

**KNOWLEDGE, ATTITUDE AND PRACTICES TOWARDS
MUCORMYCOSIS AND ITS PERIODONTAL MANIFESTATIONS- A
CROSS SECTIONAL STUDY AMONG THE UNDERGRADUATE
DENTAL STUDENTS IN CHENNAI.**

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ABSTRACT

Aim:

The aim of the current study is to analyse the knowledge, attitude and practice on mucormycosis and its associated periodontal manifestations.

Materials and methods:

An online survey of 20-25 questions based on the awareness of mucormycosis and its periodontal manifestations had been prepared and uploaded online and circulated among 100 dental students.

Results:

From the observed results of the survey among the 100 dental students 80% were adequately aware of mucormycosis and its periodontal manifestations and the remaining 20% of the individuals had very less knowledge comparatively. In comparison, the p value was found to be about 0.00 which is statistically significant.

Conclusion:

This present study concludes awareness levels were adequate and created awareness on mucormycosis and its related periodontal manifestations.

Clinical significance:

To provide better knowledge and understanding on mucormycosis and its associated periodontal manifestations in daily practices.

Keywords: mucormycosis, periodontal manifestations, diagnostic test, clinical feature, drugs used, Novel method.

INTRODUCTION:

Mucormycosis is a fungal infection caused mainly by a cluster of molds called mucormycetes. These microorganisms are most commonly found in the surrounding environment particularly in the soil and in decaying organic matter, examples of which include leaves, compost piles, or rotten wood(1). It mostly commonly affects the immune compromised individuals. It is known to affect the sinuses or the lungs after inhalation of the fungal spores. It can also occur through direct contact after any cut, burns, or any other kind of skin injury.

Mucormycosis are generally seen manifesting in seven clinical forms: rhinocerebral, pulmonary, cutaneous, gastrointestinal, central nervous system, disseminated, and, rarely, the miscellaneous form (i.e., bone, kidney, cardiac, mediastinum, oral). Pulmonary and rhinocerebral forms are common in patients with hematological malignancies(1,2). Rhinocerebral mucormycosis is an infection that occurs in the sinuses and which may later spread to the brain, which is most commonly seen in patients with uncontrolled diabetes and those who have undergone organ transplant, especially kidney transplants(3). Out of the seven variants, pulmonary mucormycosis is the most common type affecting the people already diagnosed with cancer and organ transplants. The gastrointestinal variant of mucormycosis is the most common among the young children,

especially the premature infants and low birth weight infants weighing less than 1 month of age(4). Cutaneous (skin) mucormycosis is common among the people who have weakened immune systems. Disseminated mucormycosis occurs when the infection has seemed to further spread through the bloodstream(5).

Histopathologically, mucormycosis is diagnosed when broad, irregularly shaped, nonseptate hyphae with right-angle branching are seen invading tissue. If arterial invasion occurs, thrombosis and ischemic necrosis also may occur in some cases. Identification of the mucormycosis species specifically requires culture, morphologic evaluation and also feasible genetic analysis. This infection has been reported to most commonly affect the brain, but also can affect other organs such as the spleen, heart, and skin. Signs of mucormycosis include cough, fever, headache, nasal congestion, sinus pain, blackened skin, tissue, blisters, redness, swelling, tenderness, ulcers. Mucormycosis is highly dangerous as it may spread quickly throughout the body. If untreated, the infection may further spread to the lungs or the brain. This can cause brain infections, paralysis, pneumonia, seizures and sometimes death. Common antifungal medications that physicians prescribe for mucormycosis include amphotericin B (given through an IV), posaconazole (given through an IV or orally) and isavuconazole (given through an IV or orally) (6–18),(19–23) (24) (25).

MATERIALS AND METHODS

A cross-sectional questionnaire survey was taken over to evaluate the awareness on mucormycosis and its periodontal manifestations. A validated questionnaire was prepared in English language to analyse the knowledge, attitude and practices regarding periodontal manifestations of Mucormycosis and circulated online among the undergraduate students of Saveetha Dental College, Chennai. The purpose of the current study was explained to the participants in detail and the questionnaire was filled with their individual consents. The extracted data were tabulated in MS Excel sheets and were subjected to statistical analysis using SPSS software version 19. The descriptive data which was obtained were plotted in respective bar graphs. The statistical test used in the study was Chi square test with p value less than 0.05 set as statistically significant and confidence interval of 95%. Gender and year of study were considered as independent variables.

RESULTS

PARTICIPANT DEMOGRAPHICS : SEX, YEAR OF STUDY

From the observed results of the survey among the 100 dental students 80% were aware of mucormycosis and its periodontal manifestations. And the remaining 20% of the individuals had very lesser knowledge comparatively.

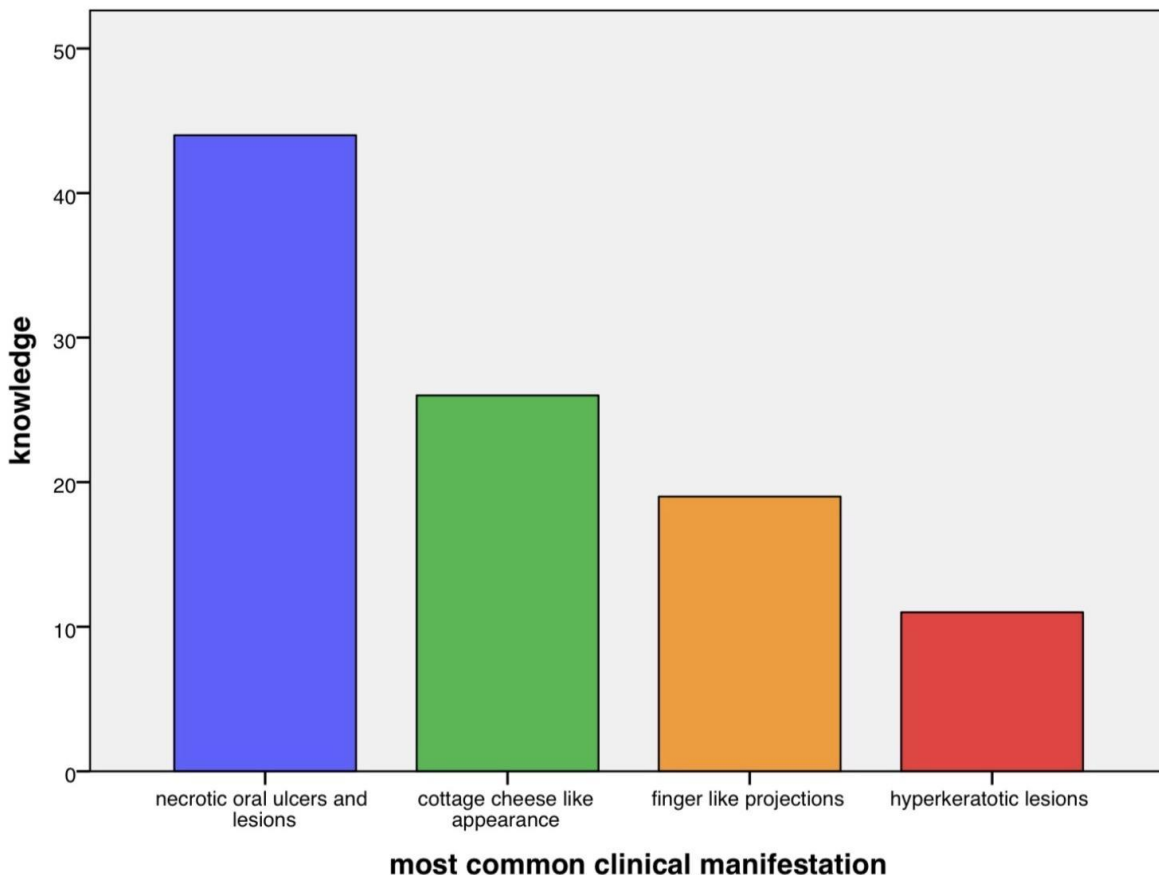


Figure 1: Bar chart depicting the knowledge on the clinical manifestation of mucormycosis. 49% answered it as necrotic oral ulcers and lesions, 34% answered it as finger like projections, 18% answered it as cottage cheese like appearance and the remaining 11% answered it as hyperkeratotic lesions.

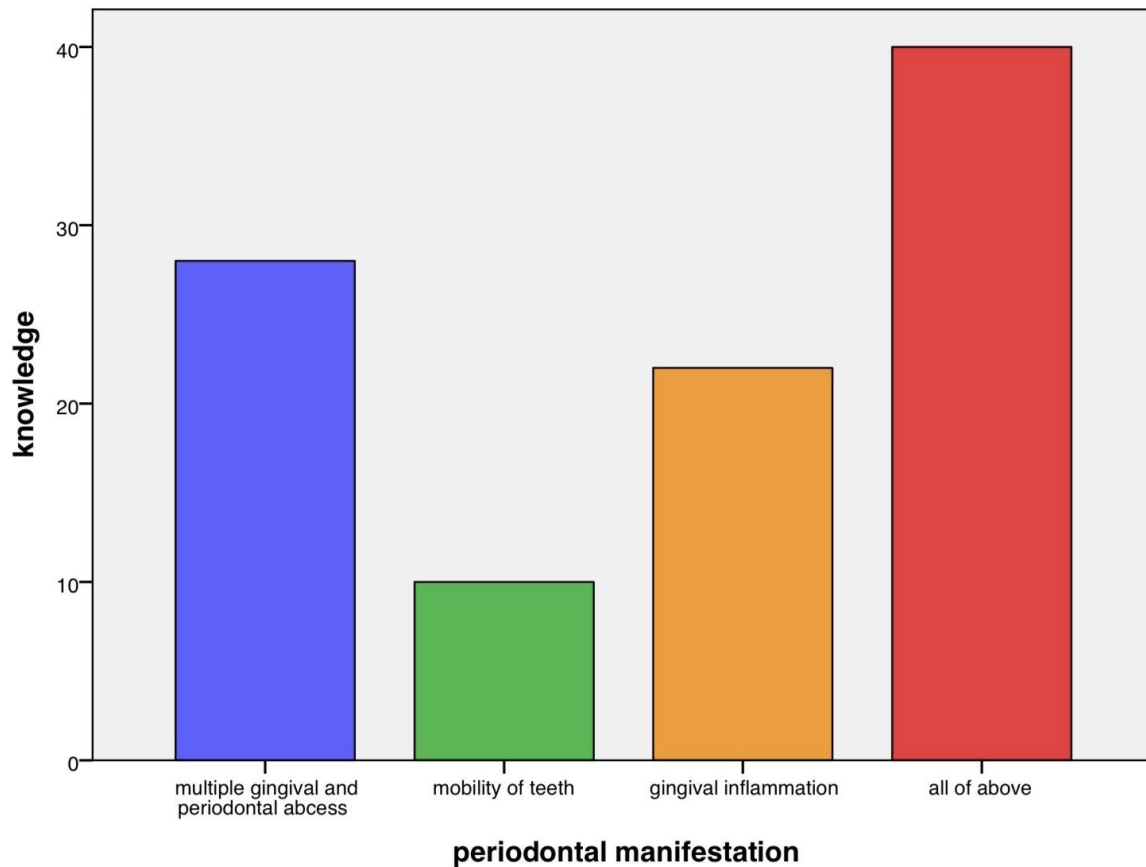


Figure 2: Bar chart depicting the knowledge on the periodontal manifestations of mucormycosis. Out of which 29% answered it as multiple gingival and periodontal abscess, 19% answered it as mobility of teeth, 24% answered it as gingival inflammation and 40% answered it as all of the above conditions.

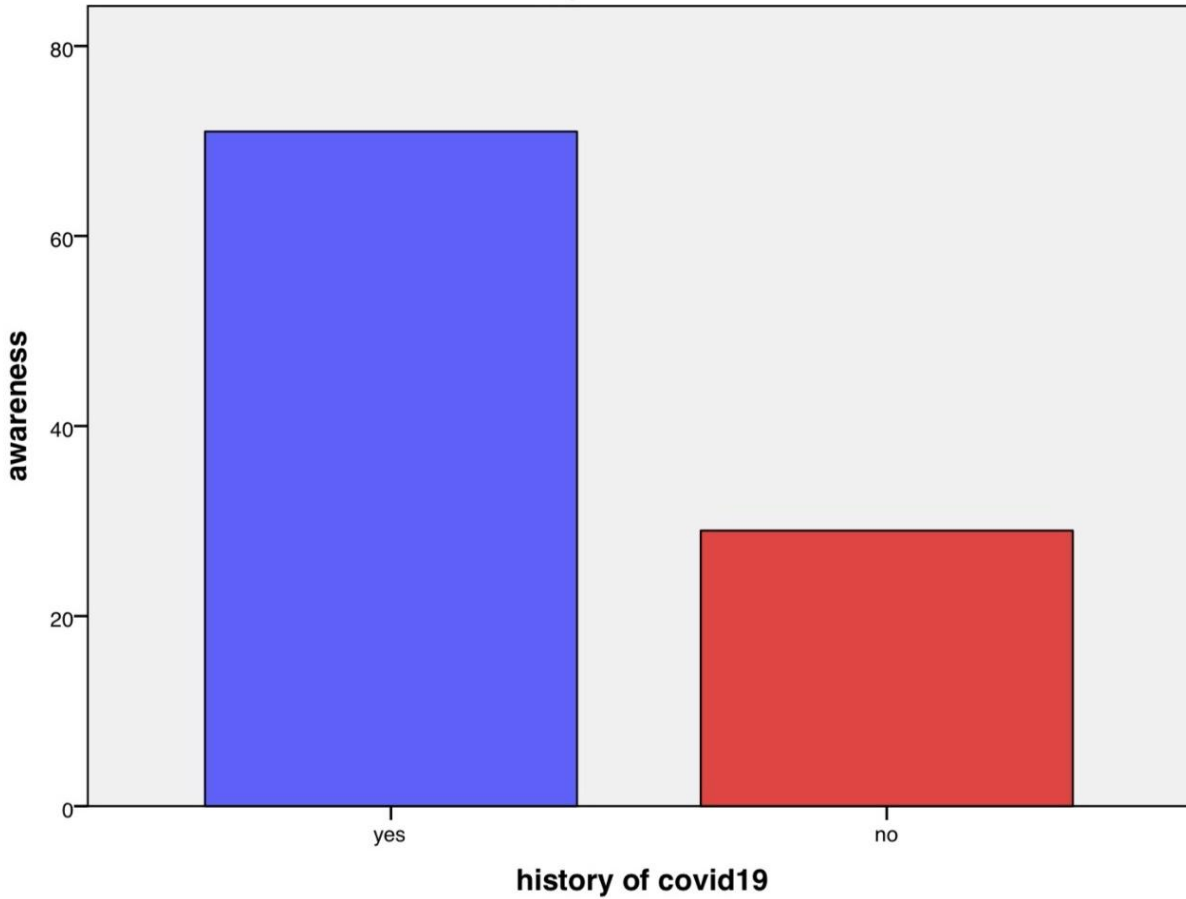


Figure 3: Bar chart depicting the awareness on the whether the individuals with no previous history of COVID can still present with mucormycosis. 81% of the individuals said individuals with no previous or past history of COVID-19 can still present with Mucormycosis and the remaining 31% said individuals with no history of COVID-19 cannot present with mucormycosis.

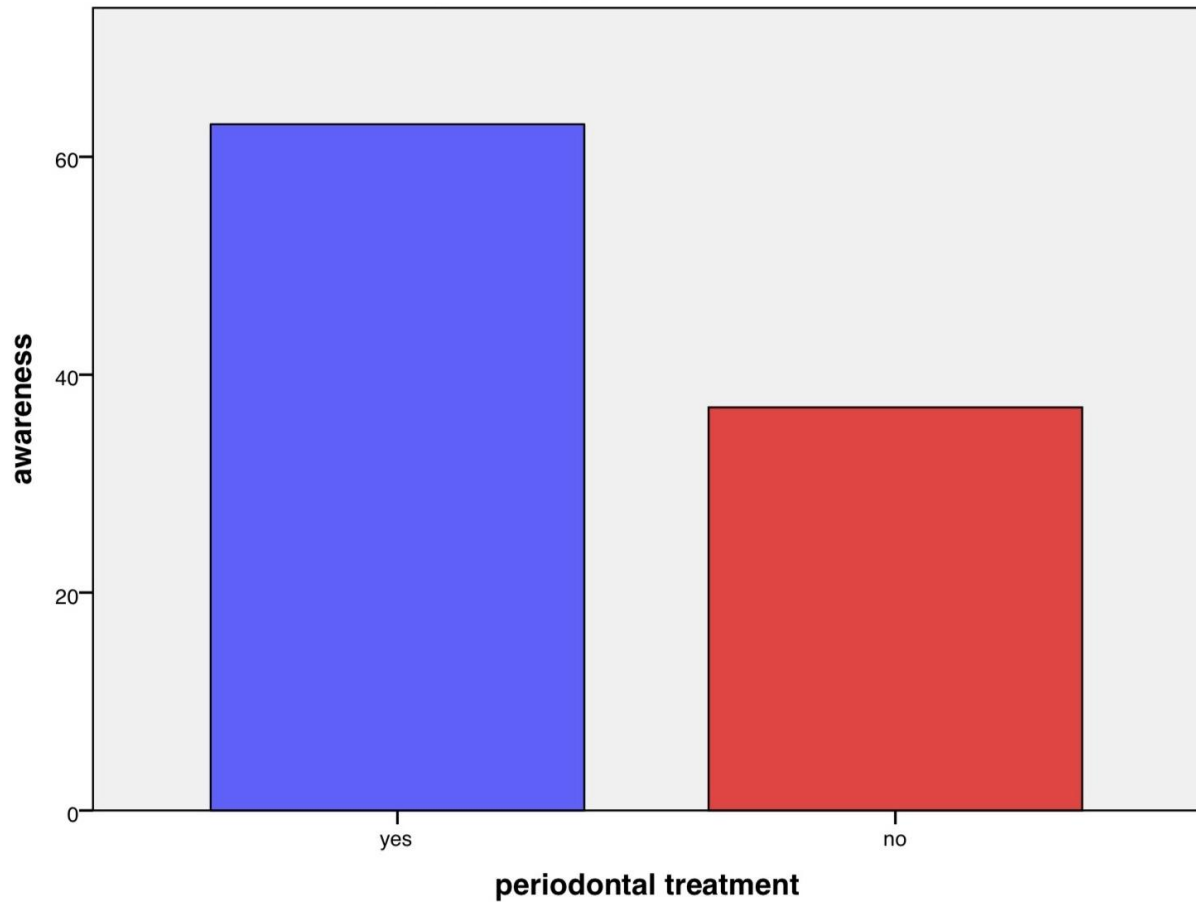


Figure 4: Bar chart depicting the awareness on whether any periodontal treatment helps controlling diabetes thereby reducing the risk for the infection. 72% said it helps reduce the risk of infection and the remaining 40% said it wouldn't help reduce the risk of infection.

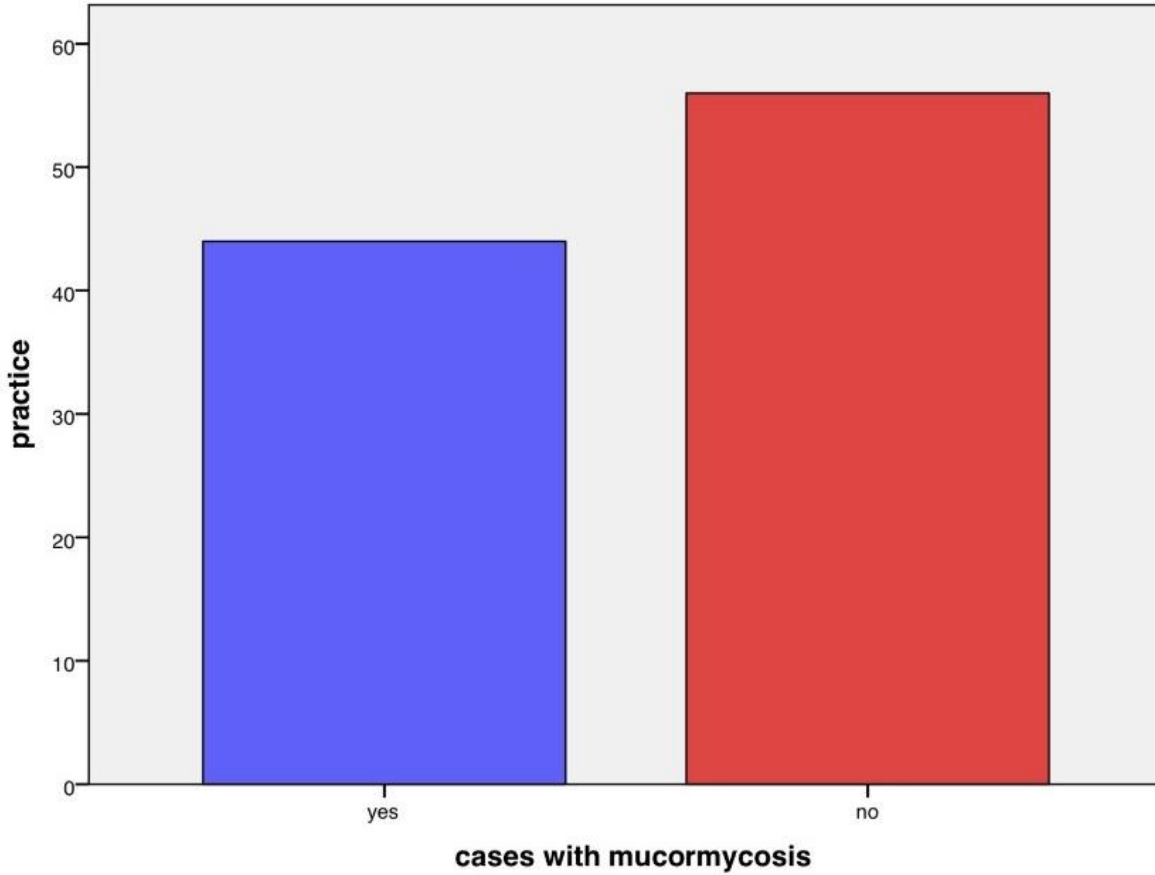


Figure 5: Bar chart depicting whether the dental students have come across any cases with mucormycosis. 57% of the dental students said they have diagnosed patients with mucormycosis and the remaining 55% said they haven't diagnosed any such cases.

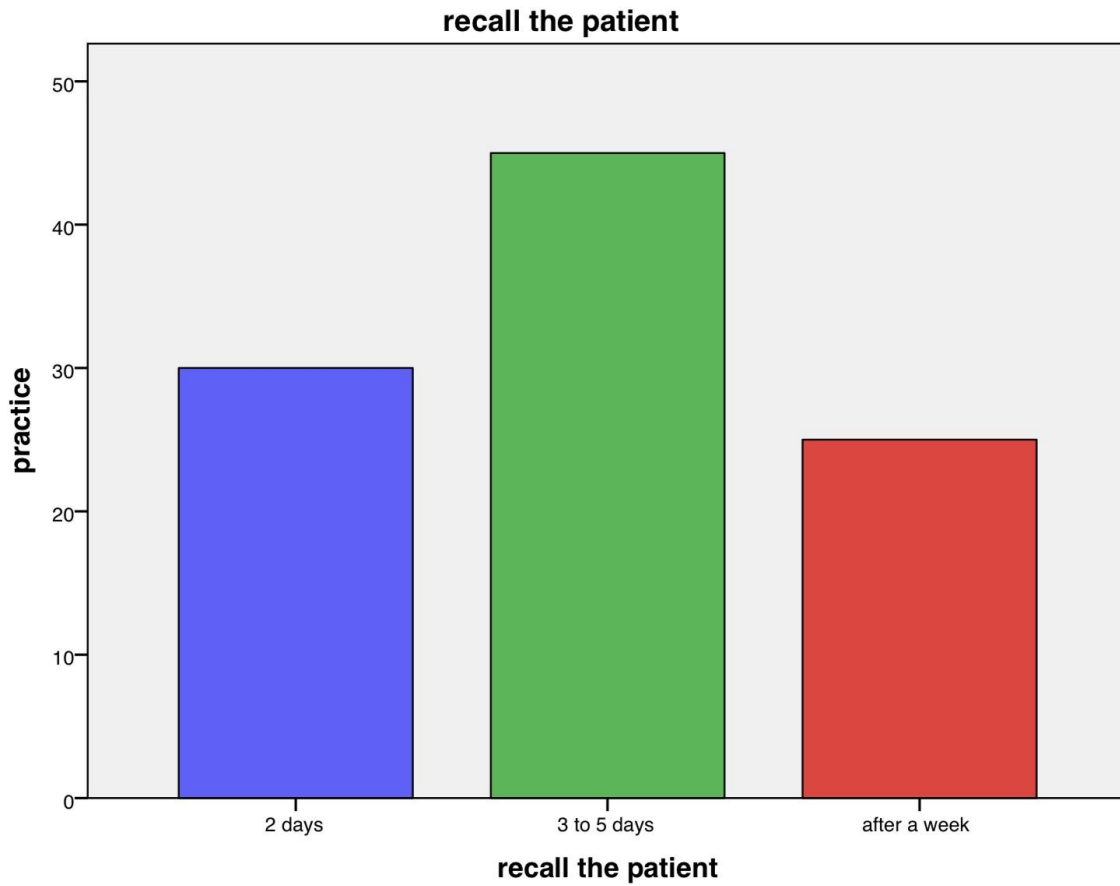


Figure 6: Bar chart depicting whether any dental student would recall the patient for a follow up, if yes then when. 38% of the dental students said they would recall patients in 2days, 48% of the dental students said they would recall after 3-5 days and the remaining 26% said they would recall after a week.

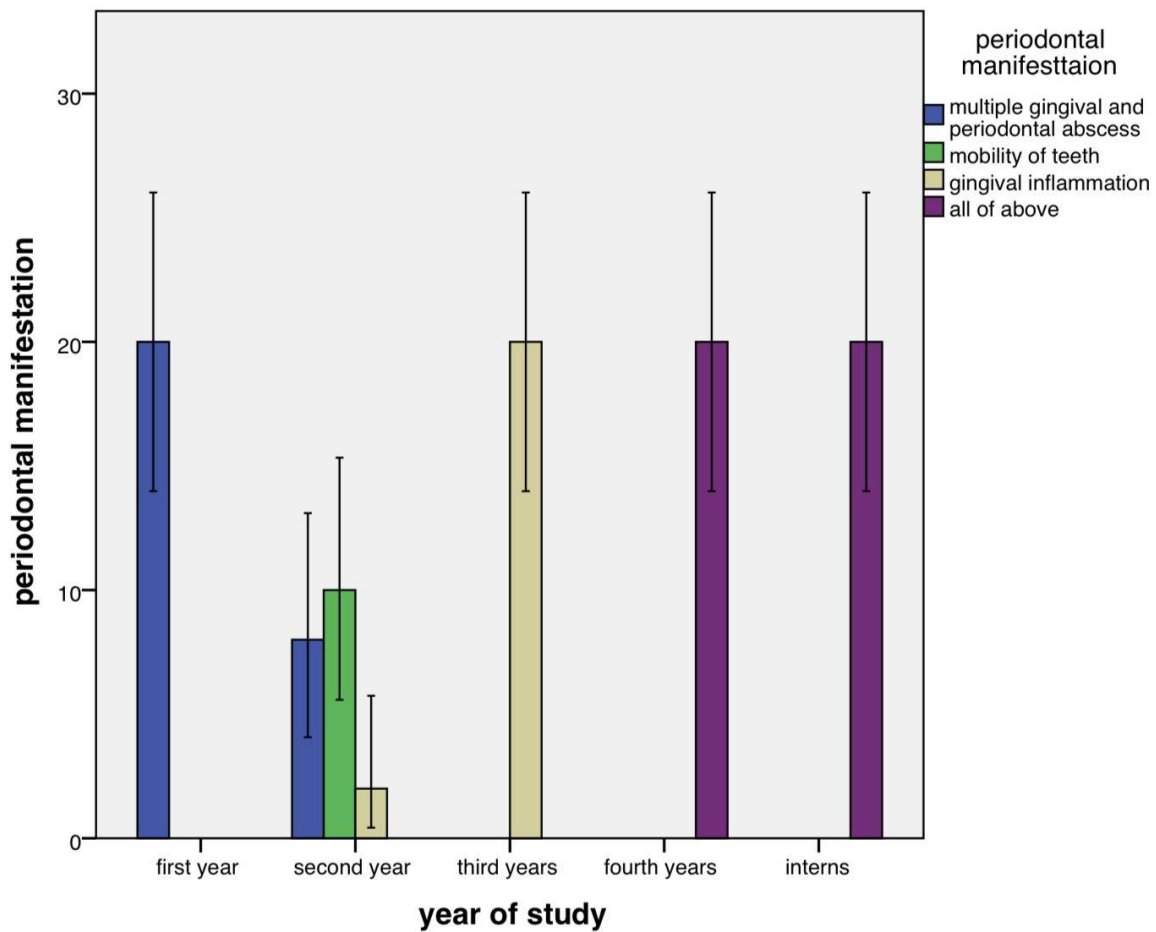


Figure 7: Bar chart depicting the comparison between year of study of dental students and the knowledge on periodontal manifestations of mucormycosis. In comparison about 20% of the first years answered it could be multiple gingival and periodontal abscesses, 10% of the second years answered it was mobility of teeth and about 20% of the fourth years and the interns said it could be all of the above clinical manifestations. Chi square p value was found to be about 0.00 which is less than 0.05 which is statistically significant.

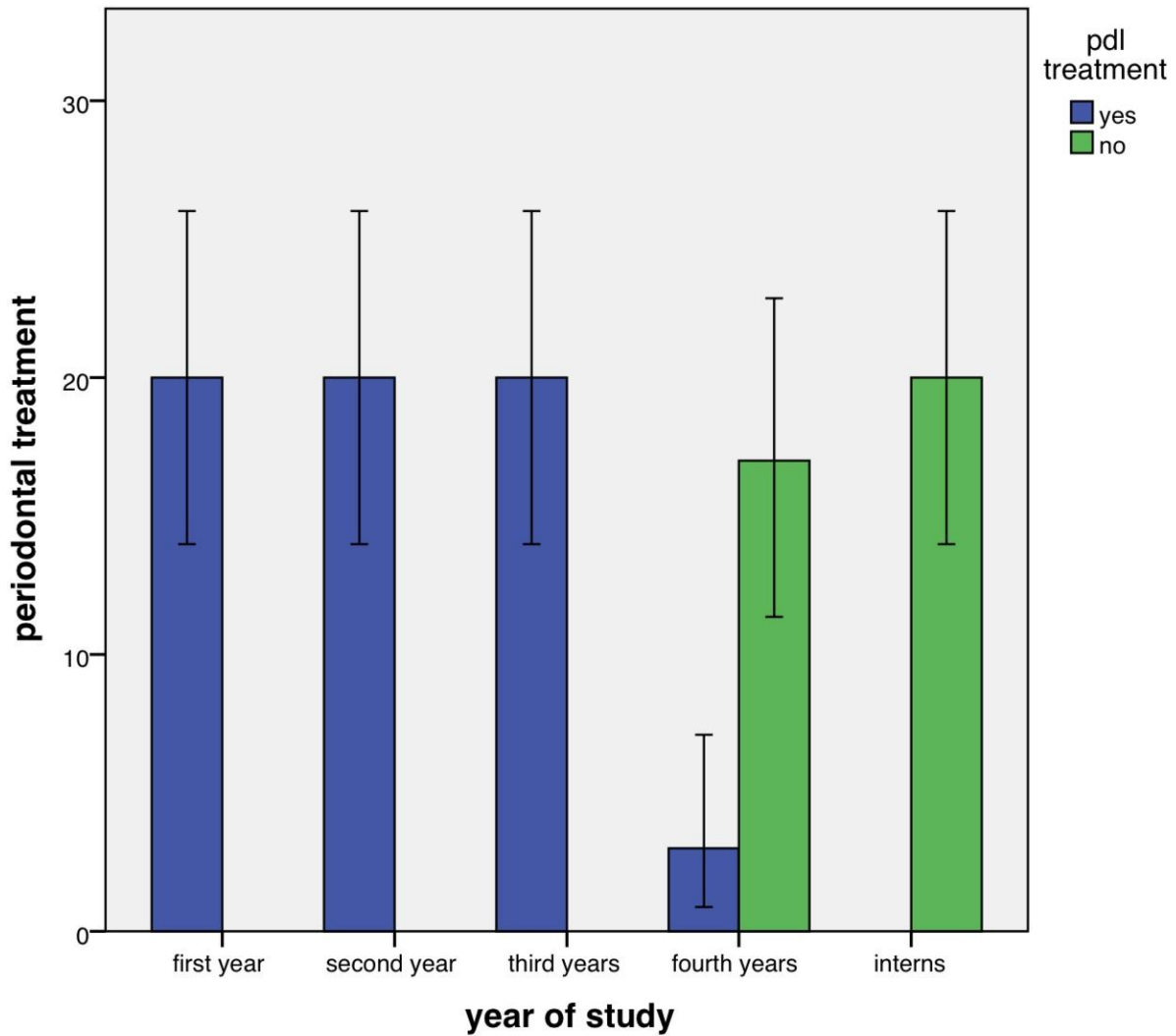


Figure 8: Bar chart depicting the comparison between the year of study of the dental students and the awareness on periodontal treatment and mucormycosis. In comparison about 20% of the first, second and third years answered periodontal treatment would help reduce cases with mucormycosis. The p value was found to be about 0.00 which is statistically significant.

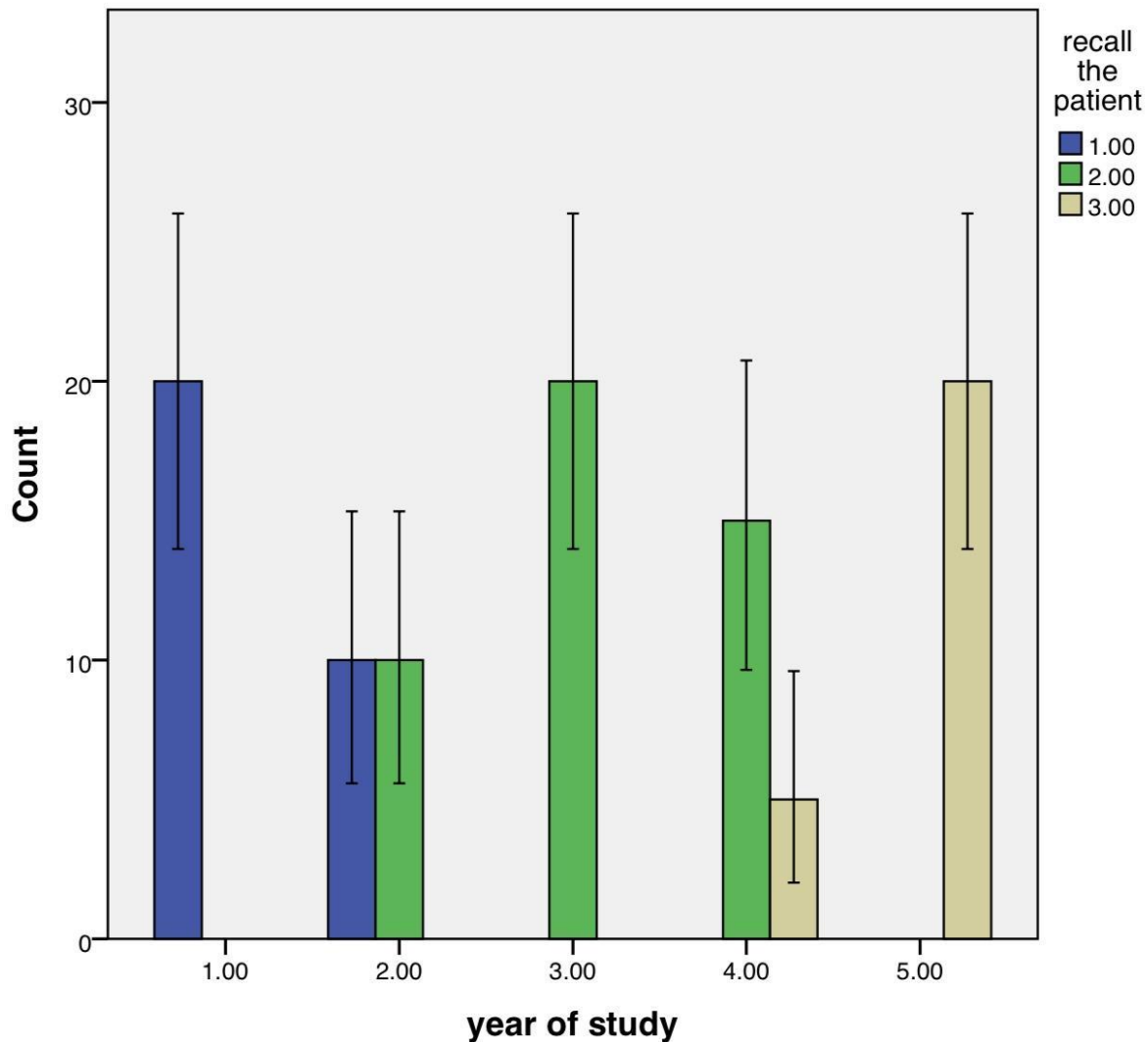


Figure 9: Bar chart depicting the comparison of year of study of the dental students and the practice on will they recall the patients with signs and symptoms of mucormycosis for review. In comparison, the first, second and third years answered that they would recall the patients in 2-5 days time and the fourth and final years said they would recall the patients for review after a week. P value was found to be 0.00 which is statistically significant.

DISCUSSION:

Mucormycosis which in the oral cavity is usually due to the transpalatal extension of the rhinocerebral infection, and mucormycosis localized mainly pertaining to the periodontal tissues that is the gingiva and the alveolar bone, which is seen rare in most of the cases.(26) In the previous studies it was noted that the patients were diagnosed with neutropenia due to a result of

chemotherapy for hematologic malignancy or diabetes mellitus in 65-73% of the cases. In other studies, mucormycosis has also been reported to occur at the site of recent dental extraction sites.(26,27) Treatment in this cases mostly involved amphotericin B with or without involving local debridement.(28) It was seen that only a few patients were completely recovered from the infections in the study groups taken up for the previous studies, and few groups even required a follow up period. (28,29)

Regarding the knowledge on mucormycosis and it's associated periodontal manifestations, only 35-40% of the study group were aware of the infection and were knowledgeable regarding the site of occurrence, mostly affected individual and the clinical manifestations and also the histopathological features. There were limited studies pertaining to the knowledge on mucormycosis and it's clinical manifestations. Further studies would help in giving a better diagnosis and also facilitate a proper treatment plan.

Mucormycosis has been reported to have a poor prognosis rate, with mortality rates of about 80%-100%; out of which for 20%, however with early recognition and aggressive treatment, survival rates may sometimes exceed upto 80%.(30) Extensive surgical debridement to remove the devitalized tissue is generally believed to be the most important component of treatment. Correction of the predisposing condition and amphotericin B therapy are also critical in a few cases.

Regarding the awareness and the practice on mucormycosis and it's periodontal manifestations, only 25-30% of the individuals in the study group were aware of the infection, and it's association with COVID affected patients and those patients who have recovered from COVID previously. And about 15-20% only were known to have reported cases of mucormycosis in their daily practice and have come across few of the periodontal manifestations as discussed previously.

Despite the profound immunosuppression and infection with a Mucor species, in some studies patients have made a complete recovery from the infection. This may have been because of the early recognition and aggressive intervention. It is possible that deferasirox chelation therapy, which the patient received briefly, provided along with adjunctive fungicidal therapy.(31),(31,32)

A diagnosis of mucormycosis can be established by direct examination of a wet mount and touch prep of tissue by using stains like Calcofluor, Fungi Fluor, or Blankofluor. Each of these reagents works on the principle of binding to the chitin and glucans of the fungal cell wall.(33) When treated specimens are being evaluated by fluorescence microscopy, they are known to have a distinct blue-white color. For cost-effectiveness, Calcofluor analysis is mostly performed in the medical centers owing to the need for fluorescence microscopy. It has been useful in the diagnosis of dermatophytosis, onychomycosis, ocular mycotic keratitis, and pulmonary fungal infections.(34),(34,35).

Few studies have used Calcofluor fluorescent wet mounts of resected oral tissue to rapidly diagnose and to define clear surgical margins for invasive fungal infection. Although not commonly used in clinical practice, Calcofluor fluorescence may have a greater sensitivity compared with more traditional diagnostic methods (i.e., potassium hydroxide, PAS, and GMS stains), and this is supported by numerous studies. (36) Calcofluor fluorescence is inexpensive and may be less costly compared with other detection methods. It can provide rapid results (30 seconds), which is conducive to timely treatment planning and also intraoperative decision making, and optimal management of an aggressive and potentially life-threatening infection. As such, this present study concludes that mucormycosis has various manifestations pertaining to the periodontal tissues and may also cause other further changes such as necrosis of tissues and mobility of teeth. It's better to have an early recognition and diagnosis of the disease to stop further spread and control of the infections.

CONCLUSION:

From the present study it can be concluded only a part of the individuals taken for the entire study are knowledgeable and aware of mucormycosis and it's associated periodontal manifestations. Further studies are required to elaborate on mucormycosis and it's related periodontal manifestations.

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CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest in the present study.

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