

A Questionnaire Study to Assess Level of Knowledge, Awareness and Management of Mucormycosis Among Prosthodontists working in dental hospitals/teaching institutions in Pune District.

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Abstract

Aim: The objectives of study were to assess the knowledge, awareness and management of mucormycosis among Prosthodontists working in dental hospitals/ teaching institutions in Pune, India. and to find out the association between the level of knowledge, awareness and management of mucormycosis and selected demographic variables. **Methods:** Descriptive survey was done through online questionnaire using Google forms software distributed to all 98 participants of six dental hospitals/ teaching institutions in Pune through their Mail-Id. The data analysis was done using the Statistical Package for Social Sciences (SPSS) statistical software, version 19.0. **Results:** All the 98 participants responded, though only less than half of the population (48% from age group 20-30 years) was aware about that infection will not transmit from dentist to dentist. Statistically significant differences in knowledge about mucormycosis among the various highly experienced and designated doctors and residents were found as level of knowledge increased with the seniority. The study also shows that more than half about 63% of participants have rehabilitated the case of mucormycosis and among them 40% people observed some kind of difficulties for impression making or fitting of prosthesis. **Conclusion:** Though our study showed average number of participants have adequate knowledge about mucormycosis, only more than half of the population particularly from age group 20-30 years was having less knowledge and awareness. Hence, our study concludes that there is a need for an increased awareness among young prosthodontist regarding the same.

Keywords: Mucormycosis, Prosthodontics, Awareness, Obturator, Dental practice.

INTRODUCTION

The current COVID-19 pandemic which is associated with increased death rate brought up an extra challenge for health care providers. The vulnerable COVID-19 patients such as medically compromised, immunocompromised patients, patients with uncontrolled diabetes mellitus, ketoacidosis, on steroid use, with haematological malignancy, neutropenic patients, AIDS were predisposed to extensive fungal infection i.e., mucormycosis.[1],[2],[3] Other risk factors include renal insufficiency, skin trauma, broad-spectrum antibiotics, intravenous drug abuse, iron overload, prophylactic voriconazole for aspergillosis and malnutrition, organ or stem cell transplantation.[2],[3],[4]

Mucormycosis which is also known as zygomycosis is a rare but increasing fungal infection worldwide, with high morbidity and mortality. The term mucormycosis was coined by American pathologists R. D. Baker and is characterized by a rapidly progressing course of angioinvasion with thrombosis and tissue necrosis.[1],[2],[3]

Infection of mucormycosis in humans is presented in a superficial or visceral form. Superficial form has characteristic presentations seen in external ear, fingernails, skin. Abscesses, skin swelling, necrosis, dry ulcers, and eschars. Visceral forms are manifested as Rhino-orbito-cerebral, pulmonary, gastrointestinal type.[2]

The usual dental symptoms seen are sinusitis, blackish discoloration over bridge of nose/palate, nasal congestion, blackish/bloody nasal discharge, loosening of teeth, one sided facial pain, numbness or swelling, toothache, local pain on the cheek bone.

The global guideline group for the diagnosis and management of mucormycosis[5] strongly supports an early complete surgical treatment for mucormycosis whenever possible, in addition to systemic antifungal treatment. Resection or debridement should be done as required.[5],[6]

The prognosis generally depends on the extent of manifestation of the disease and effective immediate treatment initiated in response to the diseases.[2],[5] Generally, improved survival is related to earlier diagnosis and application of multidisciplinary treatment approaches involving aggressive surgical debridement.[5],[6]

Since mucormycosis frequently necessitates surgery to remove the diseased tissue, the prosthodontics rehabilitation of patients is a requisite. A prosthodontist plays a key role by delivering fixed or removable dental prosthesis such as patient specific implants or an obturator for rehabilitation of surgically operated defect.

No study has been done yet to determine the knowledge regarding mucormycosis and disease characteristics among dental professionals in India. Therefore, this questionnaire study was undertaken with a primary objective as to assess the knowledge, awareness, and management of mucormycosis among prosthodontists working in dental hospitals or teaching institutions in Pune. Secondary objective was to find out the association between the level of knowledge, awareness and management of mucormycosis and selected demographic variables to recognize any need for further awareness and training plan for the same.

METHODS:

A quantitative type of descriptive survey was conducted through online questionnaire using Google forms software and assessed using percentage. The questionnaire involved prior consent for a participant, only those who gave their consent to participate were included in the study. Inclusion criteria was Prosthodontists working in all 6 dental hospitals/teaching institutions in Pune District and Third year and Second year Prosthodontic residents in Pune District who were available at the time of study and were ready to participate in the study.

Exclusion criteria was first year prosthodontic residents and prosthodontists who were not available during the period of survey. As per the criteria convenience sampling was done and sampling frame selected was 98 (N=98). The study participants were Prosthodontists working in all six dental hospitals/ teaching institutions in Pune district.

A google form was circulated to all 98 participants through their Mail-Id. All the respondents were informed about the aims and objective of the study through their mail id and their Consent was obtained through the same. Self-Structured questionnaire was formulated in English language. The study protocol, questionnaire, validation, and consent form were approved by the hospital's ethical committee.

Knowledge, awareness and practice questionnaire was designed based on Indian Council of Medical Research (ICMR) guidelines for screening, diagnosis, and management of mucormycosis [6]. This was used as it was an evidence-based advisory for India.[6]

The questionnaire consisted of two sections, which included Section A which was comprised of 4 items. Demographic variables as age, gender, years of experience and designation as Prosthodontist / Third year resident / Second year resident and Section B comprised of 17 questions of which nine questions based on their knowledge, four on awareness, and four on management/practice related to mucormycosis management (Table 1, 2, and 3).

Statistical analysis: the obtained data was extracted into Excel sheets (Microsoft Corporation, Redmond, WA, USA) and then analyzed using SPSS software version 19.0 (SPSS Inc. Chicago, IL, USA). P values <0.05 were considered as statistically significant. The results were collated and summarized as percentages and proportions and represented in tables. Knowledge, awareness, and management score were compared using the Chi Square test for demographic variables like age, gender, designation, and experience.

RESULTS:

Response rate: Ninety-eight questionnaires were distributed among the healthcare professionals and 98 people responded (response rate 100%).

Demographic Characteristics: A total of 98 participants were included in the study. Of them 35% were males and 63% were female participants. Of the 98 participants, majority of the participants were Prosthodontic faculty being 44(44.9 %), second year prosthodontic residents as 32(32.7 %) and 22 were third year residents (22.4 %). 61.2% participants belonged to age group 20-30 years, 16.3% participants were from 21-40 years of age group, 21.4% were from 41-50 years of age group. (Table

4 shows demographic details and number of responses)

Knowledge assessment: Among all participants, all 98 participants were aware that mucormycosis is a fungal infection. More than 92.9% of them had knowledge that mucormycosis can occur in any of the Diabetic patients, Immunocompromised patients or the Patients who are on corticosteroids therapy. Regarding the presenting symptoms, 17.3% knew that Toothache, loosening of teeth, jaw involvement, fever, skin lesion; thrombosis & necrosis, Chest pain, pleural effusion, haemoptysis, worsening of respiratory symptoms can be the symptoms present, 1% were aware about one sided facial pain, numbness or swelling, blackish discoloration over bridge of nose/palate can be symptom while 81.6% respondents had knowledge that Sinusitis – nasal blockade or congestion, nasal discharge (blackish/bloody), blurred vision can also be a symptom. Only Around 48% of the respondents were aware about the fact that mucormycosis cannot be transmitted from person to person. 80.6% participants thought that mucormycosis can occur in only maxilla, while 16.3% people thought that it can occur in both maxillary and mandibular jaw. Among whom only half (45.9%) knew that full term recovery of mucormycosis is defined after a period of 6 months from the period of surgical debridement. 75.5% respondents knew that both open bulb or closed bulb type of an obturator can be given to mucormycosis treated patients. Of them, 68.4% and 66.4% knew that the interim prosthetic obturator is given after 1 month of surgical debridement and Definitive prosthetic obturator is given after 6 months of surgical debridement period, respectively.

Chi square association revealed that there was a weak positive correlation between the age and gender of the respondents with knowledge of mucormycosis with chi square value of 0.596 ($P < 0.36$) for gender and chi square value 3.983 ($P < 0.01$) for age. But there are statistically significant differences in knowledge about mucormycosis among the various highly experienced and designated doctors and residents as level of knowledge increased with rank/seniority, such that chi square value of 25.541, with degree of freedom at $P < 0.22$ for experience and chi square value of 9.113, with degree of freedom at $P < 0.22$ for designation.

Awareness assessment: The overall awareness among the respondents was positive towards the present scenario of mucormycosis spread in the country India. 69.4% participants were agreed on early detection of mucormycosis can reduce the mortality rate. More than half 56.1% people had never reported any mucormycosis cases in their dental hospitals before covid-19.

But of them, all participants were aware about sudden spike in reported cases of mucormycosis in COVID-19 Pandemic situation. Among all, 77.6% people knew adjunctive endodontic, periodontal, extraction treatment can be performed after surgical debridement of lesion. On Chi Square analysis, awareness about mucormycosis was seen in strong significant association with age, years of an experience and designation. There was a weak positive correlation between the gender ($p < 0.01$) of the respondents with the awareness and management of mucormycosis with chi square value of 1.884.

Management associated assessment: The responses to management of mucormycosis related questions were also found to be satisfying. 20.3% of participants reported that for rehabilitation of these patients, fixed prosthesis can be given or not is a case-based decision so it varies as per the patient’s intraoral condition, 48% of them felt that fixed prosthesis can be given, 13.3% felt fixed prosthesis cannot be given while 18.4% participants were unaware of the prosthetic rehabilitation using fixed prosthesis. Most of them 99% participants felt that follow up after delivery of prosthesis is essential and among them about 82 reported that follow up after 24 hrs, 1 month and once yearly after insertion should be taken.

Chi square test analysis showed significant association between age, experience and designation of participant and management of mucormycosis as evidenced by chi square value of 3.573, with degree of freedom at $P < 0.34$ for age, chi square value of 36.937, with degree of freedom at $P < 0.34$ for experience and chi square value of 15.276, with degree of freedom at $P < 7.56$ for designation and no significance seen with gender and management of mucormycosis case (chi square value of 0.518, with degree of freedom at $P < 12.36$)

Table 1: Knowledge related Questions and number of responses

List of questions	n(%)
1) What kind of an infection is mucormycosis? (knowledge)	
i. Fungal	98 (100)
ii. Bacterial	0
iii. viral	0
iv. Don’t know	0
2) The occurrence of mucormycosis is most prevalent in (knowledge)	
i. Diabetic patients	3 (3.1)
ii. Immunocompromised patients	4 (4.1)
iii. Patients on corticosteroids	0

iv.	All of the above	91 (92.9)
3) What is clinical presentation of mucormycosis? (knowledge)		
i.	Sinusitis – nasal blockade or congestion, nasal discharge (blackish/bloody), blurred vision	0
ii.	One sided facial pain, numbness or swelling, blackish discoloration over bridge of nose/palate	1 (1)
iii.	Toothache, loosening of teeth, jaw involvement, fever, skin lesion; thrombosis & necrosis, Chest pain, pleural effusion, haemoptysis, worsening of respiratory symptoms	17 (17.3)
iv.	Any of the above	80 (81.6)
4) Can infection spread from an infected person to a dentist? (knowledge)		
i.	Yes	13 (13.3)
ii.	No	47 (48)
iii.	May be	32 (32.7)
iv.	Don't know	6 (6.1)
5) Which jaw is the most commonly affected by mucormycosis? (knowledge)		
i.	Maxilla	79 (80.6)
ii.	Mandible	1 (1)
iii.	Both i and ii	16 (16.3)
iv.	Don't know	2 (2)
6) Mucormycosis in a period of how many months can be safely termed as full recovery? (knowledge)		
2 months		1 (1)
3 months		8 (8.2)
6 months		45 (45.9)
Don't know		44 (44.9)
7) Do you know, which type of obturator can be given? (Knowledge)		
i.	Open bulb	9 (9.2)
ii.	Closed bulb	12 (12.2)
iii.	Don't know	3 (3.1)
iv.	Any of the i and ii	74 (75.5)
8) After surgical debridement, the interim prosthetic obturator is given after (Knowledge)		
i.	3 months	11 (11.2)
ii.	1 month	67 (68.4)
iii.	15 days	15 (15.3)
iv.	Don't know	5 (5.1)
9) Definitive prosthetic obturator is given after (Knowledge)		
i.	3 months	10 (10.2)
ii.	6 months	65(66.3)
iii.	1 year	14 (14.3)
iv.	Don't know	9 (9.2)

Table 2: Awareness related Questions and number of responses

List of questions	n(%)
10) Mucormycosis has a very poor prognosis. Do you think early detection can reduce the mortality rate? (awareness)	
i. Yes	68 (69.4)
ii. No	1 (1)
iii. May be	29 (29.6)
11) Have you reported any case of mucormycosis in your clinic/hospital before COVID-19? (awareness)	

i. Yes	43 (43.9)
ii. No	55 (56.1)
12) Have you noticed the increase in number of mucormycosis cases during COVID-19? (awareness)	
i. Yes	98 (100)
ii. No	0
13) Can adjunctive endodontic, periodontal treatment be performed after surgical debridement of lesion? (awareness)	
i. Yes	76 (77.6)
ii. No	5 (5.1)
iii. May be	17 (17.3)

Table 3: Management related Questions and number of responses

List of questions	n(%)
14) Have you rehabilitated any patient of mucormycosis? (management)	
i. Yes	64 (65.3)
ii. No	34 (34.7)
If yes, then had you faced any problems during impression making/fitting of prosthesis?	3 (3.1)
i. Yes, then please specify	44 (44.9)
ii. No	24 (24.5)
iii. Not applicable	30 (30.6)
15) Can fixed prosthesis be given to mucormycosis treated patients? (management)	
i. Yes	47 (48)
ii. No	13 (13.3)
iii. Don't know	18 (18.4)
iv. Others, please specify_____	20 (20.3)
16) Is it necessary to follow up the patient after delivery of definitive prosthesis? (management)	
i. Yes	98 (99)
ii. No	1 (1.0)
17) If yes, then how often patient should be recalled? (management)	
please specify:	82 (83.6)

Table 4: Representing demographic variables and responses given

Demographic details and their responses	n=98, n (%)
Gender	
Male	35 (35.7)
Female	63 (64.3)
Age group (years)	
20-30	60 (61.2%)
31-40	16 (16.3%)
41-50	21 (21.4%)
51-60	1 (1%)
Designation:	

Prosthodontic Faculty	44 (44.9 %)
Third year Prosthodontic Residents	22 (22.4 %)
Second year Prosthodontic Residents	32 (32.7 %)
Experience:	
0-5	62 (63.5%)
6-10	9 (9.1%)
11-15	15 (15.3 %)
16-20	9 (9.1 %)
>20	3 (3 %)

DISCUSSION:

In cases with mucormycosis, the role of prosthodontists is critical because it primarily occurs around rhinomaxillary or rhinocerebral areas involving facial tissues, palate, alveolar bone, mandibular bone.[1],[2]

During the second wave of COVID-19 pandemic, an epidemic of mucormycosis had developed in India, with a high global fatality rate of 46%.[4]To the best of our knowledge, no studies have been published yet to assess the knowledge, awareness, and management of mucormycosis amongst dental professionals especially prosthodontists in India.

One recently published study is by Massey et al. [1], which was conducted on nurses from Kanpur, India. The study had shown that out of 60 nurses, majority of nurses had average knowledge regarding mucormycosis and there was no impact of age, gender, experience, and source of information on knowledge regarding mucormycosis.

In contrast, our study is supported by the study findings that age, years of experience and designation has statistical significance in relation to the knowledge, awareness, and management of mucormycosis among dental professionals. Gender have shown weak positive statistical significance when related to knowledge and awareness and no significance to management aspect of the conducted study.

It was found that are statistically significant differences in knowledge among the various highly experienced and designated doctors and residents as the level of knowledge increased with the seniority. Only less than half of the population (48% from age group 20-30 years) was aware about the fact that it is not a transmissible disease and 54.1% were not aware of the complete recovery period of mucormycosis treated patients.

The rising cases of mucormycosis during this pandemic have made dental professionals to enhance their skills to give best optimal prosthesis for their rehabilitation of patients. The study also shows that more than half about 63% of participants have rehabilitated the case of mucormycosis and among them 40% people reported some kind of difficulties for impression making or fitting of prosthesis. These problems were also addressed by our questionnaire study.

Limitations of the study was the essentially small number of participants. The future study can be done on pan-India basis to assess the further about relation between covid-19 and mucormycosis cases. In addition, some other factors that are associated with self-reporting studies such as accuracy of recall, personal bias could also have affected the results of this study in some ways.

CONCLUSION:

Our study concludes that age, years of experience and designation of a prosthodontist are significantly associated with knowledge, awareness about mucormycosis and its management but gender plays no any significant role. The area of concern is for particularly from age group 20-30 years that, less than half of the population (48%) was aware about transmissibility of infection i.e., it does not transmit from dentist to dentist unless the one is immunocompromised and has underlying comorbidities, and 54.1% of that population were unaware about the complete recovery period of mucormycosis treated patients. Therefore, as per our study there is a need for an increased awareness among young prosthodontist regarding the same.

Conflict of interest: None declared

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