

Assessment of Knowledge and Awareness of Medical Students about the Re-emerging MonkeyPox Virus Infection

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Abstract

Introduction: India reported its first case of MonkeyPox on 14th July 2022 in Kerala after WHO declared it to be a public health emergency of international concern. Since MonkeyPox is a re-emerging disease, knowledge about its etiopathogenesis, clinical features and treatment is essential among budding doctors especially in non-endemic countries.

Methodology: A cross-sectional study was conducted in Dr. Vithalrao Vikhe Patil Foundation's Medical College and Hospital among 3rd year Phase I and Phase II medical students using a self-designed, pre-structured online questionnaire to assess their knowledge about the MonkeyPox virus. Data obtained was collected in Excel and analyzed using SPSS software (version 20)

Results: The average knowledge score was between 40-60% (AVERAGE) with a 95% confidence interval (CI) of 4.39 - 9.39. Of the total participants, 30 (26%) had poor knowledge, 47 (41%) had average knowledge, 37 (32%) had good knowledge and 1 (1%) had excellent knowledge about the MonkeyPox virus. Better knowledge scores were observed among female students ($P=0.003$) and students studying in 3rd Year Phase I of medical school ($P=0.01$).

Conclusion: The findings of this study demonstrate that a significant number of medical students have insufficient awareness about the re-emerging MonkeyPox virus.

Keywords: Knowledge; Medical students; MonkeyPox.



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INTRODUCTION

India reported its first case of MonkeyPox on 14th July 2022 in Kerala, when a suspected imported case was confirmed to be MonkeyPox by NIV.¹ India was the first South Asian, and 10th Asian country to report the outbreak after WHO declared it to be a public health emergency of international concern affecting more than 80 countries with over 31000 cases in total. India reported a total of 10 confirmed cases and 8 suspected cases.^{2,3}

The MonkeyPox virus is a dsDNA virus belonging to the Orthopoxviridae genus of Poxviridae family. It is zoonotic in transmission⁴ and has an asymptomatic incubation period of 3-17 days along with fever that rises as high as 38-40°C. The viral infection manifests on the skin as a distinctive rash and can be associated with cutaneous dermal petechiae. Other non-specific symptoms include: headache, backache, nausea and vomiting.⁵ Human to human transmission is the reason behind the outbreak and is primarily seen in men who have sex with men.⁶

The antiviral drug Tecovirimat (TPOXX) approved by the Food and Drug Administration authority (FDA) for treating small pox in adults and children is said to be approved for treating MonkeyPox.⁷ Apart from that, the treatment is mostly symptomatic.

Since MonkeyPox is a re-emerging disease, knowledge about its etiopathogenesis, clinical features and treatment is essential among budding doctors. Medical students have a responsibility as future physicians to spread awareness, especially in non-endemic countries and stay on top latest epidemics. However, studies assessing knowledge of medical students about Monkey Pox in India are limited. So, we conducted this study among 3rd year Phase I and Phase II medical students studying in Dr. Vithalrao Vikhe Patil Foundation's Medical College and Hospital, Ahmednagar to assess their knowledge about the re-emerging MonkeyPox virus.

METHODOLOGY

A cross-sectional study was conducted at Dr. Vithalrao Vikhe Patil Foundation's Medical College and Hospital, Ahmednagar among MBBS Students studying in 3rd year Phase I and Phase II medical students.

Simple convenience non-probability sampling technique was used and data was collected by means of a self-designed, pre-structured online questionnaire. The questionnaire had 16 close-ended questions with single and multiple correct answers.

The questions included: family of the virus, where the first case was found in India, the incubation period, mode of transmission, clinical features, fatality, relation with COVID-19 and its diagnosis, treatment and vaccination.

The questionnaire was validated by conducting a pilot study. The valuation of answers was done with

the help of model answers. The level of knowledge was assessed by a scoring system.

1 point was given for every correct answer. 0 points were given for incorrect or unknown answers. There were a total of 16 points.

Scoring system:

Below 40% - poor (<6 points)

40-60% - average (6-8 points)

60-75% - good (9-11 points)

Above 75% - excellent (>12 points)

Out of 16 questions, 13 had single correct answers, whereas 3 were multiple correct answers. For multiple correct, 1 point was awarded only on choosing all the correct answers.

Data collected was compiled and entered into Excel sheets and analyzed using SPSS Software (version 20).

Categorical data was expressed as frequency and percentage. Continuous data (if present) was expressed with mean and standard deviation. Chi-square test was used to compare two categorical data. A P-value of <0.05 was considered statistically significant.

Informed consent was taken from students before starting the study. All MBBS Students studying in 3rd year Phase I and Phase II at Dr. Vithalrao Vikhe Patil Foundation's Medical College and Hospital, Ahmednagar who consent to participate in the study were included and those who didn't give consent were excluded from the study.

Sample size was calculated using the formula $N = z^2 pq/d^2$ where, p =prevalence, $q=1-p$, N =sample size, $z=1.96$ at 95% confidence interval (CI), d =maximum tolerable error. Estimated sample size was 115.

Ethical Approval was obtained from the Institutional Ethics Committee (IEC) before starting this study.

RESULTS

A total of 115 students filled out the online questionnaire, out of which 44.3% (51) were males and 55.7% (64) were females.

Out of the total participants, 66.95% (77) students were studying in 3rd year Phase I and 33.05% (38) in 3rd year Phase II of medical school.

The average knowledge score was between 40-60% (AVERAGE) with a 95% confidence interval

(CI) of 4.39 – 9.39. Of the total participants, 30 (26%) had poor knowledge, 47 (41%) had average knowledge, 37 (32%) had good knowledge and 1 (1%) had excellent knowledge about the MonkeyPox virus.

Table 1: Scoring system and scores received by students.

Scoring System			
Score	Points	Frequency	Percentage
Poor	<6	30	26%
Average	6 to 8	47	41%
Good	9 to 11	37	32%
Excellent	>12	1	1%

While 96.52% (111) students had heard of the MonkeyPox virus, only 63.48% (73) could correctly identify the family and incubation period. 75.65% (87) students were aware about the location of the first confirmed case in India.

Table 2: Knowledge items and response rates of single correct answer questions.

Sr. No	Question	Correct Response	Correct Answer		Incorrect Answer		Don't know	
			Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
1	Have you heard of the Monkey Pox Virus?	Yes	111	96.52%	4	3%	0	0%
2	Which family does the virus belong to?	Poxviridiae	73	63.48%	26	23%	16	14%
3	Where was the first case found in India?	Kerala	87	75.65%	12	10%	16	14%
4	What is its incubation period?	3-17 days	73	63.48%	24	21%	18	16%
5	What is its most characteristic feature?	Rashes	62	53.91%	46	40%	7	6%
6	How is the pattern of distribution of its rashes?	Face and extremities	61	53.04%	39	34%	15	13%
7	Identify the MonkeyPox rash from the given image	Option 2	15	13.04%	100	87%	0	0%
8	Is MonkeyPox Fatal?	Maybe	42	36.52%	55	48%	18	16%
9	Is MonkeyPox related to COVID-19 infection?	No	56	48.70%	44	38%	15	13%
10	Can it mimic COVID-19 infection?	Yes	24	20.87%	67	58%	24	21%
11	Which diagnostic technique is preferred for diagnosis?	PCR	58	50.43%	57	50%	0	0%
12	Is a vaccine available for MonkeyPox?	Yes	50	43.48%	44	38%	21	18%
13	Is vaccination routinely recommended?	No	53	46.09%	30	26%	32	28%

There were 3 multiple choice questions.

Only 6% (7) students could identify all 3 modes of transmission of the MonkeyPox virus. However,

Only 53.91% (62) students knew that rashes are the most characteristic feature of MonkeyPox virus and only 53.04% (61) students could correctly identify the pattern of distribution of the rashes. Further, a very small number of students 13.04% (15) could rightly recognize the MonkeyPox rash.

38% (44) participants wrongly believed that MonkeyPox is related to COVID-19 infection and 58% (67) students were erroneous in thinking that MonkeyPox infection cannot mimic COVID-19 infection.

50.43% (58) students knew that PCR is the preferred diagnostic technique for MonkeyPox infection. While only 43.48% (50) participants knew that a vaccine is available for MonkeyPox, further 54% (62) students were unable to recognize that vaccination is not routinely recommended for the same.

72% (83) students got at least one mode correct, and 8% (9) students couldn't identify even one mode.

A very small percentage of students 2% (2)

accurately recognized all 5 signs/symptoms of the MonkeyPox infection. Nonetheless, 89% (102) students were successful in identifying at least one of the symptoms correctly.

While 74% (85) participants knew at least one of

the strategies for treatment of MonkeyPox, only 7% (8) students knew all the options correctly.

Better knowledge scores were observed among female students ($P=0.003$) and students studying in 3rd Year Phase I of medical school ($P=0.01$).

Table 3: Knowledge items and response rates of multiple correct answer questions.

Question	Multiple Correct Response	All correctly identified		Some correctly identified		None correctly identified		Don't know	
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
How is MonkeyPox virus transmitted?	Airborne, Sexual, Fomite borne	7	6%	83	72%	9	8%	16	14%
What are its signs and symptoms?	Fever and chills, Weakness, Rashes and/or sores, Swollen lymph nodes, Cough	2	2%	102	89%	0	0%	11	10%
How can it be treated?	Home isolation, Antivirals, Symptomatic care.	8	7%	85	74%	8	7%	14	12%

Table 4: Chi-Square test of demographic variable

Demographic Variable	Frequency	Mean \pm SD	P-value
Gender	—	—	—
Male	54	6.67 \pm 2.92	0.003
Female	61	7.26 \pm 2.17	—
Year of Study	—	—	—
3rd Year Phase I	77	7.32 \pm 2.51	0.01
3rd Year Phase II- Final year	8	5.38 \pm 2.23	—
3rd Year Phase II- Internship year	30	6.53 \pm 2.58	—

DISCUSSION

MonkeyPox is a re-emerging virus and has been declared an international emergency.^{2,3} As India is not an endemic country, we need to assess the knowledge of medical students (to be doctors), so that we are better prepared to handle any future outbreaks effectively. This study is one of the very few studies performed to evaluate the knowledge of medical students in India about the MonkeyPox virus. As described by our results, more than 95% of the students had heard about the MonkeyPox virus. However, the overall knowledge scores were average and a majority of students fell in the poor to average score category. It was surprising to see that very few students were aware about MonkeyPox rashes and only 15 out of 115 students could identify the rash correctly from the given images. This calls for action. We need to include emerging and re-emerging diseases in medical students' curriculum and also conduct special seminars and lectures of the same.

The COVID-19 pandemic has shown us that how a seemingly mild, unusual infection can progress to a pandemic.⁸ We need to be ready to recognize early signs and take immediate action on all fronts. Medical students who are our future frontline medical professionals, have to be well-versed with the signs and symptoms, prevention, diagnosis and treatment of the disease, only then can they achieve rapid control over the same.⁹

A good number of students, around 75% were well aware about the location of the first confirmed case in India. This is a result of social media and rapid dissemination of public health updates via news media. However, we need more regular daily updates and also risk communication and advocacy as well as public health education with essential medical details such as important warning signs and prevention methods to be better aware and prepared to handle any emergency.¹⁰

There was a significant amount of confusion between COVID-19 infection and MonkeyPox,

with some students thinking that they are related and most students didn't know that they can mimic each other. While a good number of students could identify at least one symptom and more of transmission, an extremely small percentage of students could correctly guess all symptoms. This can lead to many missed diagnosis. This gap in knowledge, however, can be attributed to the fact that MonkeyPox is not an endemic virus and as of now the cases are very limited and restricted only to some regions. This has also been seen in previous studies where absence of knowledge was attributed to non-endemicity.¹¹

Better knowledge scores were observed among female students ($P=0.003$) in our study, in line with a study conducted previously by Jairoun et al.¹² This contradicts a study conducted by Alshahrani et al¹³ which states that male students have better knowledge scores. Our study was different in finding that students studying in 3rd Year Phase I of medical school ($P=0.01$) had a higher knowledge score than students in higher grades, as opposed to other studies which showed that a higher year in medical school is associated with higher knowledge levels.¹³ We attribute this to the introduction of a revised medical curriculum, known as Competency Based Medical Curriculum, by the National Medical Council (NMC) for their batch which emphasizes on updated information and clinical integration since early years of medical school.¹⁴

Previous papers have shown that an important factor to controlling spread of MonkeyPox was less knowledge about MonkeyPox.¹⁵ Even though we trust the ability of our system to adequately manage future outbreaks, our findings indicate an urgent need to increase knowledge and awareness about MonkeyPox virus among medical students who will play an important role in all future epidemics and outbreaks.¹⁶

CONCLUSION

To sum up, the findings of this study demonstrate that a significant number of medical students have insufficient awareness about the re-emerging MonkeyPox virus. They find it difficult to differentiate the MonkeyPox rash from other clinical differentials, and have poor overall knowledge about the virus.

Recommendation

Past epidemics like COVID-19 have revealed the need for continuous medical education and public health training. Knowledge and cooperation from

all healthcare providers is essential in the control of outbreaks. It should be ensured that medical students should learn about all new epidemics and emerging and re-emerging diseases in their lectures or courses and also by conducting awareness programs and seminars about the same.

Limitation:

The study was conducted at one institution and did not include students in 1st and 2nd year of medical school. So, more extensive studies with a bigger sample size need to be conducted on a larger level.

Conflict of interest: None.

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REFERENCES

1. Yadav PD, Reghukumar A, Sahay RR, Sudeep K, Shete AM, Raman A, Pramod VK, Abraham P, Benson R, Sarin SM, Mohandas S. First two cases of Monkeypox virus infection in travellers returned from UAE to India, July 2022. *Journal of Infection*. 2022 Nov 1;85(5):e145-8.
2. Sharma P. Monkeypox is now a public health emergency of international concern. *Nepal Journal Of Medical Sciences*. 2022 Jul 31;7(2):1-4.
3. Jindal R, Grover C, Sarkar R, Gupta LK. IADVL Academy Position Statement on Emerging Dermatoses in India: Monkeypox. *Indian Dermatology Online Journal*. 2022 Sep 1;13(5):559-69.
4. Mansfield K, King N. Viral diseases. In: *Nonhuman primates in biomedical research* 1998 Jan 1 (pp. 1-57). Academic Press.
5. Al-Musa A, Chou J, LaBere B. The resurgence of a neglected orthopoxvirus: Immunologic and clinical aspects of monkeypox virus infections over the past six decades. *Clinical Immunology*. 2022 Sep 5:109108.
6. Thornhill JP, Barkati S, Walmsley S, Rockstroh J, Antinori A, Harrison LB, Palich R, Nori A, Reeves I, Habibi MS, Apea V. Monkeypox virus infection in humans across 16 countries—April–June 2022. *New England Journal of Medicine*. 2022 Aug 25;387(8):679-91.
7. Rizk JG, Lippi G, Henry BM, Forthal DN, Rizk Y. Prevention and treatment of monkeypox. *Drugs*. 2022 Jun 28:1-7.
8. Hunter P. The spread of the COVID-19 coronavirus: Health agencies worldwide prepare for the seemingly inevitability of the COVID-19 coronavirus becoming endemic. *EMBO reports*. 2020 Apr 3;21(4):e50334.

9. Hurwitz S, Kelly B, Powis D, Smyth R, Lewin T. The desirable qualities of future doctors—a study of medical student perceptions. *Medical teacher*. 2013 Jul 1;35(7):e1332-9.
10. Dausey DJ, Ricci KA, Stoto MA, Sloss EM, Davis LM, Lurie N, Myers SS, Olmsted SS, Ridgely MS, Wasserman J. Communication with the Public in Outbreaks of West Nile Virus, SARS, Monkeypox, and Hepatitis A in the United States.
11. Hasan M, Hossain MA, Chowdhury S, Das P, Jahan I, Rahman MF, Haque MM, Rashid MU, Khan MA, Hossain M, Nabi MH. Human Monkeypox and Preparedness of Bangladesh: A Knowledge and Attitude Assessment Study among Medical Doctors. *Journal of Infection and Public Health*. 2022 Dec 6.
12. Jairoun AA, Al-Hemyari SS, Abdulla NM, El-Dahiyat F, Shahwan M, Hassan N, Alyousef NG, Sharif S, Jaber AA. Awareness and preparedness of human monkeypox outbreak among university student: Time to worry or one to ignore?. *Journal of Infection and Public Health*. 2022 Oct 1;15(10):1065-71.
13. Alshahrani NZ, Mitra S, Alkuwaiti AA, Alhumam MN, Altmimi SM, Alamri MH, Albalawi ZA, Almorgi MW, Alharbi HK, Alshahrani SM. Medical Students' Perception Regarding the Re-emerging Monkeypox Virus: An Institution-Based Cross-Sectional Study From Saudi Arabia. *Cureus*. 2022 Aug 16;14(8).
14. Shrivastava SR, Shrivastava PS. Competency-based medical education for undergraduates in India: Strengths, weaknesses, opportunities, challenges analysis and the way forward. *Mustansiriya Medical Journal*. 2020 Jan 1;19(1):37.
15. Ahmed SK, Abdulqadirb SO, Omar RM, Hussein SH, M-Amin HI, Chandran D, Sharma AK, Dhama K, Ahmed ZK, Essa RA, Abdulla AQ. Study of knowledge, attitude and anxiety in Kurdistan-region of Iraqi population during the monkeypox outbreak in 2022: An online cross-sectional study.
16. Rodriguez-Morales AJ, Lopardo G, Verbanaz S, Orduna T, Lloveras S, Azeñas-Burgoa JM, Escalera-Antezana JP, Alvarado-Arnez LE, Barbosa AN, Diaz-Quijano F, Cimerman S. Latin America: Situation and preparedness facing the multi-country human monkeypox outbreak. *The Lancet Regional Health—Americas*. 2022 Sep 1;13.

