeypox infection and viral characteristics (13-items), perceptions toward Monkeypox (6-items/yes or no questions) and safety practices of Monkey pox among HCWs (11-items/ 4-point Likert scale).[15]

Ten (10) per cent of the sample size were pretested at State Hospital, Ijaye, Abeokuta among the health care workers. Both the face and construct validity of the questionnaire were done. Face validity was assessed during pretesting and modifications were made to make the question more understandable. Construct validity was ensured by making an accurate operational definition for each variable. Content validity was ensured through engaging colleagues to have an input in the research work.

Data collection and analysis

Data was collected over a period of three (3) months (between November, 2022 and January, 2023) and thereafter analyzed using SPSS software version 20. Knowledge were scored based on 9 questions under knowledge domain, scores of 0-5 were considered to have poor knowledge and those between 6 and 9 were considered to have good knowledge. Perception were also scored based on 9 questions under perception domain and scores of 0-4 were considered to have poor perception while those between 5 and 9 were considered to have good perception.[14] Responses by respondents were summarized using percentages and frequencies. Test of association were done using chi-square and level of significance was set at 5% ($p<0.05$).

RESULTS

Socio-demographic characteristic of respondents

Table 1, a total of 402 health workers at Federal Medical Centre, Abeokuta participated in this study, of which 241 (60%) were females while 161 (40%) were males. The age range for this study was 59-20 years of age. Mean age was 35.4±6.5 years with age group 26-35 years (49.0%) having the highest prevalence among the respondents. Majority were Christians (64.7%), 178 (44.3%) had 5 and above years of working experience, 336 (83.6%) earn more than ₦ 30,000 as monthly incomes while 390 (97%) had tertiary level of education. Also, 387 (96.3%) of respondents heard of monkey pox earlier, however, only 35 (8.7%) attended training since the beginning of the epidemic. Majority of the respondents were doctors (23.6%) (Figure 1) and sources of information were social media (38.8%), electronic media (26.8%) and through colleagues' (Figure 2). Most of the respondents had fair knowledge (65.7%) while only (16.4%) had good knowledge. Majority of respondents had good perception (65.9%) of monkeypox infection, while (5.2%) had poor perception.

Table 1: Socio-demographic characteristics of participants.

Variables	Frequency (N)		Percent (%)
Age [a]			
<25	34		8.5
26-35	197		49.0
36-45	138		34.3
>45	33		8.2
Mean±SD	35.36 ± 8.24		
Gender [a]			
Male	161		40.0
Female	241		60.0
Religion [a]			
Islam	139		34.6
Christianity	260		64.7
Agnostic	3		0.7
Years of experience at work [a]			
1-2	164		40.8
3-4	60		14.9
5 and above	178		44.3
Tribe [a]			
Benue/Edo	9		2.2
Hausa	5		1.2
Ibo	34		8.5
Yoruba	354		88.1
Average monthly income [a]			
<₦ 30,000	66		16.4
>₦ 30,000	336		83.6
Level of education [a]			
Primary	0		0.0
Secondary	12		3.0
Tertiary	390		97.0
Heard of monkey pox before [a]			
No	15		3.7
Yes	387		96.3
Attended any training since the beginning of the epidemic [a]			
No	367		91.3
Yes	35		8.7
	Poor	**Fair**	**Good**
Level of knowledge	17.9	65.7	16.4
Level of perception	5.2	24.9	65.9

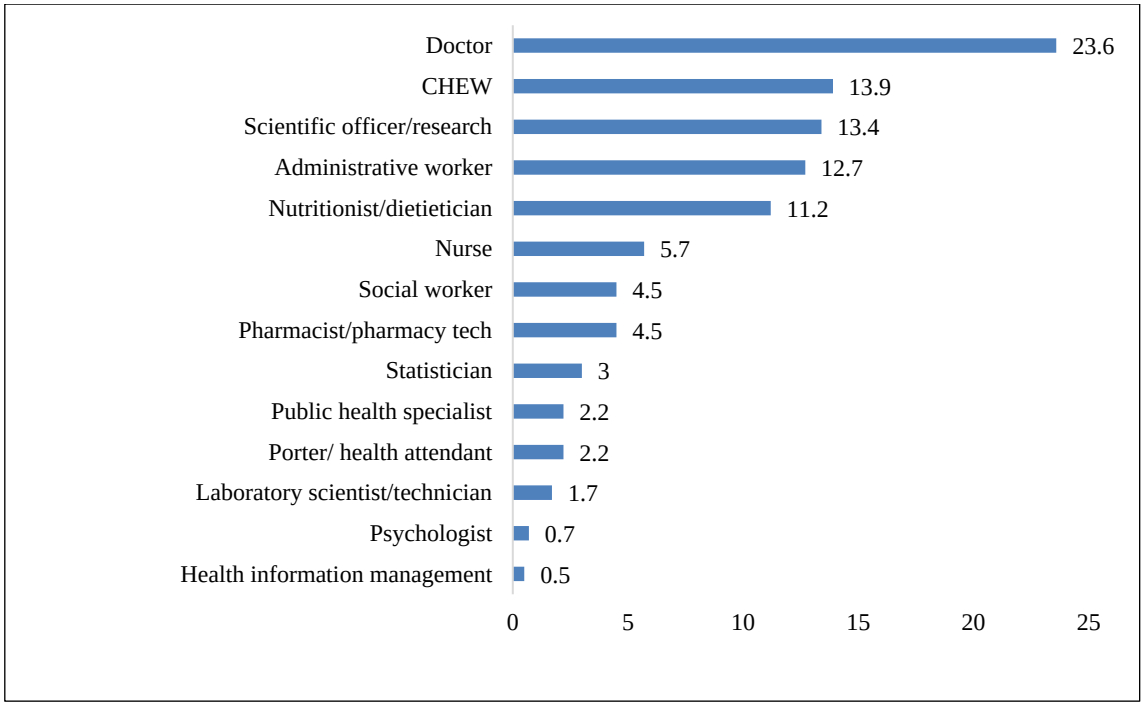

Figure 1: Health worker participants in the study. CHEW-Community health extension worker.

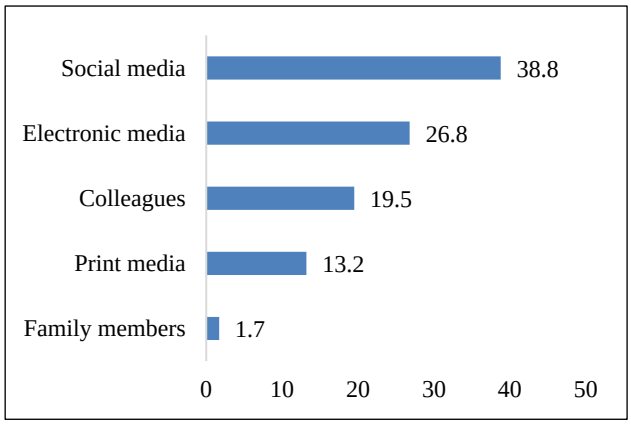

Figure 2: Source of information on monkey pox (multiple answers allowed).

Knowledge on monkeypox infection

Table 2 showed the knowledge questions and how correctly and incorrectly they were answered, 224 (55.7%) had incorrect knowledge about what type the monkeypox virus is. Similarly, 311 (77.4%) had incorrect knowledge on how monkeypox is transmitted. Also, 178 (44.3%) correctly identify monkey pox as a DNA virus, 251 (62.4%) identified monkey pox as double stranded and 263 (65.4%) knew the virus to be zoonotic. In addition, 253 (62.9%) had incorrect knowledge of people at risk of monkeypox infection, 372 (92.5%) had a correct knowledge of symptoms of monkeypox infection. Also, 376 (93.5%) had a correct knowledge that supportive care is the current line of management. Lastly, 390 (97.0%) had correct knowledge that hand washing and social distancing can prevent infection.

Perception about monkeypox infection

Figure 3 shows the perception of the healthcare workers about monkey pox and level of perception respectively, 97.3% and 94.3% correctly answered that washing hands with soap and water can help in prevention of Monkey pox transmission and disinfecting equipment's and working area in hospitals at least once a day prevents hospital transmitted infection. Equally, 98.0% perceived that sick patients should share their current travel history with healthcare personnel, about 27.4% correctly reported that monkey pox is a fatal infection. Majority, 91.5% had correctly perceived that eating well and safe handling of fever rash is safe, 72.6% correctly perceived that monkeypox is a fatal infection.

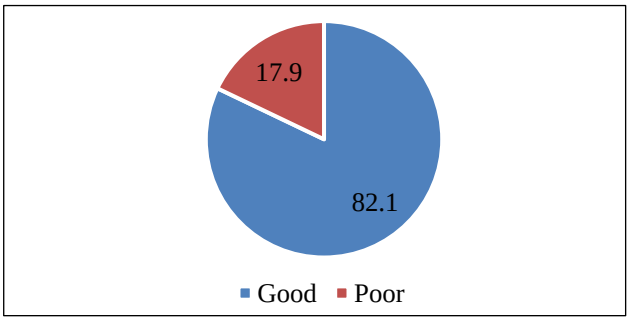

Figure 3: Level of knowledge on monkey pox.

Association between socio-demographic characteristics and knowledge and perception

Table 3 shows the association between socio-demographic characteristics and knowledge of

respondents, age (α-0.001), gender (α-0.001), years of working experience (α-0.001), average monthly income (α-0.001), level of education (α-0.039) and heard of monkeypox before (α-0.042) were all statistically significant to knowledge regarding monkeypox.

Table 2: Knowledge on monkeypox infection.

Statements	Correct (%)	Incorrect (%)
What type of virus	178 (44.3)	224 (55.7)
Monkey pox virus is	251 (62.4)	151 (37.6)
Monkey pox virus is	263(65.4)	139 (34.6)
Monkey pox virus is transmitted through	91 (22.6)	311 (77.4)
People at risk of monkey pox infection are	149 (37.1)	253 (62.9)
Which animal can transmit infection	247 (61.4)	155 (38.6)
Symptoms of monkey pox infection are	372 (92.5)	30 (7.5)
Are there sub-clinical infection	289 (71.9)	113 (28.1)
Supportive care is the current line of management	376 (93.5)	26 (6.5)
Hand washing, and social distancing can prevent infection	390 (97.0)	12 (3.0)

Table 3: Social demographic characteristics of respondents and relationship with knowledge and perception.

Variables	Knowledge (%)			Perception (%)			
	Poor	Good	P value	Poor	Good	Total	P value
Age [a]			0.000*				0.000*
<25	0 (0.0)	34 (8.5)		8 (2.0)	26 (6.5)	34 (8.5)	
26-35	44 (10.9)	153 (38.1)		35 (8.7)	162 (40.3)	197 (49.0)	
36-45	17 (4.2)	121 (30.1)		60 (14.9)	78 (19.4)	138 (34.3)	
>45	11 (2.7)	22 (5.5)		18 (4.5)	15 (3.7)	33 (8.2)	
Gender [a]			0.057				1.000
Male	36 (9.0)	125 (31.1)		55 (13.7)	106 (26.4)	161 (40.0)	
Female	36 (9.0)	205 (51.0)		66 (16.4)	175 (43.5)	241 (60.0)	
Religion [a]			0.195				0.136
Islam	0 (0.0)	139 (34.6)		35 (8.7)	104 (25.9)	139 (34.6)	
Christianity	69 (17.2)	191 (47.5)		86 (21.4)	174 (43.3)	260 (64.7)	
Agnostic	3 (0.7)	0 (0.0)		0 (0.0)	3 (0.7)	3 (0.7)	
Years of experience at work [a]			0.013*				0.000*
1-2	36 (9.0)	128 (31.8)		29 (7.2)	135 (33.6)	164 (40.8)	
3-4	3 (0.7)	57 (14.2)		10 (2.5)	50 (12.4)	60 (14.9)	
5 and above	33 (8.2)	145 (36.1)		82 (20.4)	96 (23.9)	178 (44.3)	
Tribe [a]			0.000*				0.000*
Benue/edo	9 (2.2)	0 (0.0)		6 (1.5)	3 (0.7)	9 (2.2)	
Hausa	5 (1.2)	0 (0.0)		5 (1.2)	0 (0.0)	5 (1.2)	
Ibo	34 (8.5)	0 (0.0)		24 (6.0)	10 (2.5)	34 (8.5)	
Yoruba	24 (6.0)	330 (82.1)		86 (21.4)	268 (66.7)	354 (88.1)	
Average monthly income [a]			0.000*				0.000*
< ₦ 30,000	0 (0.0)	66 (16.4)		2 (0.5)	64 (15.9)	66 (16.4)	
> ₦ 30,000	72 (17.9)	264 (65.7)		119 (29.6)	217 (54.0)	336 (83.6)	
Level of education [a]			0.100				1.000
Primary	0 (0.0)	0 (0.0)		0 (0.0)	0 (0.0)	0 (0.0)	
Secondary	0 (0.0)	12 (3.0)		3 (0.7)	9 (2.2)	12 (3.0)	
Tertiary	72 (17.9)	318 (79.1)		118 (29.4)	272 (67.7)	390 (97.0)	
Have you heard of monkey pox before [a]			0.003*				0.080
No	7 (1.7)	8 (2.0)		8 (2.0)	7 (1.7)	15 (3.7)	
Yes	65 (16.2)	330 (82.1)		113 (28.1)	274 (68.2)	387 (96.3)	
Have you attended			0.085				0.222

Continued.

Variables	Knowledge (%)			Perception (%)			
	Poor	Good	P value	Poor	Good	Total	P value
any training since the beginning of the epidemic [a]							
No	62 (15.4)	305 (75.9)		108 (26.9)	259 (64.4)	367 (91.3)	
Yes	10 (2.5)	25 (6.2)		13 (3.2)	22 (5.5)	35 (8.7)	

*Statistically significant.

There was also statistically significant association between age (α- 0.001), years of working experience (α- 0.001), tribe (α- 0.001), and average monthly income (α- 0.001) with perception about monkeypox infection among the respondents (Figure 4).

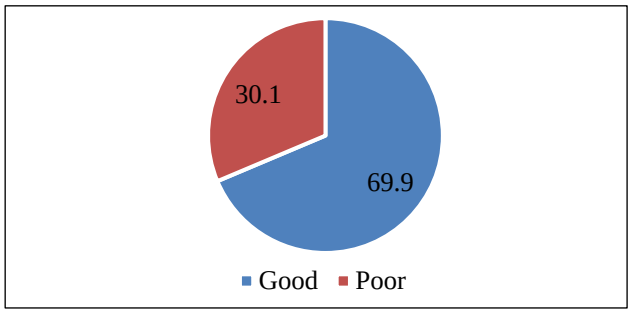

Figure 4: Level of perception of health workers on monkey pox.

Safety practices among healthcare workers

Table 4 shows the safety practices among healthcare workers, 98.3% agreed that the use of personal protective equipment (PPE) is necessary while attending to patient with rash while 1.7% disagreed. Also, 96.3% agreed that the complete collection of data, including disease history, clinical presentation, complications and completion of the relevant form are required after confirmed diagnosis of monkeypox infection and 3.7% disagreed. In addition, 98.3% agreed that exposed people with symptoms of fever, headache and rash should have blood samples taken for PCR testing while 1.7% disagreed. Majority of respondents 387 (96.3%) admitted patients should be hospitalized in the isolation room, preferably with restriction of contact with other patients and HCW while 294 (73.1%) agreed that if no isolation room is available, patients with a diagnosis of monkeypox infection can be put in the same room with beds 1.0 meter apart.

Table 4: Safety practices among healthcare workers.

Statements	Agree (%)	Disagree (%)
The use of personal protective equipment is necessary while attending to patient with rash.	395 (98.3)	7 (1.7)
The complete collection of data, including disease history, clinical presentation, complications and completion of the relevant form are required after confirmed diagnosis of Monkey pox infection	387 (96.3)	15 (3.7)
Suspected cases of Monkey pox infection after triage should be taken into care in an isolation room	392 (97.5)	10 (2.5)
Training and observation of standard precautionary measures are required by care-giving personnel in suspected and probable cases of monkey pox infection	402 (100)	0 (0.0)
Suspected and probable cases of Monkey pox infection must be reported immediately to the infectious disease control center.	399 (99.3)	3 (0.7)
A complete list should be provided of all people who have been in contact with the confirmed patient with Monkey pox55 infection	394 (98.0)	8 (2.0)
The number of care-giving personnel for suspected, probable and confirmed cases of monkey pox infection, including physicians and nurses, should be limited and certain	324 (80.6)	78 (19.4)
Exposed people with symptoms of fever, headache and rash should have blood samples taken for PCR testing	395 (98.3)	7 (1.7)
Admitted patients should be hospitalized in the isolation room, preferably with restriction of contact with other patients and HCW	387 (96.3)	15 (3.7)
All members of the family of a patient with Monkey pox infection are considered to have a history of contact with the disease	360 (89.6)	42 (10.4)
If no isolation room is available, patients with a diagnosis of monkey pox infection can be put in the same room with beds 1.0 meter apart	294 (73.1)	108 (26.9)

DISCUSSION

Globally, the WHO had reported 86,496 laboratory-confirmed cases of monkeypox and 111 deaths in 110 countries as of March 16, 2023.[18,19] Of the 1,420 cases of monkeypox reported in Africa as of March 16, 2023, Nigeria alone recorded 57.1% of the confirmed cases and eight fatalities was recorded in the continent.[19] For these reasons, attending physicians and other health workers in Nigeria need to be prepared to prevent avoidable morbidity and mortality that may be the case due to poor knowledge and awareness of this emerging disease.[20] This study was carried out among 402 healthcare workers at the Federal Medical Centre, Abeokuta. South-west, Nigeria with 23.6% doctors, 13.9%; CHEWs (Community Health Extension Workers); 13.4% scientific officers and 5.7% Nurses and a mean age of 35.36±8.24 years. Majority of the respondents 60% were females. This is similar to a study by Miraglia del Guidice et al in Italy where most respondents 97% were female, and the average age was 41.7 years.[21] However, Alshahrani et al in Saudi Arabia reported that approximately 57% of the participants were under 30 years, and 56.8% were male. Awoyomi et al reported that social media was the most frequently reported source of information 31.1% followed by newspaper and TV 29.0%, while the least was radio 11.7%.[18] This study equally found social medial 38.8%, as the major source of information, followed by electronic media 26.8% and colleagues 19.5% respectively. Since, the social media, and electronic media were the commonest sources of information; these mass media could be used for the enlightenment campaign. However, there is need for caution on the use of social medial for mass education due to infodemic and other misinformation associated with social media.[18,22]

This study had a preponderance of young and well educated participants, 97.0% had tertiary education. A young and highly educated workforce will likely possess and deploy both the physical strength/resilience as well as the intellectual capability/skill requisite to fight endemic/ re-emerging infections like monkeypox virus.[23] Observation from this studies and others imply that if adequately mobilized, the Nigeria's health and educational sectors, can gallantly fight to control and possibly eradicate monkeypox infection in the country; in collaboration with other relevant sectors and agencies.[20,21,23]

This study also found a mean knowledge of 6.48±1.19 with only 16.4% of the participant having good knowledge, a Saudi Arabia study reported mean score of 5.44 points.[23] Miraglia del Giudice et al also reported a mean knowledge score of 3.4 out of 13, this obviously showed a knowledge gap evident from the low number of HCWs who gave correct answers to the different questions.[21] In the same vein, 82.1% of our study population had good knowledge about some basic aspects, related to definition, transmission mechanisms, and categories of people that are at higher risk. This finding compares well with Awoyomi et al who reported 60.5% in another study in Abeokuta, South-west, Nigeria with good knowledge of the modes of transmission, clinical symptoms and methods of prevention and control of monkeypox infection.[18] It is quite interesting to note that among our respondents 77.4% had incorrect knowledge on how monkeypox is transmitted, 44.3% correctly identify monkey pox as a DNA virus, and 62.4% identified monkeypox as double stranded. Despite, the latest declaration of the disease as a Public Health Emergency of International Concern (PHEIC), a significant proportion of the assessed workers were not clear regarding the endemicity of monkeypox, also about transmission, clinical differences with smallpox, chickenpox, and influenza, as well as the clinical evolution (e.g., skin lesion evolution) and the main associated findings.[18,22,24,25]

Still on the general knowledge concerning monkeypox, this study found 92.5% had correct knowledge of symptoms of monkeypox infection, 93.5% had a correct knowledge that supportive care is the current line of management. While 97.0% had correct knowledge that hand washing and social distancing can prevent infection. This overall good knowledge of 82.1% is not unexpected considering that the categories of the respondents in this study are health care workers and are in a better position to understand the symptomatology of the disease as well as the prevention and control measures. The good knowledge found presupposes that the respondents may not only recognize the symptoms suggestive of monkeypox but may also take appropriate measures to protect themselves from getting infected or spreading the disease.[18,23,25]

In spite of many studies reporting negative perception this study found 65.9% of our respondents had good perception about monkeypox infection.[26-29] Awoyomi et al reported only 31.6% had positive perception about the disease in their study, compared with Ghazy et al.[30] who also reported that 58.4% expressed complacency towards monkeypox disease The complacency reported in some of the studies cited had been associated with facts that monkeypox infection is a self-limiting disease and has a lower case fatality ratio.[29] The low case fatality ratio and the self-limiting nature of the virus may elicit complacent mentality and attitude among the respondents.[18] Ugorji, Chinwendu et al in Bayelsa, South-south, Nigeria reported a positive perception 64.0% among the health workers, similar to this current study believing that not taking appropriate preventive actions against monkeypox disease will expose one to higher risk of the disease.[13] This shows the willingness to adopt preventive measures to limit the risk of contracting the disease.[13]

Certain factors were found to determine and associated with knowledge of respondents in this current study which equally had positive perception on the risk assessment of the participants. Age (α-0.001), female

gender (α-0.001), years of experience at work (α- 0.001), average monthly income (α- 0.001), level of education (α-0.039) and heard of monkeypox before (α- 0.042) were all statistically significantly associated with knowledge. These findings were similar to what Alshahrani et al found in Kingdom of Saudi Arabia where a 'good knowledge' score for monkeypox was associated with age under 30 years (p = 0.013), female gender (p<0.01), being a general practitioner (p-0.04), working in the private sector (p<0.01), and having information on human monkeypox during medical school or residency years (p-0.01) were determinants of knowledge.[23] Awoyomi et al similar findings; age (p=0.020) educational qualification attained (p=0.004), occupation (p<0.001), and geopolitical zone of residency (p=0.001) as being strongly associated with good knowledge among their respondents.[18] However, age (α-0.001), years of experience at work (α-0.001) and average monthly income (α-0.001) were significantly associated with positive perception in this current study. From the foregoing, it is pertinent that improving the knowledge and perception of healthcare workers through have more interest in acquiring information, read scientific journals, and ensuring participation in training and retraining not only improve their knowledge but also raise the perception index towards ensuring safety measures are further strengthened.[31,32]

On the safety practices and preventive measures by healthcare workers, our current study observed that 98.3% agreed that the use of personal protective equipment (PPE) is necessary while attending to patient with rash, also 98.3% agreed that exposed people with symptoms of fever, headache and rash should have blood samples taken for PCR testing and 96.3% admitted patients should be hospitalized in the isolation room, preferably with restriction of contact with other patients. In line with standard practice, the European Centre for Disease Prevention and Control (ECDC) has stated that healthcare workers in close contact with monkeypox patients without adequate PPE are at a high risk.[33] In order to prevent occupational contagion, it is mandatory to provide PPE to healthcare facilities, to educate healthcare workers on the proper use of the equipment provided, and to continue to pay the necessary attention to hand and working environment hygiene.[34] These are the pillars of the preventive measures to be implemented in workplaces such as healthcare settings.[34,35]

This study was a cross-sectional study and was limited to healthcare workers in the services of FMC, Abeokuta facility, this limited scope of participation might bias the response and also the generalization of the outcome. There was also no categorization of medical doctors along specialities. Multivariate regression analysis was not carried out in this study that would have provided predictive measure of the outcome parameters.

CONCLUSION

Interestingly, this current study observed that most participants had just a fair knowledge of the basic information about the epidemiology of monkeypox infection, most of these information were from social media and electronic media. Similarly, very few of our respondents had any form of training before this study was undertaken. In spite of the low knowledge recorded in this study, there were positive perception index among the respondents. The positive perception index will help create the necessary safety precautions needed to ensure prevention of transmission of monkeypox virus in occupational setting. It was also observed that knowledge and perceptions were positively influenced by age, level of knowledge, years of experience at work and having heard of monkeypox before. Since monkeypox is endemic in Nigeria and the knowledge and perceptions of healthcare workers towards the disease may be critical epidemiological determinants of its transmission rate, it is imperative that intensive training be targeted among all cadres of healthcare professional including non-medical workers in healthcare setting.

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