

IDENTIFYING MONKEYPOX: DO DENTAL PROFESSIONALS HAVE ADEQUATE KNOWLEDGE AND AWARENESS?

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ABSTRACT

Background. The emergence of monkeypox has presented a new challenge for health agencies around the globe. There is significant increase in the number of cases that too in non-endemic countries with more than 18000 cases reported worldwide.

Objective. The present study was conducted to assess knowledge and awareness regarding monkeypox among dental professionals.

Materials and Method. The present cross-sectional study among 410 subjects who were residing in a northern state of the country. Informed consent was obtained from all the subjects. Study sample was selected on the basis of Systematic random sampling methodology. A self-designed close-ended questionnaire written in English and verified by experts was utilized for the study. The questionnaire was delivered personally to study subjects to collect the required information. Chi-square test and ANOVA were used for statistical analysis.

Results. One-fourth (24.8%) of the subjects never heard about monkeypox disease. Negative response was given by 44.8% of subjects regarding resemblance of monkeypox with small pox. Only 31.2% of subjects had knowledge regarding oral manifestations of the disease. High knowledge scores were reported by only 28% of subjects. Higher knowledge levels were significantly related to education level and working profile of study subjects. Online media (Internet) was preferred as the main source to obtain more information by 42.2 of subjects.

Conclusion. There was low level of knowledge regarding monkeypox among study subjects. There is an urgent need for dental professionals to keep themselves updated with recent knowledge on new emerging infectious diseases.

Key words: monkeypox, knowledge, dentists, transmission, infections, India

INTRODUCTION

Owing to mass vaccinations programs across the globe and development of herd immunity in vulnerable populations, the numbers of COVID-19 cases have reduced considerably. However, the world is still fighting the war against COVID-19 as disease outbreaks continue to occur in one or another part of the globe owing to the emergence of new variants [1]. Recently, Monkeypox, another disease of global public health importance, has started to re-emerge in different countries. It is a zoonotic disease caused

by monkeypox virus (MPXV), which is a member of orthopoxvirus genus and severe clinical presentation bearing resemblance to that of smallpox [13]. Though the first case of human monkey pox was reported in 1970 in the Democratic Republic of Congo where the disease is endemic, multiple cases of monkeypox were identified in several non-endemic countries recently [3].

Monkeypox has emerged as the most important orthopoxvirus for public health after the eradication of smallpox in 1980 and cessation of vaccination. Individuals infected with monkeypox experience

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fever, intense headache, lymphadenopathy and myalgia during the initial period. It is followed by skin eruptions in the form of rash on face, palms of the hands and soles of the feet, oral mucous membranes, genitals, conjunctiva and the cornea (Figure 1) [11].

regarding monkeypox. Therefore, the present study was conducted to assess the knowledge and awareness of dental professionals regarding identification of monkeypox among their patients.

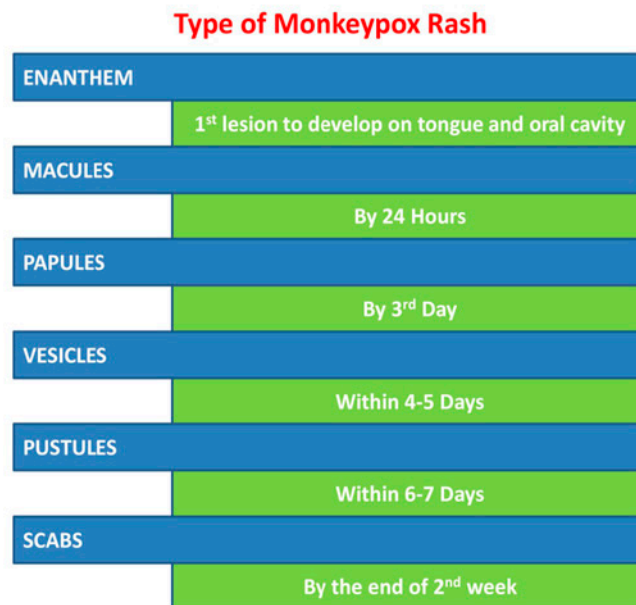


Figure 1. Progression of monkeypox rash

Human to human transmission is possible through direct contact with infectious skin or lesions and predominantly transmitted by men having sex with men [12]. Transmission can also occur from contaminated materials like bed linens, electronics, clothing etc. that have infectious skin particles. Monkeypox is often a self-limiting infection, with symptoms lasting 2-4 weeks with the case fatality ratio around 3%-6% [15].

According to latest reports, 60 countries have reported the outbreaks of the viral disease in which monkeypox is not endemic and total number of cases have crossed 18000 worldwide (75 countries) and the cases are increasing on a daily basis [4]. India has also reported four cases of monkeypox till now. WHO has declared monkeypox disease as a Public Health Emergency of International Concern (PHEIC) owing to significant increase in the number of cases globally and experts see a risk of its further international spread [18]. Being health professionals, dentists should have awareness regarding symptoms of monkeypox. Aerosol-generating procedures on monkeypox-infected patients can put dentists and dental hygienists at risk of contracting the disease. The importance of meticulous hand hygiene and use of Personal Protective Equipment (PPE) cannot be under estimated. There is limited number of research articles in the biomedical literature and barely any studies evaluating knowledge of dental professionals

MATERIALS AND METHOD

Ethical clearance

Ethical clearance for the present cross-sectional study was obtained from concerned health authorities. The purpose and the methodology of the study was thoroughly explained to each subject. They were assured of data confidentiality/anonymity, and informed that participation was voluntary. Informed consent was taken from all the subjects who were willing to participate in the study. The study was conducted in the month of June 2022 in a north Indian state.

Study population and study sample

Private dental practitioners and dental academicians constituted the study population. List of all private dental practitioners was obtained from Local Indian Dental Association (IDA) bodies. The following formula was used to calculate the required sample size:

$$n = \frac{Z^2 1 - (\alpha / 2) \times S^2}{d^2}$$

Where:

Z - is the standard normal score with 95% confidence interval (CI) ($\alpha=0.05$),

S - is the standard deviation of the variable, and d is maximum acceptable error (4%).

After excluding the non-responders, a total of 410 subjects constituted the final study sample. These were enrolled in the study using systematic random sampling methodology.

Tools of data collection / Research Instrument

A self-designed, close-ended questionnaire written in English was employed specifically for the study. The contents of the questionnaire were verified by a medical microbiologist and a family medicine doctor who had a pre-existing research interest in emerging infectious diseases. A pilot study was undertaken on 20 subjects to pre-test the questionnaire and to check the feasibility of the study. Reliability of the questionnaire was assessed using Test-Retest and the values of measured Kappa (k) were 0.82 and Weighted Kappa (k) was 0.78. The questionnaire was divided into two parts: Section A - a 'General Section' which was made to collect socio-demographic details of the subjects (gender, occupation, experience, working profile etc.). Section B comprised of 12 questions on assessing knowledge and awareness regarding monkeypox (heard about monkeypox, current outbreak, signs and symptoms, oral manifestations, availability of vaccine

Statistical Analysis

Data were collected from the study subjects and entered into Microsoft Excel Spreadsheet version 2019 and was assessed using SPSS statistical package (SPSS, version 25.0, Chicago, IL, USA). Categorical measurements were calculated using descriptive statistical methods (number, percentages, mean etc.). Comparison of qualitative variables was done using Analysis of Variance test (ANOVA) and Chi-square test. The significance level was set at <0.05.

RESULTS

Socio-demographic profile of study population

The analysis of the socio-demographic data depicted in Table 1 revealed that the majority of the subjects were males (56.5%) as compared to females (43.5%) and 42.7% had a post graduate qualification in dentistry. It was also observed in our study that subjects having experience of more than 10 years in academics/private practice were comparatively less (25.1%) as compared to subjects having 5-10 years of experience (42%). More than half of the subjects (52.4%) were involved in private dental practice alone.

Table 1. Socio-demographic characteristics of the study population

Socio-demographic characteristic		Number	Percentage (%)
Gender	Male	232	56.5
	Female	178	43.5
Educational status	Graduate (BDS)	235	57.3
	Postgraduate (MDS)	175	42.7
Years of Experience	Up to 5	135	33.0
	5-10	172	42.0
	More than 10	103	25.1
Working Profile	Private hospital/Clinic	215	52.4
	Academician/Teacher	85	20.7
	Both	110	26.9

etc). The questionnaire was delivered to the subjects (residence or place of practice) and designated time was given to fill the questionnaire and thereafter it was collected. A reminder was given through phone calls to answer all the questions as some of the subjects may be having a busy schedule. The response of subjects' (positive or negative) towards the questionnaire was assessed on a two-point Likert scale (positive or negative). The total score of the subject was calculated by adding the sum of responses which ranged from 1 to 12, on a Likert Scale. The final knowledge scores were categorized at three levels: low (0-4), medium (5-8) and high (9-12).

Response to the questionnaire on monkeypox

The responses of the subjects on various questions regarding monkeypox are summarized in Figure 2. We were surprised to note that approximately one-fourth (24.8%) of the subjects never heard about monkeypox disease. Almost 40% (39.5%) of subjects were not aware that there was outbreak of monkey pox in different countries. When asked about resemblance of monkey pox with small pox, 44.8% of the subjects gave a negative response. Only 52.6% of the subjects agreed to the fact that human to human transmission of monkeypox is possible. Total of 58.5% of subjects said development of skin rash as the most common sign. Less than one-third of subjects (31.2%) didn't have adequate knowledge regarding oral manifestations of

the disease and importance of hand hygiene and PPE (31.7%) to prevent the disease (31.7%). Only 36.2% of the subjects were aware of advisory given by Govt. of India on monkeypox.

Knowledge/awareness level of subjects

Only 28% of subjects reported high knowledge scores and 33.6% of subjects were having low knowledge scores according to Likert calculations

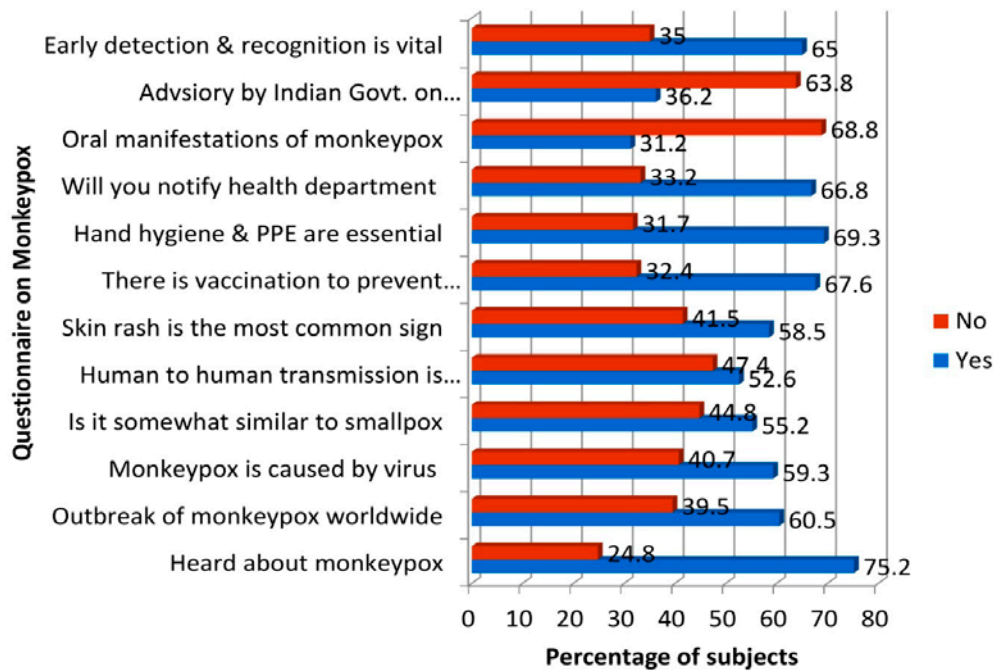


Figure 2. Questionnaire assessing knowledge of subjects on monkeypox

Table 2. Final knowledge scores of study subjects regarding monkeypox (on the basis of Likert scale)

Knowledge score	Number of subjects	Percentage of subjects	95% CI
Low	137	33.6	32.17-46.25
Medium	157	38.4	37.12-42.17
High	116	28.0	22.16-31.72
Total	410	100	

Table 3. Association between socio-demographic characteristics of study subjects with knowledge levels

Socio-demographic variable	Knowledge level						p-value
	Low knowledge		Medium knowledge		High knowledge		
	No.	%	No.	%	No.	%	
Gender							0.067
Males	86	37.0	84	36.2	62	26.7	
Females	51	28.6	73	41.0	54	30.3	
<i>Educational Status</i>							
Graduate (BDS)	79	35.1	97	41.2	59	25.1	0.024*
Postgraduate (MDS)	58	33.1	60	34.2	57	32.5	
<i>Years of Experience</i>							
Up to 5	50	37.0	49	36.2	36	26.6	0.078
5-10	57	33.1	66	38.3	49	28.4	
More than 10	30	29.1	42	40.7	31	30.0	
<i>Working Profile</i>							
Private hospital/Clinic	70	32.5	82	38.1	63	29.3	0.012*
Academician/Teacher	28	32.9	29	34.1	28	32.9	
Both	39	35.4	46	41.8	25	22.7	

*P<0.05 (Statistically significant), Tests used: Chi-square test, ANOVA

(Table 2). The analysis of knowledge scores according to socio-demographic characteristics of study subjects is mentioned in Table 3. According to the knowledge level analysis, the proportion of subjects having high knowledge scores was higher among postgraduate subjects and the findings were statistically significant ($p=0.024$). Similarly a higher proportion of subjects exhibiting high knowledge scores was seen among academicians as compared to others and the findings were statistically significant ($p=0.012$). However, knowledge scores were not significantly related to gender and years of experience. Willingness to receive more information on monkeypox if number of cases increase was shown by 65.4% of subjects and out of which 42.2% of subjects preferred online media as the main source to obtain information (Table 4).

Table 4. Different sources to receive more information if the monkeypox cases increase

Willing to receive information	No.	%
No	142	34.6
Yes	268	65.4
Sources		
Online media	113	42.2
Colleagues	43	16.1
Medical Journals	41	15.3
Newspapers/magazines	27	10.0
Television	44	16.4

DISCUSSION

In the present times, the challenges which human kind is facing are unprecedented like the recent occurrence of COVID-19 pandemic. Recently, an outbreak of monkeypox, a rare self-limiting sporadic disease, has been reported from non-endemic countries and the cases are increasing every day. Dentists, forming an important part of the health care community, should possess adequate knowledge regarding signs and symptoms of the disease which is crucial to the safety of patients and dental professionals. To the best of our knowledge, the present study is first of its kind in the entire country focusing on dental professionals' knowledge regarding monkeypox. The main finding of this study was the generally unsatisfactory levels of knowledge among study subjects.

Astonishingly, almost one-fourth of the subjects in the study never heard about monkeypox and 40% of subjects were not aware of its outbreak globally. This could be due to the reason that till recently, monkeypox outbreaks were rarely reported; badly managed and little described leading to an incomplete picture of the disease's importance [16]. Moreover, only four confirmed cases of monkeypox are reported in India till

now, therefore dissemination of information regarding monkeypox through newspapers and social media is very limited. However, more than 90% of subjects had heard about monkeypox in a study conducted among general practitioners in Indonesia [8].

The clinical picture of monkeypox closely resembles with smallpox that starts with fever initially followed by skin rash appearing 1-3 days after the onset of fever and lymphadenopathy, with lesions appearing simultaneously, and evolving at a similar rate [7, 10]. Approximately 45% of subjects in our study had no knowledge regarding this. This is similar to reports of a recent study conducted among students in Jordanian Health Schools [14].

Human-to-human transmission of monkeypox virus can take place through close contact with respiratory secretions, skin lesions of an infected person and contaminated objects, including clothing and bedding [9, 17]. Only 52.6% of subjects in the present study were possessed adequate knowledge on this aspect. Lack of knowledge in these areas can have significant negative public health consequences.

Dental professionals being 'Oral Specialists,' should have knowledge regarding oral manifestations of diseases which are of public health importance [2]. Less than one-third of subjects in our study had knowledge regarding oral manifestations of monkeypox. This could be due to the reason that dental professionals do not encounter cases of monkeypox routinely in their practice as it is an uncommon infectious disease and India falls under non-endemic category.

Effective disease control requires a strong partnership between clinicians and public health personnel. It is the responsibility and duty of medical practitioners to notify public health authorities in case they encounter a patient suspected of having a disease designated as PHEIC to allow prompt and direct public health action if needed [6]. However, findings of the study revealed that 33.2% of subjects felt no need to report such cases (monkeypox) to government authorities.

This study also found that proportion of subjects possessing high knowledge scores were more in case of post graduates as compared to graduates ($p=0.024$), stressing the positive impact of education on knowledge which can prove vital in the prevention of disease. Moreover, academicians significantly reported higher knowledge scores as compared subjects engaged in private practice ($p=0.012$). This could be due to the reason that subjects engaged in academic teaching are exposed to more learning experiences which can lead to regular knowledge updating. Online media (Internet) was preferred as the main source to obtain more information on monkeypox as compared to other sources. The use of Internet in the health domain is becoming a major worldwide trend. Internet is

exploding with information and is being used for health purposes by great deal of population through mobile phones, electronic health records, social media etc. [5].

The findings of the present study should be interpreted in light of some limitations. As studies on knowledge of dental professionals regarding monkeypox were almost non-existent in literature, the results of the study have been compared to studies engaging other health professionals. Secondly, as this was a questionnaire based study and relied upon self-reported data, so there can be possibility of social-desirability bias. Moreover, the study population didn't include subjects working in government set up or institutions as obtaining permission from government authorities is a tedious procedure and takes lot of time. Lastly, the study focussed on limited sample size, therefore more studies engaging a larger sample should be conducted in future as this was first of its kind study providing baseline information.

CONCLUSION

The results of the study reveal that level of knowledge regarding monkeypox among study subjects was low as less than one-third of subjects showed high knowledge scores. This was expected as one-fourth of study subjects never heard about monkeypox. I think it is vital for dental professionals to have knowledge regarding new emerging infectious diseases and the public health response that often shifts as we learn new information. So many dental professionals were caught off guard during the COVID-19 pandemic and the changing public health measures. Given the large livestock population and human population that live close to forests and wildlife habitats, India is a hotspot for zoonotic diseases. Currently, Monkeypox may not be a cause for major concern but it is imperative we remain vigilant and there is no room for complacency, considering how rapidly diseases get transmitted across a vastly populous country. To prevent transmission, there is an urgent for round-the-clock surveillance, along with prompt identification and isolation of confirmed cases.

Conflict of interest

Authors declare no conflict of interest.

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