

ORIGINAL ARTICLE

A Cross-sectional Study on Undergraduate Medical Students' Knowledge, Perception and Awareness about Monkeypox Infection

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ABSTRACT

Background: Monkeypox virus infection is emerging as global outbreak in 2022. Basic knowledge about the disease, its transmission, clinical features and prevention should be provided to all healthcare providers.

Aim: To assess knowledge of undergraduate medical students about Monkeypox infection.

Methods: This cross-sectional study was conducted at Niazi Medical and Dental College, Sargodha between August and September 2022. Students from third to final year were included and a self-report questionnaire comprising of demographic data, source of information about infection and preventive measures based on obtainable facts from the United States Centers for Disease Control and Prevention and WHO was used. Descriptive statistical analysis was done on SPSS version 22.

Results: 95.4% of participants knew about monkeypox infection out of which 87.9% reported virus as causative agent. 45.4% stated direct contact as a mode of disease transmission. Two-fourth respondents didn't know about the incubation period out of them majority were in final year. Majority learned about it through social media and most common reported symptoms were rash and fever. 34.5% were aware of the pre-emptive measures of the disease while only 1/3rd of participants were acquainted with availability of vaccine. One-fourth MBBS students, majority final year, had knowledge regarding active cases of Monkeypox in Pakistan. 2/3rd responders thought that Pakistan's health system could not bear the burden of another outbreak.

Conclusion: Knowledge of emerging monkeypox infection is limited in medical students, therefore, measures should be taken to arrange awareness programs and educational courses at institution and national levels.

Keywords: Monkeypox, virus infection, global outbreak, incubation period, pre-emptive measures, medical student.

INTRODUCTION

The Chordopoxvirinae subfamily of the Poxviridae family and the genus Orthopoxvirus contain the DNA virus known as the monkeypox virus, which is closely related to the smallpox virus.^{1,2} In the Democratic Republic of Congo, it was first described in relation to humans in 1970³. Since then, there have been periodic outbreaks of infection, primarily in Africa, which are typically caused by reservoirs in wildlife (mostly rodents)⁴. Orthopox viruses are described as typically large viruses with a size between 140 and 450 nm, a brick-like structure, and a genome that codes for more than 200 genes^{5,1}. Through intricate chemical and molecular processes, they carry out their replication cycle in the cytoplasm of infected cells¹.

Classically, a 1-4 day febrile prodromal illness is described with headache and tiredness subsequently leading to appearance of well-circumscribed maculopapular, vesicular, pustular, and then crusty scab lesions.⁶ The rash usually starts in the mouth, and then spreads to the face and extremities, including the palms and soles. These lesions progress at the same time and last for around 1-3 days at each stage. With lymphadenopathy, unlike with smallpox, the rash can appear before or after the disease. From mild to severe and life threatening, diseases fall on a wide spectrum^{7,8}. Pneumonitis, encephalitis, keratitis causing visual impairment, and superimposed bacterial infections are some of the described complications of monkeypox⁹. Direct skin-to-skin contact with lesions on the skin and indirect contact with contaminated fomites, such as contaminated bedding or clothing, are regarded to be the two main ways that human-to-human transmission happens¹⁰. Pregnant women are more prone to develop miscarriages and more grave disease¹¹.

The diagnosis is made by taking a sample from a skin lesion and sending it for PCR molecular testing¹². Supportive care serves as the foundation of clinical management. There are currently no particular therapies for monkeypox that have been approved by the US Food and Drug Administration (FDA). Cifovir, brincidofovir and

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tecovirimat are antiviral medications that have demonstrated activity against it¹³. There are no specific vaccines available to guard against monkeypox infection and illness¹⁴.

Numerous countries in Europe, South America, the Middle East, Canada, and the United States have reported thousands of cases as of 2022. Most incidents have involved young gay men between the ages of 25 and 35¹⁵. This suggests that close intimate encounters during sex might play a significant role in transmission. This is predominately characterized by unusual presentations, including vaginal, perigenital, and perianal lesions¹⁵. One of the greatest monkeypox outbreaks in history is currently underway, with chains of transmission taking place outside of areas where monkeypox is known to be prevalent in a number of different countries¹⁴. Therefore, it is high time to equip undergraduate medical students about the recent outbreaks and ways to handle them.

To our knowledge, only 2-3 studies are reported worldwide (none from sub-continent) on undergraduate and postgraduate medical students on this topic so far. Keeping in view of above mentioned facts, current study is designed to assess basic knowledge about monkeypox infection among undergraduate medical students in an attempt to spread awareness about the current outbreak and as a part of health promotion and prevention. As an emerging global outbreak, this study is an initial attempt to a new research area where measures regarding its prevention and early detection need to be evaluated.

The objectives of the study were to assess knowledge of undergraduate medical students about Monkeypox infection and to raise awareness among undergraduate medical students regarding prevention of monkeypox infection.

MATERIALS AND METHODS

This cross-sectional study was conducted at Niazi Medical and Dental College, Sargodha between August and September 2022. Students from third year to final year were included. A cross-sectional descriptive proposal was employed using a self-report

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questionnaire based on obtainable facts from the United States Centers for Disease Control and Prevention (CDC) and WHO^{7,15} designed on Google forms. The questionnaire was initially validated by conducting a pilot study on 20 healthcare professionals working in different fields, modifying it accordingly, reapplying it to 25 undergraduate students, before getting approval from the Research and Ethical Board of the college. The form was shared with all 300 third, fourth and final year undergraduate medical students. Following survey completion, responses were automatically summed up in an Excel table within a Google form document. Finally, 175 complete responses were selected and analyzed in SPSS version 22.

The questionnaire consisted of 20 questions and was divided into four sections: demographic characteristics of the students (name, age, gender, year of study); investigation of the main source of knowledge about monkeypox (source, causative agent, incubation period, symptoms and mode of transmission of the disease); third section of the survey was made up of questions regarding pre-emptive measures of the disease and the last section evaluated the awareness about active cases and their management in Pakistan. Descriptive statistical analysis was used to determine the number of participants, percentages, frequency of different options opted.

RESULTS

Table 1 represents the demographic characteristics of participants. Out of 174 participants, 101 (58%) were females and majority 158 (90.8%) had age between 21–25 years. 2/5th of the participants 68 (39.1%) were final year MBBS students, 1/3rd 56 (32.2%) were students studying in third year while rest 50 (28.7%) were fourth year students.

According to Table 2, 166 participants out of 174 (95.4%) have heard about Monkeypox infection. Around 153 MBBS students (87.9%) correctly reported virus as the causative agent of Monkeypox infection, out of which 61 were in 5th year, 43 were in 4th year and 49 were in 3rd year. Out of total 68 final year students,

40 (58.8%) were aware that how harmful this infection is and 63 out of total 174 participants were not aware or were not sure of the disease symptoms. 79 students (45.4%) reported direct contact as a mode of disease transmission. Two-fourth of the respondents 88 (50.6%) didn't know about the incubation period of Monkeypox out of which 28 were in 3rd year, 22 were in 4th year and 38 were in 5th year. Only one third of the participants 60 (34.5%) were aware of the pre-emptive measures of the disease out of which 25 students were final year MBBS students. Around 50% of the respondents 83 (47.7%) were not sure regarding the invention of vaccine against Monkeypox infection and 35% respondents (61) reported that the vaccine is not invented yet. Only 20 out of 174 students (11.5%) reported that Government of Pakistan has taken precautions against this infection in which 10 were 3rd year MBBS students while 6 students were in final year. One-fourth MBBS students 42 (24.1%) had knowledge regarding active cases of Monkeypox in Pakistan out of which 21 were final year students. Two-third respondents 112 (64.3%) were of the view that Pakistan cannot bear another pandemic or were not sure if Pakistan will be able to go through another such situation. Out of total 174 respondents, 74 participants thought that health care system of Pakistan is not capable of handling this disease out of which 27 were in 3rd year, 20 were in 4th year and 27 students were in 5th year.

Table 1: Demographic Characteristics of Participants (n=174)

Variable	f	%
Gender		
Male	73	42.0
Female	101	58.0
Age		
16-20 Years	11	6.3
21-25 Years	158	90.8
26-30 Years	05	2.9
MBBS Study Year		
3 rd Year	56	32.2
4 th Year	50	28.7
5 th Year	68	39.1

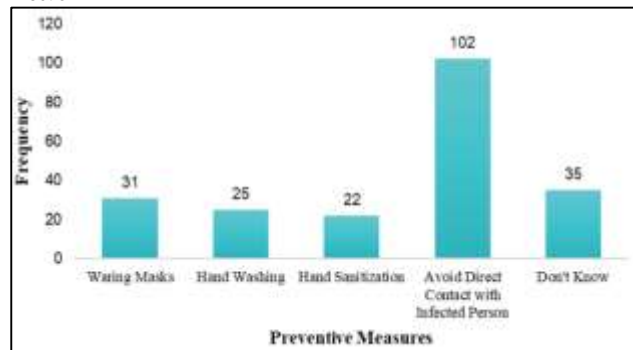
Table 2: Distribution of responses based on study year of MBBS Students

Questions	Responses	Total (n=174)	Frequency/Percentages of Groups		
			3 rd Year (n=56)	4 th Year (n=50)	5 th Year (n=68)
1. Heard of Monkeypox	Yes	166/95.4	51/91.1	50/100.0	65/95.6
	No	8/4.6	5/8.9	0/0.0	3/4.4
2. Causative Agent	Virus	153/87.9	49/87.5	43/86.0	61/89.7
	Bacteria	4/2.3	1/1.8	2/4.0	1/1.5
	Fungi	0/0.0	0/0.0	0/0.0	0/0.0
	Protozoa	1/0.6	0/0.0	1/2.0	0/0.0
	Don't know	16/9.2	6/10.7	4/8.0	6/8.8
3. Awareness of disease harmfulness	Yes	105/60.3	35/62.5	30/60.0	40/58.8
	No	43/24.7	12/21.4	13/26.0	18/26.5
	Not sure	26/14.9	9/16.1	7/14.0	10/14.7
4. Aware of disease symptoms	Yes	111/63.8	33/58.9	37/74.0	41/60.3
	No	42/24.1	17/30.4	8/16.0	17/25.0
	Not sure	21/12.1	6/10.7	5/10.0	10/14.7
5. Spread of Disease	Respiratory droplets	47/27.0	16/28.6	10/20.0	21/30.9
	Direct contact	79/45.4	26/46.4	24/48.0	29/42.6
	Blood	3/1.7	0/0.0	1/2.0	2/2.9
	Respiratory droplets and direct contact	6/3.4	0/0.0	6/12.0	0/0.0
	Don't know	39/22.4	14/25.0	9/18.0	16/23.5
6. Incubation Period	1 week	13/7.5	6/10.7	1/2.0	6/8.8
	2 weeks	50/28.7	17/30.4	18/36.0	15/22.1
	3 weeks	23/13.2	5/8.9	9/18.0	9/13.2
	Don't know	88/50.6	28/50.0	22/44.0	38/55.9
7. Aware of pre-emptive measures	Yes	60/34.5	15/26.8	20/40.0	25/36.8
	No	66/37.9	27/48.2	14/28.0	25/36.8
	Not sure	48/27.6	14/25.0	16/32.0	18/26.5
8. Monkeypox vaccination invention	Yes	30/17.2	9/16.1	8/16.0	13/19.1
	No	61/35.1	24/42.9	17/34.0	20/29.4
	Not sure	83/47.7	23/41.1	25/50.0	35/51.5
9. GoP taken precautionary measures	Yes	20/11.5	10/17.9	4/8.0	6/8.8
	No	83/47.7	28/50.0	22/44.0	33/48.5
	Not sure	71/40.8	18/32.1	24/48.0	29/42.6
10. Knowledge of active Monkeypox cases	Yes	42/24.1	16/28.6	5/10.0	21/30.9
	No	96/55.2	29/51.8	34/68.0	33/48.5
	Not sure	36/20.7	11/19.6	11/22.0	14/20.6
11. Pakistan can bear another pandemic	Yes	62/35.6	15/26.8	19/38.0	28/41.2
	No	58/33.3	23/41.1	19/38.0	16/23.5
	Not sure	54/31.0	18/32.1	12/24.0	24/35.3
12. Health care system can	Yes	54/31.0	14/25.0	15/30.0	25/36.8

handle the disease	No	74/42.5	27/48.2	20/40.0	27/39.7
	Not sure	46/26.4	15/26.8	15/30.0	16/23.5

Out of 174 participants, 102 participants (58.6%) reported that Monkeypox infection can be prevented by avoiding direct contact the infected person. 35 participants (20.1%) did not have any idea about prevention (Fig.1).

Figure 1: Knowledge of MBBS students regarding prevention of Monkeypox infection



Three-fourth of the participants 133(76.4%) came to know about Monkey infection through social media and 45 participants heard about it in the news. However, 6 students reported that they have never heard of this disease (Fig. 2). Most frequently reported symptoms were rash (111) and fever (100) while 29 participants (16.7%) reported that they don't know about the symptoms of this infection (Fig. 3).

Figure 2: Sources of participants' knowledge regarding Monkeypox infection

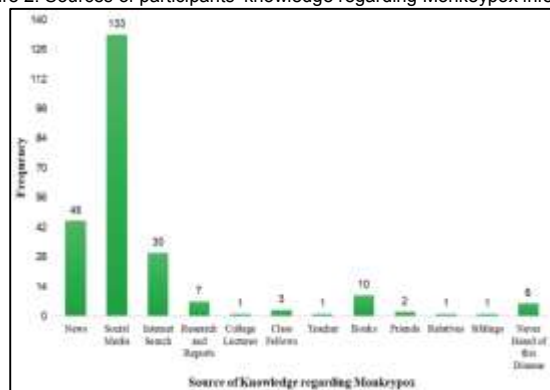
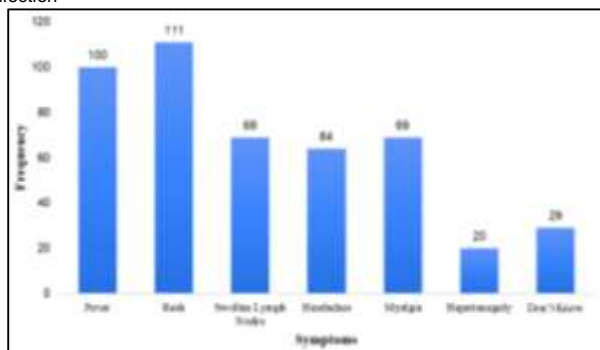


Figure 3: Responses of participants regarding symptoms of Monkeypox infection



DISCUSSION

The increase in occurrences of human monkeypox highlights the importance of healthcare professionals using preventive, early identification, quick response, and management techniques. However, a World Health Organization (WHO) review found that a lack of knowledge about the illness, particularly among medical professionals, was one of the challenges in preventing the reappearance of monkeypox.¹⁶ Although there are only a few incidences of monkeypox in Pakistan, it is crucial for medical students and healthcare professionals to be informed about and ready for monkeypox patients. We wanted to evaluate how well-versed undergraduate medical students were in monkeypox for this reason.

Our study showed that 96 % undergraduate medical students have heard about Monkeypox out of which 87% reported virus as causative agent. These findings are consistent with a study conducted in Saudi Arabia.¹⁷ Limited knowledge about the symptoms and transmission of disease was recorded in our study which is similar to results of study conducted in Indonesia on general practitioners¹⁸.

Twenty four percent students had knowledge regarding active cases of Monkeypox in Pakistan out of which 21 were final year students. These findings were equivalent to those of an analysis by Ibrahim et al¹⁹ into the Zika virus knowledge of medical students. Only 1/3rd of the participants were aware of the preemptive measures of the disease which is in contrast to research by Alshahrani et al¹⁷ where 60% knew about the preemptive measures.

Our study also pointed out that majority of students did not know about the invention and availability of vaccine for the disease. Similar result were reported by Sallam et al²⁰. Majority of participants in our study revealed social media as the source of knowledge about monkeypox which is in accordance with two other studies²¹⁻²³ but in contrast to finding about a less spoken Zika virus infection.²⁴ Most participants were not optimistic that current healthcare system could afford the burden of another outbreak. Whereas, study in Saudi students revealed that they were positive that their system could handle another outbreak well¹⁷. This is the first study carried out in Pakistan on Monkeypox at any level. Also limited data is available internationally for comparing results. We are hopeful that our study will provide a foundation for designing awareness programs and courses for healthcare professionals.

However, this study was not without limitations. Because the study was cross-sectional, we were unable to establish a causal relationship between the dependent and independent variables. Secondly, an estimated sample size was not included due to exclusion procedures. Third, this result cannot be generalized to a wide range of countries due to single institution based study.

CONCLUSION

This study concluded that the knowledge of an emerging monkeypox infection is limited in medical students. It is, therefore, required that such topics should be addressed in public health education courses and training and awareness programs should be prioritized to fill gaps in knowledge regarding emerging zoonotic viral infections, including HMPX in medical students.

Conflict of interest: Nil

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