

Knowledge and Attitude Regarding Human Monkeypox Infection Among Health Care Professionals: A Cross-Sectional Study in A Tertiary Care Hospital in Northern Uttar Pradesh

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Abstract

Background: In order to effectively combat monkeypox, healthcare professionals (HCPs) must be knowledgeable about the condition and have a positive outlook on it. Little is known about the knowledge and attitude of HCPs in Uttar Pradesh during the outbreak of this non-endemic disease.

Methods: A cross-sectional online survey was used to gauge 121 HCPs' attitudes and knowledge regarding monkeypox. Frequency reporting was employed to evaluate general attitudes and knowledge. The link between the research variables was evaluated using Spearman's rank correlation coefficient, while the Mann-Whitney U test and Kruskal Wallis test were employed to measure the difference. A p value of 0.05 or lower was considered significant.

Results: A total of 121 HCPs took part, and none of them showed particularly high levels of expertise, with the majority (69.4%) showing somewhat low levels. More participants (72.7%) displayed a neutral attitude towards monkeypox preparedness and eventual control. The Shapiro-Wilk test showed that the data did not have a normal distribution. There were no discernible differences in knowledge and attitude scores across the different demographic factors. Spearman's rank correlation ($r_s = 0.109$, p value >0.05) indicated a somewhat positive association between Knowledge and Attitude scores, which was statistically insignificant.

Conclusions: HCPs in Uttar Pradesh have relatively less knowledge about human monkeypox compared to their attitude towards prevention and treatment. An effective strategy for the institute, the state as well as the nation's readiness for this monkeypox outbreak might be implemented to impart knowledge and perform practical sessions for the same.

Keywords: Monkeypox, Knowledge, Attitude, Healthcare Professionals, Online Survey.

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Introduction

In 1958, a viral illness known as monkeypox (Mpox) was found in laboratory monkey colonies. The first

recorded human instance occurred in 1970. The symptoms of smallpox are similar to those of monkey pox, but they are less

severe, and monkey pox rarely causes mortality.[1] Monkeypox had been documented among people in central and west Africa prior to the 2022 pandemic.[2] In the past, practically all non-endemic infections were connected to animal imports from endemic countries or to foreign travel to such nations. A Nigerian conference visitor who tested positive for Mpox in Singapore in May 2019 was the region's first incidence of monkeypox.[3] The first case in the South-East Asia region was a man in his thirties who had travelled from the Central Asia and tested positive on July 14, 2022. A young person from Kerala who had just come from the United Arab Emirates died on July 30, 2022, marking the first case fatality in India. Numerous cases have been reported thus far in numerous other states across the nation.[4]

Although there are vaccines and treatments for monkeypox, the prevention of human-to-human transmission of the disease depends on effective public health surveillance that includes early detection and high-quality care from HCPs. However, this recommendation demands that HCPs have the necessary skills to recognise and manage monkeypox.[5] Although the World Health Organisation (WHO) and other national and local health organisations have worked to spread knowledge in this area, more needs to be done.[6]

Understanding the sickness, one's attitude towards its prevention, and one's intention to adhere to the advised practises all play a significant role in one's decision to take preventative measures, especially in the case of infectious diseases. Knowledge, attitudes, and practises, or KAPs, are referred to collectively.[7]

Everyone is, in fact, susceptible to developing monkeypox. Since HCPs are the front-line medics, their risk of infection and cross-infection is higher. As a result, it is essential that they have the knowledge

and attitude necessary to stop the spread of the virus and achieve a positive outcome.⁸ Regarding the knowledge and attitudes of HCPs, the material that is currently accessible offers a diverse picture.

Research on knowledge and attitudes regarding monkeypox have found that while some research found that people had inadequate information and a negative attitude, others found that People were knowledgeable and optimistic.[9,10,11,12] To evaluate the knowledge and outlook of the HCPs during the ongoing non-endemic outbreak, we investigated the KA, or knowledge and attitude, component of the KAP study design regarding monkeypox in a tertiary care hospital in Uttar Pradesh, India.

Aims and objectives:

1. To assess the knowledge regarding human monkeypox infection among healthcare professionals working in a Tertiary Care Hospital in Northern Uttar Pradesh.
2. To assess the attitude regarding human monkeypox viral infection among healthcare professionals working in a Tertiary Care Hospital in Northern Uttar Pradesh.
3. To determine whether there is any correlation between different sociodemographic factors and the knowledge and attitude scores
4. To evaluate if there is any association between the knowledge and attitude scores

Materials and Methods:

A private medical college and a tertiary care hospital in Moradabad, Uttar Pradesh, India, was the site of this study. The Institutional Review Board of this college gave its approval for this study's ethical conduct. It is a cross-sectional study that had 121 HCPs filling out an online questionnaire on their own time. A brief summary of the research was provided before asking for participation without the expectation of compensation. Participants

were deemed to have given their agreement to the survey if they completed the online form. The approach of a convenience sample was used to recruit participants. The questionnaire was offered in the form of a Google form, and users were asked to participate via social media sites like WhatsApp.

The names of the partakers were not gathered in order to conserve anonymity and discretion. The raw data was taken out of the poll at the conclusion and entered into statistical software for analysis.

The knowledge and attitude questionnaire used in this study was based on metrics created for cross-sectional studies Ricco and colleagues did among clinicians in Italy while also taking the WHO recommendations into consideration.¹³

Inclusion Criteria

1. HCPs working at a private medical college and tertiary care hospital in Uttar Pradesh.
2. HCPs of either gender.

Exclusion Criteria

1. HCPs not willing to give informed consent.

Descriptive statistics were employed to show the respondents' demographic traits for statistical analysis. Percentages were used to assess categorical variables. To determine the distribution of the data, the Shapiro-Wilk test was used. The association between the research variables was assessed using Spearman's rank correlation coefficient, while the difference was assessed using the Mann-Whitney U test and Kruskal-Wallis test. For both the Kruskal-Wallis test and the Mann-Whitney U test, a p value of 0.05 was considered significant. Additionally, for the correlation analysis, p 0.05 was considered significant. The Statistical Package for Social Sciences (SPSS) version 21.0 was used to analyze the data.

Results

The final statistical analysis includes 121 respondents who willingly participated in this survey and met the inclusion criteria. According to Table 1, the majority of our participants were male doctors (57.9%), under 30 years old (67.8%), PG residents by profession (55.4%), employed in orthopaedics and paediatric departments (14%), and had experience ranging from 1 to 10 years (69.4%).

This Uttar Pradesh Private Medical College and Tertiary care Hospital participated with 14 medical and surgical specialties. The accurate response rates for each of the 21 questions on the monkeypox knowledge questionnaire ranged from very poor (for example, only 11% correctly responding to a true false question stating that children typically have a milder form of disease) to good knowledge (with 84.3%) responding correctly that Monkeypox can be prevented by frequently using an alcohol-based hand sanitizer or soap and water to wash one's hands. The correct response rates for each question on the knowledge questionnaire are shown in Table 2.

According to the level of knowledge, none of the 121 healthcare professionals showed good understanding of monkeypox, only 30.6% showed moderate knowledge, and the majority, or 69.4%, showed poor knowledge. However, only a small percentage of respondents (5%), who showed a negative attitude, did so; the majority (72.7%), who showed a neutral attitude, and 22.3%, who displayed a positive attitude. (Fig.1 and 2). The knowledge and attitude levels are shown in Table 3 according to various demographic factors. No notable distinction in knowledge and attitude among various socio-demographic characteristics were observed (see Table 4)

To ascertain the link between the Knowledge and Attitude scores, a Spearman's rank-order correlation was

performed. As shown in Table 5, there was a marginally positive connection between Knowledge and Attitude scores that was

statistically insignificant ($r_s = 0.109$, p value >0.05).

Table 1: Socio-demographic characteristics

Characteristics	Frequency	Number (Percentage)
Age in years		
Less than 30 years	82	67.8
30-60 years	38	31.4
More than 60 years	1	0.8
Gender		
Female	51	42.1
Male	70	57.9
Professional Designation		
MBBS	22	18.2
PG Resident	67	55.4
Post PG	32	26.4
Department		
Orthopaedics	17	14.0
Anaesthesia	9	7.4
Basic Health Sciences	7	5.8
General Medicine	16	13.2
Ophthalmology	12	9.9
ENT	12	9.9
Obstetrics and Gynaecology	5	4.1
Paediatrics	17	14.0
General Surgery	9	7.4
Emergency Medicine	1	0.8
Chest Medicine	1	0.8
Psychiatry	1	0.8
Radiology	11	9.1
Dermatology	2	1.7
Experience in Medical Field		
Less than 1 year	17	14.0
1 -10 years	84	69.4
More than 10 years	20	16.5

Table 2: Knowledge related to Monkeypox

Questions	Correct rate. % of Total	Options*
Is monkeypox prevalent in India?	50, 41.3%	Yes, No , Don't know
There are many human monkeypox cases in India?	65, 53.7%	Yes, No , Don't know
Monkeypox is infection by a newly discovered virus	48, 39.7%	Yes, No , Don't know
Monkeypox virus spreads only among primates, including humans	26, 21.5%	True, False
Monkeypox is easily transmitted human-to-human?	86, 71.1%	True, False
Could a monkey bite from an infected monkey spread monkeypox?	64, 52.9%	Yes, No Don't know
The majority of imported cases of monkeypox come from travellers from North and South America and Europe.?	87, 71.9%	True, False
Which of the following is not true about monkeypox?	11, 9.1%	Time from exposure to onset of symptoms ranges from five to twenty-one days, Clinical presentation may be asymptomatic, Children usually have a milder form of disease, Small pox vaccine can be used in outbreaks
Monkeypox is endemic to:	77, 63.6%	Southern China, United Kingdom, West and Central Africa , Middle eastern countries
Early Symptoms of Monkeypox infection include all of the following EXCEPT :	90, 74.4%	Flu-like syndrome, Respiratory signs (such as a cough, sore throat, or nasal congestion), Hematemesis, Rashes on the skin that will crust later on
The Typical illness in monkeypox lasts around	96, 79.3%	Less than a week, 2-4 weeks , More than a month, More than 3 months
Infection with monkeypox is typically linked to the following:	30, 24.8%	typical, cervical and/or inguinal Lymphadenopathy, typical axillary and/or groin Lymphadenopathy , No Lymphadenopathy
Monkeypox-associated skin	77, 63.6%	Varicella/Herpes-Zoster, Typhus,

lesions according to their stage could have Differential Diagnosis of:		Molluscum contagiosum, Syphilis, Herpes simplex, All of the above
The usual methods of Monkeypox spread include the following EXCEPT :	34, 28.1%	touching clothing of infected people, sexual contact, short term exposure of respiratory droplets , foetus through placenta, hugging and kissing
Monkeypox can be prevented by frequently using an alcohol-based hand sanitizer or soap and water to wash one's hands.	102, 84.3%	True , False
Paracetamol is one treatment option for patients with symptomatic monkey pox.	92, 76.0%	True , False
Antivirals are necessary for treating human monkeypox.	74, 61.2%	Yes , No, Don't know
Antibiotics are necessary for treating human monkeypox	54, 44.6%	Yes, No , Don't know
People who get the chicken pox vaccine are immunised against the monkeypox?	90, 74.4%	True, False
Is there a specific vaccine for monkeypox?	25, 20.7%	Yes , No, Don't know
Systemic complications of Monkeypox are:	63, 52.1%	Bronchopneumonia, Encephalitis, Corneal Infection, a and b, All of the above

*Correct answers are bolded

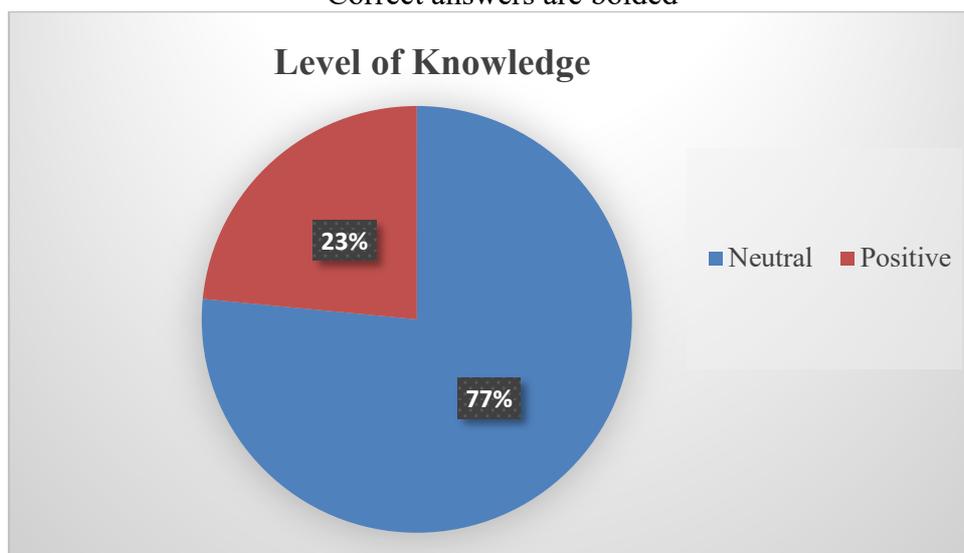


Figure 1: Level of Knowledge

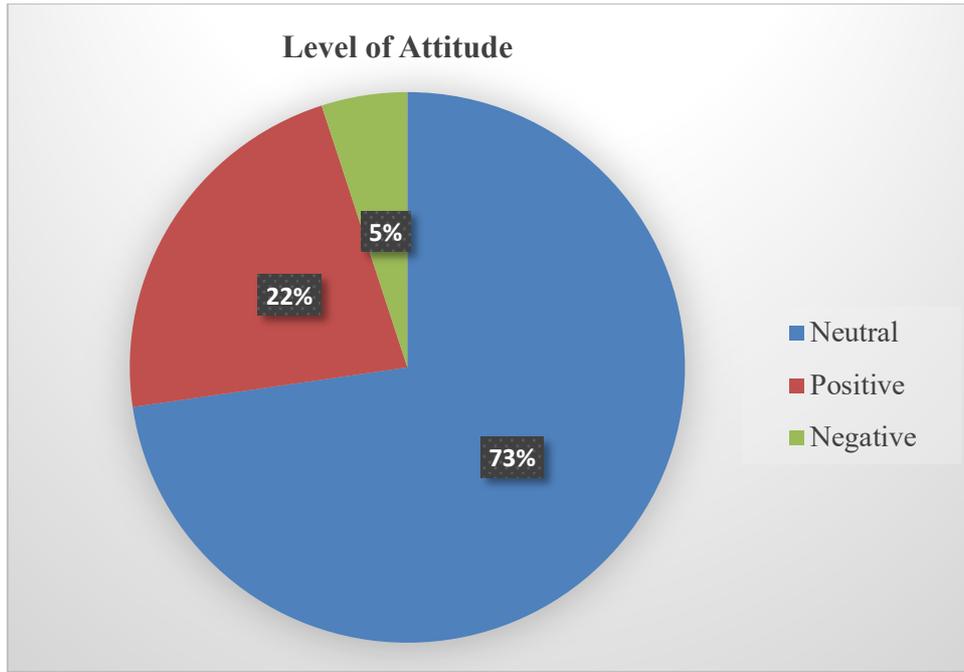


Figure 2: Level of Attitude

Table 3: Knowledge and attitude level of participants in terms of socio-demographic characteristics

Characteristics	Knowledge Level			Attitude Level		
	Good	Moderate	Poor	Negative	Neutral	Positive
Age						
< 30 years	0 (0%)	25 (20.6%)	57 (47.1%)	3 (2.4%)	62 (51.2%)	17 (14%)
30-60 years	0 (0%)	12 (9.9%)	26 (21.4%)	3 (2.4%)	25 (20.6%)	10 (8.2%)
> 60 years	0 (0%)	0 (0%)	1 (0.8%)	0 (0%)	1 (0.8%)	0 (0%)
Gender						
Female	0 (0%)	18 (14.8%)	33 (27.2%)	1 (0.8%)	38 (31.4%)	12 (9.9%)
Male	0 (0%)	19 (15.7%)	51 (42.1%)	5 (4.1%)	50 (41.3%)	15 (12.3%)
Professional Designation						
MBBS	0 (0%)	7 (5.7%)	15 (12.3%)	2 (1.6%)	17 (14%)	3 (2.4%)
PG Resident	0 (0%)	19 (15.7%)	48 (39.6%)	0 (0%)	51 (42.1%)	16 (13.2%)
Post PG	0 (0%)	11 (9%)	21 (17.3%)	4(3.3%)	20 (16.5%)	8 (6.6%)
Department						
Orthopaedics	0 (0%)	7 (5.7%)	10 (8.2%)	1 (0.8%)	15 (12.3%)	1 (0.8%)
Anaesthesia	0 (0%)	1 (0.8%)	8 (6.6%)	0 (0%)	7 (5.7%)	2 (1.6%)
Basic Health Sciences	0 (0%)	1 (0.8%)	6 (4.9%)	1 (0.8%)	4 (3.3%)	2 (1.6%)
General Medicine	0 (0%)	5 (4.1%)	11 (9%)	1 (0.8%)	13 (10.7%)	2 (1.6%)
Ophthalmology	0 (0%)	3 (2.4%)	9 (7.4%)	1 (0.8%)	8 (6.6%)	3 (2.4%)
ENT	0 (0%)	7 (5.7%)	5 (4.1%)	0 (0%)	6 (4.9%)	6 (4.9%)
Obstetrics and Gynaecology	0 (0%)	1 (0.8%)	4 (3.3%)	0 (0%)	5 (4.1%)	0 (0%)
Paediatrics	0 (0%)	9 (7.4%)	8 (6.6%)	1 (0.8%)	10 (8.2%)	6 (4.9%)
General Surgery	0 (0%)	0 (0%)	9 (7.4%)	1 (0.8%)	7 (5.7%)	1 (0.8%)

Emergency Medicine	0 (0%)	0 (0%)	1 (0.8%)	0 (0%)	1 (0.8%)	0 (0%)
Chest Medicine	0 (0%)	1 (0.8%)	0 (0%)	0 (0%)	0 (0%)	1 (0.8%)
Psychiatry	0 (0%)	0 (0%)	1 (0.8%)	0 (0%)	0 (0%)	1 (0.8%)
Radio-diagnosis	0 (0%)	2(1.6%)	9 (7.4%)	0 (0%)	10 (8.2%)	1 (0.8%)
Dermatology	0 (0%)	0 (0%)	2 (1.6%)	0 (0%)	1 (0.8%)	1 (0.8%)
Experience in Medical Field						
< 1 year	0 (0%)	4 (3.3%)	13 (10.7%)	1 (0.8%)	13 (10.7%)	3 (2.4%)
1-10 years	0 (0%)	28 (23.1%)	56 (46.2%)	2(1.6%)	60 (49.5%)	22 (18.1%)
> 10 years	0 (0%)	5 (4.1%)	15 (12.3%)	3(2.4%)	15 (12.3%)	2(1.6%)

Table 4: Comparison of Scio-demographic Characteristics and Mean Knowledge and Attitude Scores

Demographic characteristics	N (121)	Mean Knowledge Score	P-value	Mean Attitude score	P-value
Age in years*					
Less than 30 years	82	11.09(2.3)	0.638	32.83(4.3)	0.734
30-60 years	38	11.15(2.2)		32.85(4.5)	
More than 60 years	1	11(1.8)		34(3.7)	
Gender[#]					
Female	51	11.09 (2.3)	0.393	32.83(4.3)	0.119
Male	70	11.18(2.2)		32.89(4.3)	
Professional Designation*					
MBBS	22	11.21(2.2)	0.979	32.84(4.4)	0.646
PG Resident	67	11.09 (2.3)		32.81(4.4)	
Post PG	32	11.15(2.2)		32.85(4.5)	
Department[#]					
Medical	65	11.14(2.2)	1.000	32.85(4.5)	1.000
Surgical	56	11.09(2.3)		32.81(4.4)	
Experience in Medical Field*					
Less than 1 year	17	11.22(2.2)	0.552	32.85(4.5)	0.055
1 -10 years	84	11.12(2.2)		32.86(4.5)	
More than 10 years	20	11.15(2.2)		32.83(4.5)	

* Kruskal Wallis Test, [#]Mann Whitney Test, p < 0.05

Table 5: Correlation between knowledge and attitude scores

Variable	Correlation Coefficient	P-value
Knowledge-Attitude scores	0.109	>0.05

Discussion

Just as the globe was getting used to fighting the epidemic, a new zoonotic infection appeared in those nations where it was not widespread. Even though there were few cases and it wasn't a major threat in India at the time the study was

conducted, it is still crucial to be ready to battle this illness with the right information and a proactive mindset towards managing it.[14]

The governments at the international, national, and local levels, as well as their separate public health departments, need to

remain attentive and act together to effectively stop this outbreak from turning into a full-blown epidemic or pandemic. It is necessary to educate people from every country, village, and town about how to prevent the disease, identify its risk factors, and manage it. Particular attention must be paid to training frontline HCPs in addressing confirmed or suspected cases while staying safe. One must first recognize the gaps in knowledge in order to fill them and develop a constructive mindset.[15]

According to our present knowledge, this study is the first of its type to evaluate the attitudes and expertise of healthcare professionals in India's north-western state of Uttar Pradesh. Additionally, this study was carried out at a time when the incidence of monkeypox cases was relatively low in Northern India and there was a nationwide surge in newly diagnosed cases beginning in Southern India. According to the study, the majority of participants had poor understanding of monkeypox, and none of the individuals had any good knowledge. This concurs with a different study carried out in the United States of America.[16] Another study conducted in Bangladesh found that clinicians' knowledge of monkeypox was deficient.[17]

Given that monkeypox is a re-emerging infectious disease and has never been reported in India, it is not surprising that participants lack knowledge about it in general. Another cause for this lack of information could be that medical personnel are under time pressure and therefore focus their attention on illnesses that are more widespread or endemic. As a result, it is not anticipated that healthcare professionals would be able to fully manage or treat this ailment. However, a different study that evaluated professionals' attitudes and knowledge regarding a different re-emerging disease showed that they had adequate knowledge.[18] Another survey showed

that the majority of individuals had solid understanding about monkeypox.[19]

According to our study, the majority of participants had a favourable opinion on monkeypox. This is consistent with a different Pakistani study. [20] In contrast, in a different study conducted in Kuwait, about half of the study sample had a positive outlook and felt confidence in their ability to recognise monkeypox illness based on their institutions' capacity to carry out the necessary diagnostic tests.[21]

Despite the enormous lack of understanding about monkeypox, it was found that participants generally had a better attitude. The doctors' upbeat outlook is caused by the fact that they are already depleted from their affair with COVID-19 and are cognizant of the effects of a pandemic. They depicted a bright outlook towards learning about the virus as a result, and they are eager to take the required precautions to stop the virus from spreading and to adhere to the recommended treatment plan.[22]

In our study, the various demographic characteristics did not significantly differ in knowledge or attitude. This is consistent with another study conducted in Ohio where Knowledge and Attitude scores were not correlated with any demographic characteristic.¹⁶ In contrast to these findings, another study found that having knowledge of human monkeypox during medical school or residency years was associated with a "good knowledge" score for monkeypox ($p = 0.13$), female gender ($p = 0.01$), being a general practitioner ($p = 0.04$), working in the private sector ($p = 0.01$), and age under 30 years ($p = 0.01$).¹⁹ In a different study, knowledge and attitude showed a favourable age correlation ($p = 0.05$).[17]

Our research revealed a minimal, statistically insignificant positive association between Knowledge and Attitude scores. In contrast, a different

study showed a statistically significant correlation between participant knowledge and attitude: of the 119 doctors who scored well on the knowledge scale, 110 (92.44%) also scored 80% or higher on the attitude scale.[17] Our results are comparable to those of a study on knowledge and attitude regarding a viral infection, which found a weak link between having strong information and having a favourable attitude (correlation value: 0.148).[23]

Although knowledge is a key component in determining one's attitudes, this is not always the case because a variety of factors can affect someone's knowledge and attitudes. Because there are other actions that can change a one's lifestyle besides attitudes in this regard. A person's attitude is a response to a stimulus. It is a propensity for activity and an eagerness to respond to particular environmental elements. According to earlier studies, attitudes and knowledge regarding the monkeypox infection are related.[11]

Limitations

There are certain restrictions, even though this study is the first of its kind to our knowledge to assess Knowledge and Attitude linked to monkeypox in a population in Uttar Pradesh and even though it is consistent with the scant prior research on other HCPs in other nations. First of all, the state of Uttar Pradesh is the exclusive focus of our study. In light of the fact that there has been an increase in instances of monkeypox since this poll was conducted, the results may not accurately reflect knowledge and attitudes across the nation. Additionally, this study used a self-administrated questionnaire to gather data, which may only represent participants' views at one particular time. Another aspect that can be viewed as a limitation is the fact that practises were not evaluated in this study. The reasoning behind this choice was that since hypothetical questions are typically used to evaluate practises, it is rare for statements

about actual practises to be made. Instead, it generates information about how people behave or what they believe should be done, which we have already assessed when we assessed attitudes.

Conclusion

In conclusion, our research shows that Northern Uttar Pradesh health care professionals are under-informed on monkeypox yet they are somewhat confident and motivated towards handling the non-endemic outbreak. This study served as a wake-up call to our Institute's existing medical and health education programmes, with the goal of advancing better knowledge and inspiring an even more optimistic outlook in order to more successfully combat not only this emerging zoonotic disease but any local or global threat.

Declarations

Ethical Approval- Ethical approval for the conduct of the study had been taken prior to commencement of the study from the Institutional Review Board (IRB) Teerthanker Mahaveer Medical College & Research Center, Moradabad, bearing reference number IRB/86/2022.

Availability of data and materials- All data generated or analysed during this study are included in this published article

Competing interest: The authors declare that they have no competing interests

Author's contributions:

MT - Concept designing, literature search, manuscript preparation.

PA- Manuscript preparation, manuscript editing.

JSP- Manuscript editing, data analysis, data acquisition.

PSM- Manuscript review, interpretation of the data.

SP- Manuscript review, content.

PS- Data acquisition, manuscript review.

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