

Assessment of Knowledge and Attitude Regarding Monkeypox Virus among Students of a University in Karachi Metropolis

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Abstract

Objective: The objective of this study was to gather information regarding the knowledge and attitude of students at Hamdard University about this disease.

Methods: A cross-sectional study was conducted at Hamdard University, Karachi, after obtaining ethical approval from the Ethical Committee of the Faculty of Pharmacy, Hamdard University, Karachi Campus. A total of 403 valid responses were included in the study. The sample size was calculated using Raosoft software using the standard formula of sample size calculation which was calculated to be 365. Data was collected from October to December 2023 for three months at Hamdard University. Statistical analysis was performed using SPSS-20. The chi-square test was applied due to the non-normal distribution of the data. The response rate was less than 50%. Data was considered significant when $p < 0.05$.

Results: A total of 403 student's data is included in the study. The results showed that 62% of participants had good knowledge about the disease and 70% showed a positive attitude. Data strongly depended on gender ($\chi^2 = 3.9$, $p < 0.05$ – knowledge; $\chi^2 = 6.78$, $p < 0.01$ – attitude) with female predominance. Type of profession ($\chi^2 = 4.53$, $p < 0.05$ – knowledge; $\chi^2 = 9.5$, $p < 0.01$ – attitude) where students of health-related professions showed better knowledge and positive attitude compared to students of the non-medic profession. Participants showed worry about the disease and were significantly willing to get vaccinated if provided ($\chi^2 = 10.83$, $p < 0.05$)

Conclusion: This study concludes that there is a gap in awareness and health facilities among university students along with inadequate budget allocation. This study stresses that awareness regarding infectious disease should be encouraged and a sound health policy should be formulated to overcome any emergency infectious disease burden.

Keywords: Neglected tropical disease, monkeypox disease, monkeypox virus, cross-sectional study, knowledge, attitude.

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Introduction

Monkeypox disease was a neglected tropical disease until the 70s¹. It has been surfacing every ten to twenty years since the cessation of the smallpox eradication campaign in 1980². Its recent

outburst was observed in 2022 during COVID-19 which involved 110 countries, 87,000 reported cases and 112 deaths³, which is increasing the final threat to burden the global economy further.

It is a disease caused by pox virus which belongs to the orthopox virus family. It is a long, enveloped, double-stranded DNA virus whose main hosts are rodents, rabbits and non-human primates⁴. The disease is characterized by flu-like presentation, fever, lymphadenopathy and maculopapular rash all over the body⁵. It mainly affects the male gender of the sexually active age group especially those who are homosexuals^{6,7}. Although monkeypox is not as lethal as certain ailments, the

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case fatality rate was originally approximated to range from 3 to 6%⁸. The disease is transmitted through bites, scratches, body fluids and consumption of infected animals. Respiratory droplets, genital contact and through skin sores are major routes of human-to-human transmission^{4,9}.

Pakistan has not been exposed to the outbreak but awareness and attitude towards avoidance of a disease is mandatory to be transferred to the local population. Thereby there is a current heightening in apprehensions regarding the increasing incidence of cases. Although, adherence to established protective measures serves to deter the transmission of monkeypox, alongside the availability of efficacious vaccines and therapeutic interventions¹⁰.

The general population should be aware of the disease and its burden and how to avoid transmission among themselves and their families. There is a direct relationship between knowledge attitude and practices against some diseases¹¹. It is a public health emergency; therefore, awareness programs are a mainstay. There is a very urgent need to conduct multiple surveys as well to know the level of awareness in the general population and students from different fields as the target of this disease are adults with queer sexual orientation. The current study therefore was designed to observe the "knowledge and attitudes" of students in the health profession towards Monkeypox disease and to compare this knowledge and attitude with the students belonging to non-medic professions.

Methodology

A cross-sectional study was conducted within the institution to evaluate 403 university student's perspectives, beliefs, and understanding of the monkeypox virus through the use of non-probability conventional sampling techniques. The research plan was approved by Hamdard University Karachi, Pakistan's ethical review committee in reference No. (ERC-FoP-2023-012).

The inclusion basis of the study included university students, more than 18 years of age, willing to participate in the study, and belonged to health-related fields. Exclusion criteria were non-university students or office workers, below 18 years of age or above 30 years of age, reluctant to participate, and belonging to non-health related fields like business administration or engineering etc.

Before starting the survey we calculate the sample size, via the Internet Raosoft sample size calculator. Using a 95% confidence interval, 50% of the distribution, and 5% margin of error for a total population of 7000, a sample size of 365 was determined.

Before starting the survey literature review was conducted. Further information was gathered by regulatory authorities like the World Health Organization and the Centers for Disease Control and Prevention's official websites (CDC). The questionnaire was peer-reviewed by Professors, general physicians, community pharmacists and researchers studying infectious diseases.

The questionnaire consisted of 16 questions including demography, knowledge and attitude-related questions. Appropriate changes were made according to the result of the reliability assessment of the pilot study. After forming a Google form, the questionnaire was distributed online. After completion of the responses, data was entered in SPSS after ruling out the possibility of duplication of the data. There were 5 questions related to Knowledge, a gain of e" 3 points was considered good knowledge and <3 was considered poor knowledge, The same was the case with the attitude section, with six questions on attitude towards monkey pox disease (MPD), e" 3 points were considered positive attitude and <3 was considered a negative attitude.

Data were analyzed by IBM using Statistical Package for Social Sciences (SPSS) software version 20. The reliability of the questionnaire was validated by running the Cronbach's alpha model test on a pilot study with >10 participants with a reliability of $\alpha = 0.716$. The data was non-parametric, which was assessed using The Kolmogorov-smirnov-

rov test of Normality. The descriptive analysis using frequency distribution with percentages followed by a test for Goodness of Fit for various variables was applied. To assess the relationship between variables Pearson’s test for correlation was used along with the calculation of Odd’s ratio for the dichotomous variables. The interconnection between knowledge–attitude and fear of disease vs. vaccination was analyzed by Bivariate correlation analysis using Pearson’s correlation coefficient. Results were considered significant when $p < 0.05$.

Results

Approximately 1000 questionnaires were distributed via online platforms but only 403 completed questionnaires were received back whose data is presented in the study. The response rate was roughly <50%. The internal consistency of the questionnaire was calculated to be 0.716. According to Kolmogorov-Sminorov test dates were non-normally distributed. 61% of the participants belonged to 18 – 22 years of age slot ($\chi^2 = 197.14, p < 0.001$). 55% (n = 223) of the responders were female and 45% (n = 180) were male ($\chi^2 = 4.59, p < 0.05$).

Around 54% (n = 218) were students of MBBS followed by 37% (n = 149) of the participants were from the pharmacy profession ($\chi^2 = 467.5, p < 0.001$). As the study population were students from health-related fields 28.8% (n = 116) were in their 2nd professional and 25% (n = 101) students were from first professional ($\chi^2 = 47.2, p < 0.001$) as shown in Table 1.

Table 1. Demographical Characteristics of Study Participants

Variable	Demographic Information N (%)		Chi-squared value
	Frequency	%age	
Age			
18-22	247	61.3%	$\chi^2 = 197.14$ $p < 0.001$
23-27	139	34.5%	
> 28	17	4.2%	
Gender			
Male	180	44.7%	$\chi^2 = 4.59$ $p < 0.05$
female	223	55.3%	
Education			
PharmD	149	37.0%	$\chi^2 = 467.5$ $p < 0.001$

MBBS	218	54.1%	
BDS	13	3.2%	
DPT	11	2.7%	
nutrition	12	3.0%	
Education level			
1st year	101	25.1%	$\chi^2 = 47.16$ $p < 0.001$
2nd year	116	28.8%	
3rd year	75	18.6%	
4th year	76	18.9%	
5th year	35	8.7%	
Education type			
Medical	217	54%	$\chi^2 = 2.385$ NS
Allied Health Sciences	186	46%	
Have you received any training programs?			
Yes	89	22.1%	$\chi^2 = 125.62$ $p < 0.001$
No	314	77.9%	

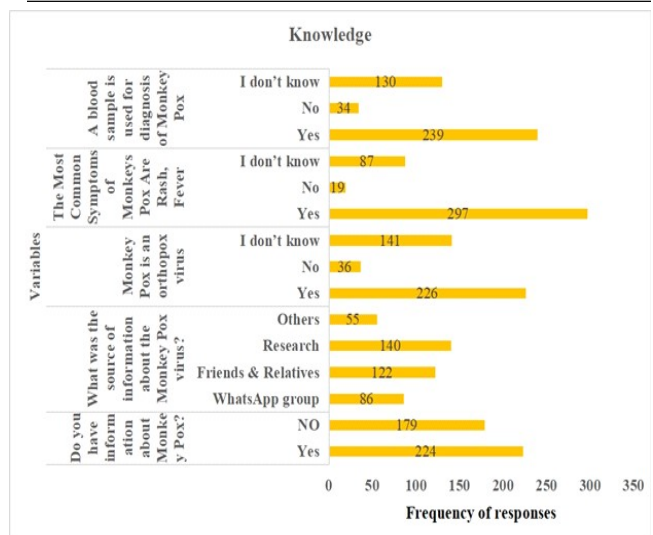


Fig 1. Knowledge About MPD

Figure 1 describes the responses of participants regarding knowledge about MPD. With 5 questions related to Knowledge, a gain of ≥ 3 points was considered good knowledge and <3 was considered poor knowledge. 62.5% (n = 252) participants showed good knowledge and 37.4% (n = 151) had poor knowledge ($\chi^2 = 25.3, p < 0.001$). 55% (n = 223) had information about MPD. The source of information is research articles (35%), family & friends (30%) and WhatsApp groups (21%). 56% (n = 226) participants knew that it belonged to the orthopoxvirus group ($\chi^2 = 134.8, p < 0.001$) whereas 73.3% (n = 297) knew that it is characterized by rash and fever ($\chi^2 = 312.68, p <$

0.001) whereas 59% (n = 239) knew that blood samples are required for diagnosis ($\chi^2 = 156.6$, $p < 0.001$). On performing Pearson’s chi-squared test of correlation knowledge was found to be significantly dependent on gender where women were more aware of the disease compared to men ($\chi^2 = 3.9$, $p = 0.048$, OR = 1.5) and type of education as people belonging to health-related fields were more knowledgeable compared to people with other professions ($\chi^2 = 4.53$, $p = 0.033$ with the odds ratio of 1.55, as shown in Table 2.

Table 2. Pearson Correlation Coefficient Analysis between Knowledge and Attitude with Gender and Type of Education

Knowledge vs Gender					
Variable	Male	Female	χ^2	p	
Knowledge	Good	103	149	$\chi^2 = 3.9$	$p = 0.048$
	Bad	77	74		
Knowledge vs. Education type					
Variable	Medical	Non-Medical	χ^2	p	
Knowledge	Good	146	106	$\chi^2 = 4.53$	$p = 0.033$
	Bad	71	80		
Attitude vs Gender					
Variable	Male	Female	χ^2	p	
Attitude	Positive	115	169	$\chi^2 = 6.779$	$p = 0.009$
	Negative	65	54		
Attitude vs. Education type					
Variable	Medical	Non-Medical	χ^2	p	
Attitude	Positive	167	117	$\chi^2 = 9.51$	$p = 0.002$
	Negative	50	69		

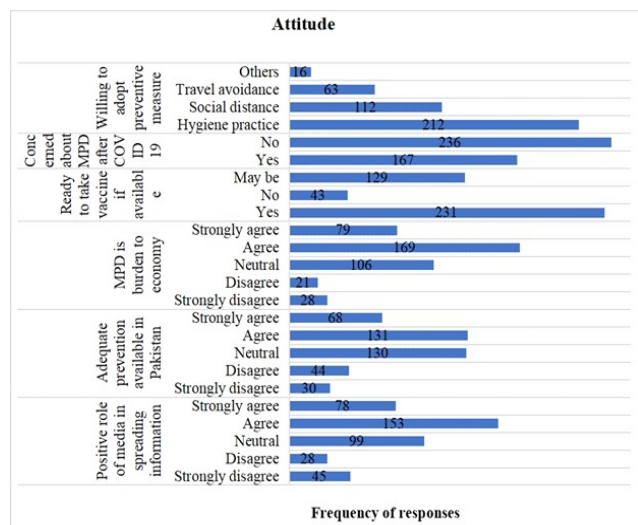


Fig 2. The attitude of the participants towards Monkeypox disease

Figure 2 summarizes the details about the attitude of the participants towards Monkeypox disease. There were six questions related to attitude towards MPD, ≥ 3 points were considered positive attitude and < 3 was considered a negative attitude. 70% (n = 284) of the participants showed a positive attitude whereas 30% (n = 119) showed a negative attitude. 56.6% (n = 236) participants were more concerned about COVID-19 compared to MPD and were willing to avoid the exposure by practising hygiene (56%), social distancing (28%) and travel avoidance (16%). Approximately 57% (n = 231) considered the positive role of media in spreading awareness about the disease ($\chi^2 = 119.37$, $p < 0.001$). 61.5% (n = 248) consider it a burden on the health care system ($\chi^2 = 183.4$, $p < 0.001$) but only 18% (n = 74) do not think that the measures in Pakistan to prevent and control the disease are adequate although 57.3% (n = 231) are willing to take vaccine for the disease if made available. The test of correlation for attitude showed a high dependence of gender for attitude towards MPD ($\chi^2 = 6.78$, $p = 0.009$) with the odds ratio of 1.76 with the more positive attitude shown by women participants of the study compared to male participants. There was a strong dependence on the type of education as health professionals showed a more positive attitude compared to non-medics ($\chi^2 = 9.5$, $p = 0.002$) with an odds ratio of 1.96 as shown in Table 2.

Discussion

Recent continuous outbreaks of neglected diseases are very alarming¹², one of which is monkeypox viral disease which belongs to the Orthopox virus genus⁴. Primary hosts of the virus are rodents and non-human primates⁴. This neglected tropical disease was first detected in a laboratory monkey in 1958¹³. The first ever human infection was reported in Africa in 1970¹³. The smallpox eradication campaign was halted in 1978 with the declaration that smallpox had been eradicated from the world in 1980². During 1981 – 86, 37 cases were reported in Congo¹³.

According to a recent pooled analysis, MPOX is transmitted through sexual contact in >91% of cases¹⁴. It's mainly 96% prevalent in men⁶ with a male-female ratio of 2.5:1¹⁵. Major age group of affected individuals was between 30 – 60 years (60%) and from 18 – 29 years (39%)⁶. It's most common in people with queer sexual preferences⁷. 38% of MPOX cases are co-morbid with HIV and 41% of cases with other sexually transmitted diseases⁶. Rank wise top 5 countries harboring MPOX disease are Brazil, Columbia, Mexico, Peru and France⁶.

The disease starts with flu-like symptoms called the febrile stage¹⁶ after a 7 – 17 days incubation period followed by a prodromal period of rash (rash stage 2 to 4 weeks duration) followed by a cutaneous phase (2 – 6 days), then pustular phase (5 – 7 days) and finally desquamation period (1 – 2 weeks). The total duration is mainly 3 – 4 weeks¹⁶. In a meta-analysis, major diagnostic features found in patients were fever in 55% of cases, inguinal lymphadenopathy in 46% of cases and ulcers/vesicles on the genital and anal regions in 34% of cases¹⁴.

The current study focused on the knowledge and attitude of university students regarding Monkeypox disease (MPD). According to some studies in Pakistan, an online survey showed 41.7% positive attitude and only 34.4% of participants displayed good knowledge¹⁷. Another study showed an average knowledge level of 76.7% of participants¹⁸. The present study demonstrated that 62.5% of participants with good knowledge and 70% with positive attitudes. The result was somewhat better than the previous studies probably because all participants of the study belonged to health-related fields where 36% of good knowledge was displayed by medical students and 26% in students who belonged to the pharmacy, physical therapy and dentistry professions ($\chi^2 = 4.53$, $p < 0.05$) with odds of good knowledge in medical college of 1.5. These results can be strengthened by the results of a study in Bangladesh where 30.59% of doctors' demonstrated good knowledge and 84.3% showed positive attitude¹⁹. The positive attitude of medical students in the current study how

ever was 41% and 29% with other health-related professionals.

A study in Saudi Arabia conducted on physicians and general practitioners showed good knowledge of female physicians regarding MPD²⁰. This finding is consistent with our study as female preponderance was observed with 37% good knowledge in female participants compared to 25.5% good knowledge in male students ($\chi^2 = 3.9$, $p < 0.05$). Likewise, there was a big difference in terms of a positive attitude as well with 42% positive attitude in girls compared to 28.5% positive attitude in boys of the same group ($\chi^2 = 6.78$, $p < 0.001$).

According to Hasan et al¹⁹, knowledge was significantly associated with a positive attitude. The same observation was made in the current study that knowledge was found significantly associated with a positive attitude ($\chi^2 = 15.43$, $p < 0.001$). Thereby giving hope that if the information is effectively disseminated between the masses will bring about a very productive change in terms of prevention and avoidance of the disease.

According to a pilot study by Ricco et al¹, Italian physicians had erratic perceptions and varied levels of knowledge about MPD, but they were willing to take medicine if they caught the disease or vaccine if made available. Yet another study from Bates et al²¹, on clinicians in Ohio demonstrated poor knowledge but those who thought it to be a threat were willing to take the vaccination. A similar pattern was observed in our study as 41% of participants were concerned about MPD and were willing to take vaccination to avoid contracting the disease ($\chi^2 = 10.83$, $p = 0.004$). Although according to Ramirez-Soto⁶ pre-exposure prophylaxis with vaccination is recommended in high-risk groups like MSM and LGBTQ+ individuals.

Even though MPD is mainly seen to be transmitted with sexual preferences, being in close proximity to animals, lack of hygiene and poor sanitation practices may increase the risk and can contribute to dissemination of the disease to larger masses²². The current study showed that people are willing to practice hygiene 212 (52.6%), imple-

ment social distancing 112 (27.8%) and avoid travel to endemic areas 63 (15.6%) ($\chi^2 = 209.5$, $p < 0.001$).

According to WHO, a country should at least spend 5% of its GDP on the health care system^{22,23}. Participants in the study strongly agree that widespread MPD may cause an additional burden to the economy of the country ($\chi^2 = 183.4$, $p < 0.001$) as confirmation of MPD requires PCR whose kits are expensive²². The concerns of the participants towards the disease are somewhat correct. Thankfully, Pakistan is among the safe countries where no cases of MPD were reported²⁴, except for one case of a 25 years old man who was reported in Islamabad with a recent travel history the case was dismissed by NIH²⁴. Nonetheless, Pakistan lacks the healthcare infrastructure for infectious diseases along with diagnostic facilities²⁵, and requires very critical analysis and implementation of policies to overcome this lack.

Conclusion

It may be concluded that there is a dire need to invest in the healthcare sector. Effective and efficient screening policies should be devised and implemented and most importantly preparedness of the health sector for public health threats is a must with effective strategies to overcome big disasters, epidemics and pandemics

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Disclaimer: None

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