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RESEARCH ARTICLE

IS MUCORMYCOSIS A LIFE THREATENING FATAL DISEASE?

Patan Anjum[1], K.V.N.R. Pratap[2], T. Madhavi Padma[3], V. Siva Kalyan[4] and V. Srujan Kumar[5]

1. Student (BDS), Department of Public Health Dentistry, Mamata Dental College, Khammam, India.
2. Professor & HOD, Department of Public Health Dentistry, Mamata Dental College, Khammam, India.
3. Professor, Department of Public Health Dentistry, Mamata Dental College, Khammam, India.
4. Reader, Department of Public Health Dentistry, Mamata Dental College, Khammam, India.
5. Senior Lecturer, Department of Public Health Dentistry, Mamata Dental College, Khammam, India.

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Abstract

Background: The Covid-19 disease which has lead to panic in many countries including India, and now there is emergence of third wave in many parts of the world. As there are no proper treatment options and remedies for this deadly disease, it is leading to secondary infection among the patients who are Immuno-compromised called Mucormycosis also known as Black fungus disease. Thus it is very much important for the frontline workers to have the knowledge regarding this deadful disease. The objective of the study is to assess knowledge of dental students regarding mucormycosis.

Material and Method: Among 250 dental students a cross-sectional questionnaire survey was conducted in Khammam, Telangana. The sample consists of 79 (3rd years), 78 (4th years), 63 (interns), 30 (Postgraduates). They were asked to fill a questionnaire which was sent to them through google link which consists of 20 questions related to knowledge about mucormycosis.

Result and Conclusion: Majority of dental students were aware of this deadly disease mucormycosis. Almost more than 50% of study sample have knowledge regarding mucormycosis. Post graduate students have more knowledge and awareness regarding mucormycosis when compared with 3rd years, 4th years and interns.

Introduction:-

[14]Mucormycosis is a rare, fulminant, serious, rapidly spreading, Angioinvasive, life threatening opportunistic pathogen[1]. It is not a contagious disease[2]. [18]Mucormycosis (black fungus) is second common fungal infection after aspergillous[3].

It is present [8]in soil, manure, plants, decaying fruits and vegetables and even in the mucus of healthy people[1]. It is not a new disease but is affecting people since many years[1]. India globally stands at second place in diabetic mellitus cases which could be an effective reason for its rapid spread in India[4-6].

This condition can be seen in several clinical [1]forms namely rhino-orbital-cerebral mucormycosis, pulmonary, cutaneous, gastrointestinal, disseminated, and uncommon sites based on location of occurrence, paranasal. [3]Out of

Corresponding Author:- Patan Anjum
Address:- Student (BDS), Department of Public Health Dentistry, Mamata Dental College, Khammam, India.

these forms rhino-orbital-cerebral mucormycosis is the most common and fatal form and may lead to death if not treated promptly and early[1,8,9,25,26].

Some of the causes and potential risk factors for [1]mucormycosis is:

Through the inhalation of spores, Fungal hyphae, therapy with Iron chelator deferoxamine[31,32], consumption of contaminated food,contaminated homeopathic and herbal medicines[16,22-24], neonatal prematurity or malnutrition[22], [1]Inoculation of the fungi in to abrasions or the cuts of the skin, contaminated long term and improper usage of steroids, Antiboitics and contamination of [15]supportive care equipments such as oxygen cylinders, ventilators, intravenous drug abuse, improper variconazole usage [1]in covid 19 affected patients[20] ,Patients with covid 19 pneumonia and uncontrolled diabetes mellitus[16-19], hypertension, coronary artery disease, iron over load and other systemic diseases, tooth extraction-non-healing extraction socket, oro-antral fistula, unhygienic dental procedures, renal insufficiency, organ transplant, stem cell transplant, hematological malignancies, trauma and burns, decreased neutropenia[1],patients survived from natural disaster have suffered from cutaneous mucormycosis.[27-30]

As mucormycosis cases are reported with the symptoms which are affecting mostly head and neck region there is a need for the dental students to have knowledge about this deadly disease. Thus, this study was undertaken to assess knowledge of dental students regarding Mucormycosis.

Aim:-

To assess the knowledge regarding Mucormycosis among dental students in Khammam, Telangana.

Objectives:-

1. To determine the knowledge about mucormycosis[4]among dental students based on gender.
2. To determine the knowledge about mucormycosis[4]among dental students based on year of study.

Materials And Methods:-

A cross-sectional questionnaire based survey was conducted on dental students in a Tertiary care teaching Dental hospital in Khammam[4]. In a study sample of 250, 79 (3rd years), 78 (4th years), 63 (interns) and 30 (postgraduates). A specially designed questionnaire consisting of 20 closed ended questions was used to assess knowledge regarding Mucormycosis. The first few questions were regarding demographic data (name, age, gender, year of study and email/ mobile number) was also collected. The next few questions werebased on the knowledge regarding Mucormycosis. Pilot study was conducted among 50 dental students, to know the reliability and feasibility of the study. The sampling method used is convenience sampling. Data was collected using a google form link which was shared to students via social networking websites. Ethical clearance was obtained [7]from the institutional ethical committe. The purpose of the study was explained to the participants and informed consent was obtained prior to the inception of the study[7].

Study was conducted between July 30th-August 6th, 2021, among the dental undergraduates including third years final years, interns and postgraduates. The students who were willing to participate were only included in this study. The filled questionnaire responses were entered in excel sheet and [5]analysed.The statistical analysis was done using SPSS (statistical package for social sciences) 2.3 Version and[13]Chi square test was done to check the association between the groups and p value was set at 0.05.

Result:-

Figure 1 depicts the demographic profile of respondents based on their Age 30% of students belong to age group 20-21 years, 54% of students from the total sample belong to 22-23 years, 16% of the students belong to age group ≥ 24 years. Based on Gender 19.60% of students were males and 80.40% of the students were females. Based on year of study 31.60% were 3rd years, 31.20% of students were 4th years,25.20% were interns and 12% postgraduates.

Table 1 depicts the comparison of knowledge regarding mucormycosis based on gender and year of study. On comparison of knowledge based on gender when asked a question about who has more chances of getting mucormycosis (8.96%) of females and (8.16%) of males stated post covid recovered patient, (6.97%) females and (8.16%) males stated immune-compromised patients, (2.99%) females and (16.33%) males stated persons with underlying systemic diseases, (81.09%) females and (67.35%) males stated all the above. When asked a question

about which is becoming a threat simultaneously with mucormycosis in post covid period (61.69%) females and (44.90%) males stated aspergillus, (14.43%) females and (24.49%) males stated as agaricus, (19.40%) females and (18.37%) males stated as Ascomycota, (4.48%)females and (12.24%) stated as Agaricales. When asked a question about the oral presentation of mucormycosis (1.99%) of females and (10.20%) males stated as tooth mobility, (10.95%) of females and (16.33%) males stated palatal discoloration, (7.46%) of females and (12.24%) males stated as multiple abcesses, (79.60%) females and (61.22%) males stated as all the above are oral presentations. When asked a question about [3]Rhino-orbital-cerebral mucormycosis is the most common form and it affects: (5.47%) females and(16.33%) males stated as periorbital area, (13.43%) of females and (16.33%) males stated as paranasal sinuses, (6.47%) females and (12.24%) males stated as oral cavity and (74.63%) females and (55.10%) males stated as all of the above. When asked a question about preventive measures in the post covid period (3.98%) females and (18.37%) males stated as using dry and hygienic mouth masks, (4.98%) females and (10.20%) males stated as using chlorhexidine mouth rinse, (6.98%) females and (14.29%) males stated as oral hygienic maintenance, (84.08%) females and (57.14%) males stated all of the above are preventive measures in post covid period. When asked a question about which of the following are the advices to patient after recovering from covid infection to prevent cross-contamination (5.47%) females and (14.29%) males stated as changing tooth brush, (6.47%) females and (10.20%) males stated as changing mouth cleanser, (7.46%) females and (18.37%) males stated using dry and hygienic mouth masks, (80.60%) females and (57.14%) stated as all the above mentioned can prevent cross-contamination. Hence, females have more knowledge regarding mucormycosis when compared to males and its p valuesare statistically significant.

On comparison of knowledge regarding mucormycosis based on year of study, When asked a question about who has more chances of getting mucormycosis (11.39%) 3rd years, (11.54%) 4th years, (6.35%) interns, (0.00%) postgraduate's stated as post covid recovered patients, (12.66%) 3rd years, (7.69%) 4th years, (3.17%) interns (0.00%) postgraduates stated immune-compromised patients (7.59%) 3rd years, (8.97%) 4th years, (1.59%) interns, (0.00%) postgraduates sated persons with underlying systemic diseases, (68.35%) 3rd years, (71.79%) 4th years, (88.89%) interns, (100%) stated as all the above mentioned patients has more chances. When asked a question about which is becoming a threat simultaneously with mucormycosis in the post-covid period (53.16%) 3rd years, (64.10%) 4th years, (73.02%) interns (26.67%) postgraduates stated aspergillus, (22.78%) 3rd years (8.97%) 4th years, (14.29%) interns, (23.33%) postgraduates stated agaricus, (18.99%) 3rd years, (17.95%) 4th years, (12.70%) interns, (36.67%) postgraduates stated Ascomycota, (5.06%) 3rd years, (8.97%) 4th years, (0.00%) interns, (13.33%) postgraduates stated Agaricales. When asked a question about the oral presentation of mucormycosis (7.59%) 3rd years, (2.56%) 4th years, (1.59%) interns, (0.00%) postgraduates stated tooth mobility, (16.46%) 3rd years, (12.82%) 4thyears, (9.52%) interns, (3.33%) postgraduates stated palatal discoloration, (13.92%) 3rd years, (11.54%) 4th years, (1.59%) interns, (0.00%) postgraduates stated multiple abcess, (62.03%) 3rd years, (73.08%) 4th years, (87.30%) interns, (96.67%) postgraduates stated all of the above are oral presentations. [3]Rhino-orbital-cerebral mucormycosis is the most common form and it affects (12.66%) 3rd years, (6.41%) 4th years, (4.76%) interns, (3.33%) postgraduates stated periorbital area, (18.99%) 3rd years, (16.67%) 4th years, (11.11%) interns, (0.00%) postgraduates stated paranasal sinus, (10.13%) 3rd years, (10.26%) 4th years, (4.76%) interns, (0.00%) postgraduates stated oral cavity, (58.23%) 3rd years, (66.67%) 4th years, (79.37%) interns, (96.67%) postgraduates stated all of the above gets affected. When asked a question about preventive measures in the post covid period (8.86%) 3rd years, (7.69%) 4th years, (6.35%) interns, (0.00%) postgraduates stated using dry and hygienic mouth masks, (7.59%) 3rd years, (11.54%) 4th years, (0.00%) interns, (0.00%) postgraduates stated using chlorhexidine mouth rinse, (12.66%) 3rd years, (8.97%) 4th years, (6.35%) interns, (0.00%) postgraduates stated oral hygiene maintenance, (70.89%) 3rd years, (71.79%) 4th years, (87.30%) interns, (100%) postgraduates stated all of the above as preventive measures. When asked a question about which of the following are the advices to patient after recovering from covid infection to prevent cross contamination (12.66%) 3rd years, (8.97%) 4th years, (1.59%) interns, (0.00%) postgraduates stated changing tooth brush, (10.13%) 3rd years, (11.54%) 4th years, (1.59%) interns, (0.00%) postgraduates stated changing mouth cleansers, (15.19%) 3rd years, (10.26%) 4th years, (6.35%) interns and (0.00%) postgraduates stated using dry and hygienic mouth masks, (62.03%) 3rd years, (69.23%) 4th years, (90.48%) interns, (100%) postgraduates stated all of the above as advices. Hence, postgraduates have more knowledge followed by interns, 4th years, 3rd years and its p values are statistically significant.

Discussion:-

Mucormycosis was first coined in 1957 by Baker[15]. Mucormycosis was initially [10]described in 1855 it was the first authentic human case. In 1876 Pulmonary mucormycosis was discovered[7].

In a recent study conducted by Awadhesh Kumar Singh and Ritu Singh concluded that out of 101 confirmed mucormycosis cases India (82%) has highest number of mucormycosis cases followed by USA (9%) and Iran (3%) with male predominance. In this study 62.40% of the total sample were aware that India has highest number of cases. Maharashtra has highest number of mucormycosis cases in India[7].In this study 70.80% of the total sample were aware of it. Globally India stands at second place in diabetes mellitus cases according to international diabetes federation, which is one of the effective reasons for rapid increase in mucormycosis cases in India[6]. In [5]a study conducted by Prakash et.al. they noticed 57% of mucormycosis cases having uncontrolled diabetes mellitus[10,11]. In this study 63% of the total sample don't have any knowledge regarding this. [16]In a study conducted by Patel et.al stated in all the [12]forms of mucormycosis, Rhino-orbital mucormycosis is the most common form[11,12]. [9]In a recent systemic review conducted by John et.al. concluded that out of 41 confirmed mucormycosis cases 93% has covid 19 and diabetes mellitus, while 88% were receiving corticosteroids[13].In this study 66.70% of them were aware that corticosteroid [17]as the major risk factor for mucormycosis. Interns were more aware about this corticosteroid usage than other year students. Rajashri R and Muthusekhar M.R.in their study concluded that there are low incidence of mucormycosis following tooth extraction, but significant morbidity and mortality rates has been seen.Hence, dental proffesionals should have knowledge about possible complications, to avoid unfavourable outcomes[8,33,34].The [11]gold standard criteria for the clinical diagnosis of mucormycosis was stated by Smith and Krichner in 1950[14].

Females were more aware and have adequate knowledge regarding mucormycosis when compared to males.

Among the various year's students considered in the present study postgraduates answered more number of questions correctly followed by interns, 4th years and 3rd years. The reason for this could be that clinical exposure was higher in postgraduates when compared with undergraduates dental students.

Conclusion:-

Awareness of 3rd year, 4th year, and interns was low as compared to the postgraduates which [2]can be improved by incorporating basic information and making necessary changes in the academic teaching curriculum and by conducting [2]workshops, CDE programs, conferences, seminars and increasing the clinical exposure of the students to oral findings in clinics. Special study modules regarding mucormycosis[2]should be created involving the dental faculty, emphasizing the knowledge and significance of mucormycosis. Hence their knowledge and awareness could be more as compared with undergraduates. So necessary changes should be made in dental curriculum and clinicals, to upgrade students' knowledge which allows them to face any challenges in future.

Limitations:

The current study was conducted in a single institution and convenience sampling was used. So, generalisation of the results should not be done with caution.

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Conflict Of Interest:

None.

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