

Original Research Article

Assessment of knowledge, awareness and attitudes regarding the re-emerging outbreak of monkeypox among the health professionals in Bangladesh: a web based cross-sectional study

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ABSTRACT

Background: Before the early 70s, Monkeypox (MPX) was simply recognized as a native disregarded disease in western and central Africa. Moreover, monkeypox is a re-emerging disease that becomes a serious life threatening issue all over the world including non-endemic countries. Regarding the evaluation of research based information about monkeypox in Bangladesh, this study has been conducted to assess the existing knowledge among health professionals.

Methods: An online-based cross-sectional study was carried out from 20 June 2022 to 10 August 2022 time period where respondents' knowledge about monkeypox was assessed through using a 21-item scale. The chi-square test was used to make the association between socio-demographic variables and knowledge level.

Results: Among 223 respondents, only 53% had good knowledge (mean score >14). Respondents age and sex were significantly correlated with the level of knowledge about monkeypox ($p < 0.006$) and ($p < 0.02$) respectively. Around 72.1% of respondents agreed that the world's populations are able to prevent and control monkeypox worldwide and 65% of respondents believed that media coverage of monkeypox may contribute to global prevention. Moreover, 52.4% respondents had negative attitudes toward monkeypox for becoming a world pandemic.

Conclusions: The study finding reveals that knowledge about the monkeypox virus was average and training as well as awareness programs are recommended on monkeypox to promote further knowledge development among health professionals.

Keywords: Health professionals, Human monkeypox virus, Monkeypox, Outbreak, Pandemic

INTRODUCTION

Beside the significant advancement in Medical Science, the world has faced several health challenges of infectious disease with emerging and re-emerging pathogens in the Twenty-first century.¹ Though variola virus (smallpox) was successful eradicated from world population in late 1970, another awaited threat emerged

as monkeypox virus (MPXV) among the other orthopoxvirus members.² This infamous threat was introduced with several outbreaks in different countries of the world, specifically in Western and Central Africa, along with the cases in Europe and United States (U.S) with the traveling history of imported infected animals in endemic areas.^{3,4} Monkeypox virus (MPXV) was first identified in 1958 within an outbreak of a monkey colony

in Copenhagen, Denmark.⁵ The first monkeypox case was reported as a human pathogen in a 9-month-old child in the Democratic Republic of Congo (DRC), formerly known as Zaire in 1970, which remains endemic in the region.⁶ Monkeypox is regionally found in the rural and tropical rainforests of the Congo basin (CB) as well as West Africa.⁷ The majority of the cases are particularly reported in Democratic Republic of Congo (DRC) countries every year.⁸

The United States of America (USA) was recognized as the first pandemic country outside Africa for the outbreak of monkeypox virus through the shipment of 800 of African mammals from Ghana to Texas in 2003.^{9,10} The shipment consisted of three rope squirrels, two giant pouched rats, including nine infected dormice.¹¹ The MPXV infected rodents were placed and sold to the local wholesaler. The rodents and American local prairie dogs (PD) are believed as carriers of MPX infection and spread to the different states with new cases.¹² Travelers of Nigeria were the origin of cases with monkeypox in the UK in 2018 and 2019, Israel in 2018.¹³ In May 2019, the first MPXV case in Asia was reported in Singapore by a tourist from Nigeria who intended to attend a conference and confirmed a case of monkeypox.¹⁴ The Singapore government initiated isolating the case and quarantine people contacted with.¹⁵ Bangladesh is more fortunate and still in the safe zone. The first case of MPX was reported in the Hazrat Shahjalal International Airport on a flight of Turkish airlines on 7th June, 2022. A Turkish passenger who had the symptoms of skin rash was isolated and admitted to the hospital.¹⁶ The World Health Organization has proclaimed the outbreak of monkeypox as a global health emergency. WHO DG reported that more than 16000 cases are recorded from 75 countries of the world.¹⁷ Human monkeypox is a zoonotic infection with complex double-stranded DNA virus that belongs to the orthopoxvirus genus, chordopoxvirinae subfamily of poxviridae family.^{18,19} There were two distinct clades recognized as MPXV in genomic sequencing such as Congo Basin (CB) and West African (WA) clad.^{6,20} The overall clinical features of monkeypox are very similar to ordinary types of smallpox, but the severity is less. Monkeypox symptoms are characterized by itchy and painful skin lesions, generalized headache, fever, back pain, lymphadenopathy and myalgia.²¹⁻²⁶ The most particular clinical feature is skin rash that happens within three days after the fever has subsided. The further symptoms progress with maculopapular to vesicles, pustules and finally crusts. Most of the cases it is observed in the central distribution of the body including the face and extremities, but in severe cases it can be noticed throughout entire parts of the body.²⁷ However, monkeypox is characterized by low case-fatality-ratio comparison to smallpox and historically letter on averaging 30% in overall unvaccinated individuals.²⁸ On the basis of clade, the lethality of MPX has been estimated between 3.6% (95% confidence Interval 1.7–6.8) for the West African (WA) clade as well as 10.6% (95% confidence interval 8.4–13.3) for the Central

African (CA) clad.^{23,29} Animal to human (zoonosis) transmission of HMPX mostly occurs through direct contact with body fluids like saliva, blood and mucosal lesions of infected animals. Whereas, human to human transmission occurs via respiratory secretion or skin lesions of an infected person or contaminated fomites. Health workers as well as household contacts are at greater risk due to respiratory droplets needing prolonged face to face communications.^{6,30}

An online based cross-sectional study was conducted on knowledge, attitudes and practices (KAP) about monkeypox among Italian medical professionals and found knowledge status was unsatisfactory with a significant knowledge gap about all aspects of MPX.³¹ Another study was recently conducted in Saudi Arabia among physicians where only 18.6% of the respondents had ever got information about MPX in their education and findings show substantial poor knowledge about MPX.³² Knowledge of MPX among general practitioners was relatively low in every group in Indonesia.³³ Another survey conducted among university students in Jordanian health school reveals that lower levels of knowledge about HMPX were associated with higher levels of conspiracy belief.³⁴ Another recent study in Saudi Arabia published that the majority of medical students (72%) had consistently poor knowledge but the senior students were significantly more aware than junior students.³⁵ On the contrary, knowledge regarding HIV exposure, causative organisms, mode of transmission and prevention was significantly strong among college students.³⁶ Health professionals are the frontline soldiers who represent the whole health care system and provide information about health threats. We report several categories including physician, nurse, dentist, public health professional, pharmacist and pathologist particularly involved in early management of incident cases. Appropriate knowledge would be considered as the first attempt to raise awareness and change the attitude and modification of behavior. The ultimate aim of this paper is to assess the current level of knowledge of HMPX with emphasis on clinical manifestations, mode of transmission, possible diagnosis and preventive measures among health practitioners in Bangladesh.

METHODS

Study design

A cross-sectional web-based survey was performed among the health professionals from 20 June 2022 to 10 August 2022 to assess the knowledge about MPX in Bangladesh. The target population of the study was 184,691 health professionals (both government and non-government) in Bangladesh.³⁷ In the survey, registered health professionals were considered as eligible. With the conservative assumption of 50% health professionals would have a good knowledge with a 5% of margin error and 95% confidence intervals (CI), the minimum sample size 223 respondents were required for the study. The

study needed approximately 6-8 minutes for each survey to be completed. To maintain anonymity and confidentiality, the respondent's name was not included, only the investigator had access to deal with the survey account. Finally, the raw data were extracted and transferred into statistical software for analysis.

Data collection tool

An anonymous online-based self-administrated questionnaire used for data collection based on present information from the Centers for Disease Control and Prevention (CDC) in the United States and previous study.^{38,39} The questionnaire was categorized into three sections: The first section required sociodemographic information including age, sex, educational qualification, and residence. It also contained information about immunization history (vaccination against COVID-19 and EPI vaccination as per schedule). The second section contained 21 multiple-choice questions regarding knowledge of monkeypox with the score of one for a right answer and zero for a wrong answer. The total score was counted and given from 0-21. The respondent scores up to 14 counted as a good level of knowledge. The third section was the attitudes level towards monkeypox and assessed by eight statements. These statements were marked on a 3-point Likert scale (the answers were either agree, natural or disagree). These statements provided respondents' opinions about the world's monkeypox virus. The questionnaire was pre-tested and reviewed by experts in preventive medicine for reliability and validity. The results of the pilot study were only applied for the improvement purposes of the questions.

Data collection procedure

The respondents were asked to participate in the structured questionnaire by Google Template link and distributed via different social media such as Facebook, WhatsApp, Messenger and Twitter. A brief description of the research was presented at the top of the questionnaire. The respondents were ensured that their given information was used for study purposes only. Completing the online questionnaire was considered to indicate consent for the survey. After completing the survey, they submit the questionnaire to the data collection platform. It was compulsory to answer all the questions to submit for a valid response.

Statistical analysis

The data set was extracted, cleaned, analyzed and transferred into a spreadsheet. Descriptive statistics like means, standard deviation (SD), Confidence Interval CI, frequencies and percentages were calculated. The mean score was set as 14 as a cut point; a mean score of 14 or above was considered good knowledge, while below 14 was considered as poor knowledge. The variables are expressed as numbers and percentages. The Chi Square test used to make the association between variables.

Statistical analysis was done by using Microsoft Excel and SPSS version 25.0 (Chicago, IL, USA). The level of significance was set ($p < 0.05$).

RESULTS

Socio-demographic characteristics

In this study, 270 questionnaires were received from the respondents, whereas 47 responses were excluded owing to incomplete data or refusal to participate. With the rate of 83% responses, 223 respondents met the inclusion criteria for the final analysis. According to the study, 52.4% respondents belonged to the below 30 years old and 61.8% were male. Most of the respondents, 68.1% completed their graduation level in this study. More than half of the respondents, 52.4% were from the urban residential area. Maximum of the respondents, 97.7% agreed that they had already heard about monkeypox. Approximately, 95% of respondents were scheduled EPI vaccinated and 96.8% of respondents had already completed their 2nd dose of Covid-19 vaccination (Table 1).

Table 1: Socio-demographic characteristics of respondents (n=223).

Variables	Number of respondents (n=223)	Percentages (%)
Age (years)		
<30	117	52.46
>30	106	47.54
Sex		
Male	138	61.88
Female	85	38.12
Educational qualifications		
Graduation	152	68.16
Post-graduation	71	31.84
Residential area		
Urban	117	52.46
Sami-urban	61	27.37
Rural	45	20.17
Heard about monkeypox?		
Yes	218	97.76
No	05	2.24
Completed EPI vaccination in childhood?		
Yes	212	95
No	11	5
Completed covid-19 vaccination?		
Yes	216	96.86
No	07	3.13

Knowledge about monkeypox and associated determinants among health professionals

In this study, we used the average level of all scores. We decided a calculated assumption score of 14 or above indicated a good level of knowledge, whereas a score of

below 14 indicated a poor level of knowledge. According to the study, only 118 (53%) out of 223 respondents had a good level of knowledge about monkeypox. In some particular dimensions, the majority of the respondents carried accurate knowledge about monkeypox. Approximately 88.3% respondents agreed about the outbreak of monkeypox in the world. Moreover, 63.3% respondents correctly answered that monkeypox was not common in middle eastern countries as well as 73% of

respondents knew correctly the common location of monkeypox (Western and Central Africa). Among the respondents, 71.3% of them stated monkeypox is a viral disease. Furthermore, 63.6% of respondents believed that monkeypox and chickenpox are similar to its clinical manifestation. Almost 68% of respondents mentioned that antivirals are required for monkeypox management (Table 2).

Table 2: Responses of participants about monkeypox (n=223).

Knowledge based questions	Correct (%)	Incorrect (%)
There is an outbreak of human monkeypox in the world?	197 (88.3)	26 (11.7)
Is monkeypox prevalent in middle eastern countries?	141 (63.3)	82 (36.7)
Is monkeypox prevalent in Western and Central Africa?	163(73)	60 (27)
Is monkeypox a viral disease?	159 (71.3)	64 (28.7)
Is monkeypox a Infectious disease?	166 (74.4)	57 (25.6)
Is monkeypox a Sexually transmitted disease?	148 (66.3)	75 (33.7)
Is monkeypox transmitted human-to-human?	173 (77.5)	50 (22.5)
Could monkeypox be transmitted through a bite of an infected monkey?	176 (79)	47 (21)
Is Monkeypox transmitted to humans through the bites and scratches from infected animals?	171 (76.6)	52 (23.4)
Is monkeypox spread by droplets (coughing and sneezing)?	143 (64.1)	80 (35.9)
Is Monkeypox spread through bodily fluids?	169 (75.7)	54 (24.3)
Do monkeypox and chickenpox have common signs and symptoms?	142 (63.6)	81 (36.4)
A flu-like syndrome is one of the earlier signs or symptoms of human monkeypox?	166 (74.4)	57 (25.6)
Pustules on the skin are one of the regular signs or symptoms of human monkeypox?	198 (88.7)	25 (11.3)
Skin rash one of the common signs or symptoms of human monkey-pox?	192 (86)	31 (14)
Diarrhea is one of the symptoms of human monkeypox?	59 (26.4)	164 (73.6)
Are antivirals required for the human monkeypox patient's management?	151 (67.7)	72 (32.2)
There is a particular vaccine for monkeypox?	88 (39.4)	135 (60.6)
People who got the chickenpox vaccine are immunized for monkeypox?	145 (65)	78 (35)
Are antibiotics required for human monkeypox patients management?	68 (30.4)	155 (69.6)
The most effective method for stopping the expansion of monkeypox virus in the communities is to avoid contact with infected individuals?	197 (88.3)	26 (11.7)

Table 3: Association between Socio-demographic variables and knowledge score of the respondents (n=223).

Sociodemographic variables	Good knowledge N (%) 118 (53)	Poor knowledge N (%) 105 (47)	p value Chi-square
Age (years)			
<30	72 (61.5)	45 (38.5)	0.006
>30	46 (43.3)	60 (56.7%)	
Sex			
Male	81 (58.6)	57 (41.4)	0.02
Female	37 (43.5)	48 (56.5)	
Educational qualifications			
Graduation	73 (48)	79 (52)	0.03
Post graduation	45 (63.3)	26 (36.7)	
Residential area			
Urban	61 (52.1)	56 (47.9)	0.04
Semi-urban	39 (63.9)	22 (36.1)	
Rural	18 (40)	27 (60)	

Association between socio-demographic variable and knowledge scores

According to the study, the relationship calculated between socio-demographic variables and knowledge score based on age, sex, graduation and residential area. The mean score was 13.8 with a standard deviation (SD)±5.44. Consequently, we used 14 as the cutoff point, whereas 14 was considered as good knowledge while less than 14 considered as poor knowledge. In the study, respondents age significantly correlated with knowledge ($p<0.006$) while those aged below 30 years had good knowledge. On the other hand, male respondents (58.6%) carried better knowledge than female respondents ($p<0.02$) (Table 3).

Attitudes towards monkeypox among health professional

In this study, 70.8% of the respondents agreed that monkeypox would be the new pandemic in the world. Moreover, 63.6% of respondents believed that monkeypox could add a new burden on the healthcare system worldwide. Furthermore, 72.2% of respondents agreed to the prevention and control of monkeypox worldwide. Moreover, 65% of respondents believed that media coverage impacts global prevention and 81.1% of respondents interested to learn more about monkeypox (Table 4).

Table 4: Attitudes about monkeypox virus among health professional (n=223).

Attitudes towards monkeypox virus	Agree N (%)	Neutral N (%)	Disagree N (%)
I believe that the outbreak of monkeypox virus will become a new pandemic, and its impact will be similar to covid-19	158 (70.8)	42 (18.8)	23 (10.4)
I believe that the world's population can prevent and control monkeypox virus	161 (72.1)	35 (15.6)	27 (12.3)
I believe that bangladesh can face and control the monkeypox outbreak.	152 (68.1)	43 (19.2)	28 (12.7)
I think that monkeypox would be a new burden on the healthcare system of the affected countries	142 (63.6)	43 (19.2)	38 (17.2)
I believe that media coverage of monkeypox virus may have an significant contribution to global prevention	145 (65)	33 (14.7)	45 (20.3)
I am interested to learn more about monkeypox disease	181 (81.1)	29 (13)	13 (5.9)
I have negative attitudes toward the monkeypox virus that it might become a worldwide pandemic	117 (52.4)	45 (20.1)	61 (27.5)
I believe that emergency measures should be taken to prevent the monkeypox virus pandemic.	188 (84.4)	22 (9.8)	13 (5.8)

DISCUSSION

The re-emerging outbreak of human monkeypox virus particularly requires strong collaboration of the government and front line health care workers. With government resources and strengthening the surveillance system, health professionals play a responsible role including case detection, immunization and clinically managing cases with provision of maximum health services. Health professionals need to come forward and should have enough understanding of the disease to identify, diagnose and proper management of cases. This study aimed at assessing knowledge levels, raising awareness and attitudes towards monkeypox among health professionals in Bangladesh.

The results indicate that around 47% of the respondents had poor knowledge about monkeypox virus. Monkeypox is more prevalent in tropical rainforest areas and Bangladesh particularly owns the largest mangrove forest along with the rainforest region.⁴⁰ But it is most fortunate that there is no record of monkeypox cases enlisted in Bangladesh. Therefore, monkeypox got less familiar which might be the possible reason for scoring lower.

These studies align with similar findings reported that poor knowledge regarding uncommon outbreaks in the survey area. Several studies conducted in Indonesia reported that health professionals had poor knowledge associated with infrequent outbreaks, while they had good knowledge about local endemic outbreaks.^{41,42}

On the contrary, we found that the vast majority of the respondents were informed about the current outbreaks of monkeypox in different countries of the world. Almost two-third of the respondents mentioned that monkeypox is an infectious disease. Furthermore, maximum respondents agreed that monkeypox transmitted human-to-human through bodily fluids and droplets (coughing and sneezing). Among the respondents, most of them asserted that monkeypox is a sexually transmitted disease. There are some myths related to monkeypox are: monkeypox is transmitted sexually, only transmitted by monkeys, has conspiracy, has hidden treatment, is kept in laboratory provoked WHO to elicit a Q and A (Questions and Answers).⁴³ Moreover, sexually transmission of monkeypox as well as presence of virus found in the semen was reported, but it is still being investigated.⁴⁴ These myths are also likewise COVID-19

related myths that is not surprising because the reemergence issue of monkeypox coincided with COVID-19 pandemic as well as both are caused by viruses. However, the utmost part of the respondents mentioned that monkeypox symptoms are similar to smallpox and skin rash, pustules are particular symptoms of monkeypox. In addition, a good number of respondents believed that people who were vaccinated against chickenpox do not need to be vaccinated for monkeypox whereas almost two-third of the respondents did not think that monkeypox has a specific vaccine.

Regarding the assessment of the association between socio-demographic variables and knowledge about monkeypox of respondents, we found that respondents age significantly associated with good knowledge ($p < 0.006$). Respondents aged under 30 scored good reasons to have sufficient knowledge. We assumed youngsters had higher knowledge than older because of more familiar and easy accessibility to the internet as well as updated information. As we found that male respondents carried better knowledge than females ($p < 0.02$). At the same time, graduated respondents scored higher than postgraduates ($p < 0.03$). Furthermore, we found residential areas had a good impact on knowledge, respondents who belonged to urban areas had better scores than semi-urban and rural ones, while the possible reasons might be more availability of modern technologies and internet based information.

With the assessment of attitudes of the respondents towards monkeypox, maximum respondents believed that monkeypox might be a new pandemic and the impact like COVID-19. Another study conducted on the COVID-19 pandemic reveals significant impact on daily activities, food habits and mental health status after the pandemic situation.⁴⁵ At the same time, around two-third of the respondents stated that Bangladesh can face and control the monkeypox outbreaks whereas half of the respondents showed negative attitudes towards worldwide pandemic. Furthermore, the vast majority of respondents suggested that emergency measures should be taken for monkeypox outbreak prevention.

CONCLUSION

The study reveals that the ultimate knowledge of monkeypox was average among the health professionals in Bangladesh. Respondents scored well in several parts including monkeypox origination, causative agent, early symptoms and transmission but still have knowledge gaps in vaccination and management. Better knowledge associated with age, sex, education and residence. These findings point out the immediate response to the monkeypox outbreak among health professionals while they belong to the whole healthcare delivery system. Healthcare facilities should collaborate with preparations containing monkeypox information and make familiar with campaigns and consultancy from health officials.

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