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Awareness about ocular complications due to dental infections among dentists

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Abstract: Rare complications due dental infections injurious to the eye are ophthalmia, defective vision and blindness. These complications are many times neglected and not given much importance. There are no proper guidelines in preventing and managing the ocular problems.This study was done to assess the awareness among dentists about dental infection induced ocular complications. A self administered questionnaire was made and circulated among the participants. The sample size was 170 and the questionnaire was circulated through online means. The data was obtained and the results were tabulated using SPSS software. Only 37% participants were aware that dental infection can cause ocular complications. Textbooks and colleagues were the key sources of information. Majority of them showed interest in knowing the preventive and management methods.From this study, lack of knowledge and aptitude among the dentists about ocular complications was observed. Therefore further information must be provided and training must be given through workshops, camps.

Keywords: Complications, Dental, Knowledge, Ocular, Ophthalmia, Infections.

INTRODUCTION

Dental infections may cause sinusitis, orbital cellulitis(Vijayalakshmi and Ganapathy, 2016), parapharyngeal abscess(Thakar and Thakar, 1995). Several years ago, a case of ophthalmia and loss of vision due to dental infection was reported in the literature(Steinbugler, 1930; Thakar and Thakar, 1995). Further in 1795, the relation between the dental infections and ocular complications has been described. In 1817, a case was reported in which contraction of pupils occurred following dental carious tooth extraction. By removal of the pathological cause, defective vision has been treated for many patients. The subject of dental focal infection received much attention in recent times(Steinbugler, 1930). Various microorganisms are also involved during the pathology of the infection(Selvan and Ganapathy, 2016). Orbital can also be more common in rural areas due to high negligence levels of the population(Ashok and Suvitha, 2016). Pregnant women can possess more larger danger(Basha and Ganapathy, 2018).

The present thought and dental research is mainly towards the prevention of oral disease. Further, increased interest by the medical professional about nutrition (Ganapathy, Kannan and Venugopalan, 2017), the functional activity(Ashok *et al.*, 2014) which is controllable by the patient will influence public health(Ganapathy *et al.*, 2016). There is much evidence and histories stating direct relation between the etiological factor to the complications in the eye(Subasree, Murthykumar and Others, 2016). One study is conducted regarding the medical and dental divisions of the health services concluding lack of information among the participants regarding the anatomy, functions of the organ(Gillett, 1930).

Most commonly affected area is the maxillary molar(Jain *et al.*, 2018) which can become life threatening due to airway obstruction(Venugopalan *et al.*, 2014) and rapid spread into the orbit region. A critical area in the neck, Parapharyngeal space easily gets affected through dental infection(Sethi and Stanley, 1991). Other complications are sinusitis, pan sinusitis, orbital cellulitis and cavernous sinus thrombosis(Ngeow, 1999). Due to sinuses involved, can threaten a problem in the placement of implants in the maxilla for prosthodontic or orthodontic purposes(Ajay *et al.*, 2017). Orbital cellulitis can lead to several complications such as blindness, intracranial complications(Ngeow, 1999) and even sometimes death(Harbour, Trobe and Ballinger, 1984). Optic nerve damage can also occur due to compression or inflammatory processes(Jyothi *et al.*, 2017).

There is no proper literature about the awareness of ocular complications. And also no proper guidelines on prevention and management of the complications(Kannan and Venugopalan, 2018). And therefore this study was conducted to create awareness among the practitioners about the complications caused due to dental

infection.Our team has rich experience in research and we have collaborated with numerous authors over various topics in the past decade (Deogade, Gupta and Ariga, 2018; Ezhilarasan, 2018; Ezhilarasan, Sokal and Najimi, 2018; Jeevanandan and Govindaraju, 2018; J *et al.*, 2018; Menon *et al.*, 2018; Prabakar *et al.*, 2018; Rajeshkumar *et al.*, 2018, 2019; Vishnu Prasad *et al.*, 2018; Wahab *et al.*, 2018; Dua *et al.*, 2019; Duraisamy *et al.*, 2019; Ezhilarasan, Apoorva and Ashok Vardhan, 2019; Gheena and Ezhilarasan, 2019; Malli Sureshbabu *et al.*, 2019; Mehta *et al.*, 2019; Panchal, Jeevanandan and Subramanian, 2019; Rajendran *et al.*, 2019; Ramakrishnan, Dhanalakshmi and Subramanian, 2019; Sharma *et al.*, 2019; Varghese, Ramesh and Veeraiyan, 2019; Gomathi *et al.*, 2020; Samuel, Acharya and Rao, 2020)

The aim of this study is to assess the knowledge and aptitude of the dental professionals of ocular complications due to dental infection(Ranganathan, Ganapathy and Jain, 2017).

MATERIALS AND METHOD

A cross sectional study was conducted by means of an online link targeting the dental practitioners and students using a self administered questionnaire. The questionnaire covered the demographic details, knowledge based and aptitude based questions. Each of the two divisions included six questions. A total of twelve questions were framed in the questionnaire. In total seventy mails were sent, out of which sixty one responded. Therefore the response rate was 93%. The study group included dental practitioners, dental students. The data were statically analysed using SPSS software.

The questions framed are:

1. Do you know that ocular complications occur due to dental infection?
2. If yes, then source of information?
3. Did you notice any ocular complications in a patient due to dental infection?
4. If yes, what were the symptoms?
5. How long the symptoms lasted?
6. Which tooth infection is more prone for ocular complication?
7. If you encounter ocular complications due to dental infections, what would be your immediate reaction?
8. How do you prevent ocular complications due to dental infection?
9. If encountered with ocular infection, when do you report to an ophthalmologist?
10. Do you feel a dentist should take ocular complications seriously?
11. Do you think more information should be published about ocular complications?
12. Do you know how to prevent ocular infections due to dental infection?

RESULTS AND DISCUSSION

In this study, 170 questionnaires were circulated among the dentists from which 162 responded. Therefore the acceptance percentage was 95.2%. percentage distribution of study participants based on age. 46.91% of the participants belong to 17-25 years of age and 53.09% of the participants belong to 26-40 years of age(Figure 1). Among which the males were 54.9% and females were 45.1%(Figure 2). They were divided into two groups based on their age as 17-25 and 25-40. The number of participants between 17-25 are 76 and those from 26-40 are 86. These were the demographic details collected from the participants. 53 undergraduates were of age 17-25 and the remaining 40 were of 26-40 years. Postgraduate students 17-25 years of age were 23 in number, with 46 from age of 26-40 years of age.

In our study, only 37% of the participants knew that dental infections can cause ocular complications. 34% of them thought that no ocular complications can be caused due to dental infection and 29% of them didn't know about the same. Distribution of participants based on responses about source of information about ocular complications. 24.07% of the participants got information from textbooks, 21.60% of the participants from all of the above, 17.28% from journals, 14.20% from colleagues, 9.88% from personal experience and 12.96% from none of the above sources(Figure 3). 46.3% of them have noticed ocular complications in their dental practice due to dental infection. 23.5% of them were unaware about the symptoms. And 19.1% of them chose orbital cellulitis as an important complication, 39.5% of them loss of vision and 17.9% as defective vision(Figure 5).

40.1% of the participants opted to treat the dental infection as their immediate reaction towards ocular complications, 43.2% of them after the completion of the procedure and 16.7% neglected the reaction. 47.5% suggested to report to the ophthalmologist, 38.9% suggested IV antibiotics and 13.6% of them no treatment. 66% of them felt that ocular complications due to dental infection must be taken seriously, 34% of them didn't take it seriously. Unfortunately 63% of them didn't know the prevent measures of the ocular complications. 25.9% of them suggested duration to be for a few seconds, 27.2% of them a few minutes, 22.8% of them a few hours and 24.1% of them none. Association between the graduation and management strategies of the study participants about ocular complications. 54.55% of undergraduates and 54.55% of undergraduates opted to report to ophthalmologists as effective management strategies when compared with 45.45% of the postgraduates with a statistically significant difference (Pearson Chi-Square test; $P=0.03, P<0.05$)(Figure 6). Association

between the graduation levels and seriousness of ocular complications. 52.73% of the postgraduates took the complications seriously when compared to 47.27% of the undergraduates. Post graduates had more awareness about seriousness of ocular complications than the undergraduates,with a statistically significant difference(Pearson Chi-Square test; P=0.04,P<0.05).(Figure 7).

In depth knowledge and aptitude of ocular complications due to dental infection is necessary which will help the professionals practice in a more ethical way. The dental infection can pass through many ways and can cause ocular complications. Proximal are the adjacent muscle, connective tissue and sinuses to the root apices anatomically. The most common route of spread is through the maxillary sinus into the orbit via the orbital fissure(Stübinger *et al.*, 2005; Caruso *et al.*, 2006). Pterygopalatine regions(Muñoz-Guerra *et al.*, 2006), canine fossa and retrograde spread are less common pathways(Poon *et al.*, 2001).

Management strategies for complications when assessed between the undergraduates and postgraduates indicated that both preferred to report to ophthalmologists as the best strategy. Undergraduates were more serious about the need for awareness about the ocular complications due to dental infection when compared with the postgraduates. There was a statistical difference found between them.

This study assessed the knowledge and aptitude of dentists towards the ocular complications caused due to dental infection. From the observations made in our study, a low level of knowledge was indicated which emphasises inadequate understanding about the ocular knowledge. In our study nearly 50% of them didn't know that dental infections can cause ocular complications. They should have known this as they deal routinely with patients. It is very important for them to get updated with the latest information and advancement(Duraisamy *et al.*, 2019).

Other than the infection, ocular complications can also occur post treatment or even during the treatment. Administration of local anaesthesia can also be a cause for ocular complications(Liau *et al.*, 2008). Traumatic eye injury after dental procedures was rarely reported in the medical literature, like transient blindness after dental extraction, intraocular haemorrhage during dental implant surgery(Krepler, Wedrich and Schranz, 1996; Brodsky and Dower, 2001) or even retinal tears after teeth cleaning(Ng *et al.*, 2001).

The value of seriousness about ocular complications by the dentists appears to be quite low due to the belief that ocular complications are rare and lasts for a short period. However few of them have reported serious complications due to dental infections(Mehra, Caiazzo and Bestgen, 1999). Most of the studies that have investigated attitudes in combination with the level of knowledge have concluded to change the negative attitude of the participants(Blake *et al.*, 2006; DeCroos *et al.*, 2011). In our study, in spite of low level of knowledge the participants have shown more interest towards the management and preventive measures of the ocular complications.Our institution is passionate about high quality evidence based research and has excelled in various fields ((Pc, Marimuthu and Devadoss, 2018; Ramesh *et al.*, 2018; Ezhilarasan, Apoorva and Ashok Vardhan, 2019; Ramadurai *et al.*, 2019; Sridharan *et al.*, 2019; Vijayashree Priyadharsini, 2019; Mathew *et al.*, 2020)

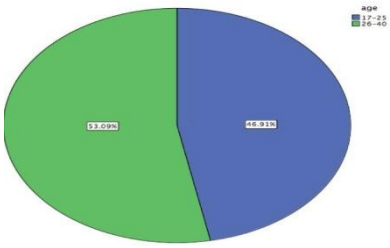

Fig.1: Pie diagram represents the percentage distribution of study participants based on age. 46.91% of the participants belong to 17-25 years of age(blue) and 53.09% of the participants belong to 26-40 years of age(green).

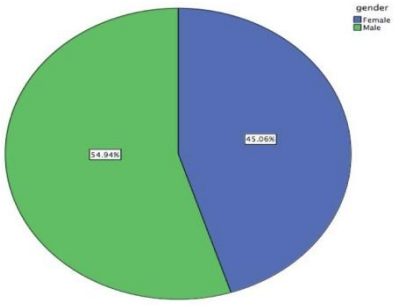

Fig.2: Pie diagram represents the percentage distribution of study participants based on gender. 45.06% of the participants were females(blue) and 54.94% of the participants were males(green).

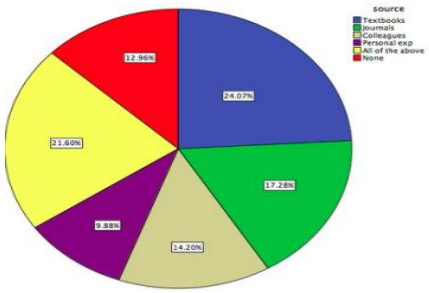

Fig.3: Pie chart represents the percentage distribution of participants based on responses about source of information about ocular complications. 24.07% of the participants got information from textbooks(blue), 21.60% of the participants from all of the above(yellow), 17.28% from journals(green), 14.20% from colleagues(brown), 9.88% from personal experience(purple) and 12.96% from none of the above(red) sources.

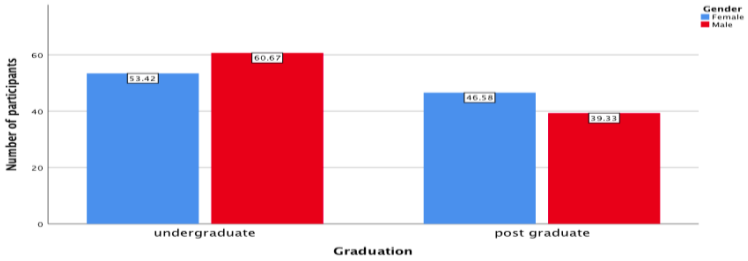

Fig.4: Bar diagram depicting the gender distribution among undergraduate and postgraduates. X-Axis represents the gender of graduates and Y axis represents the number of participants. 60.67% of the undergraduates were males(red) and 53.42% were females (blue) ,39.33% of the post graduates were males and 46.58% were females(blue).

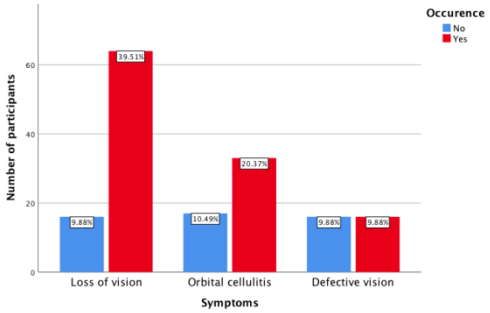

Fig.5: Bar diagram depicting the awareness of the symptoms of ocular complications. X-Axis represents the symptoms of ocular complications and Y axis represents the number of study participants with responses on awareness about symptoms of ocular complications. Loss of vision(39.51%) reported as an important symptom for ocular complications followed by orbital cellulitis(20.37%) and defective vision(9.88%).

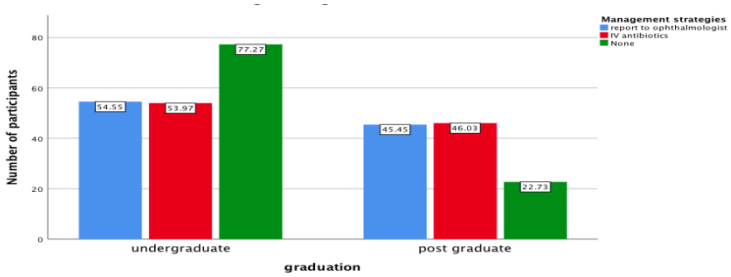

Fig.6: Bar diagram depicting the association between the graduation and management strategies of the study participants about ocular complications. X-Axis represents the graduation of participants and Y axis represents the number of the study participants with responses on awareness about management strategies of ocular complications. 54.55% of undergraduates and 54.55% of undergraduates opted to report to ophthalmologists as effective management

strategies(blue) when compared with 45.45% of the postgraduates with a statistically significant difference (Pearson Chi-Square test; p=0.03,p<0.05).

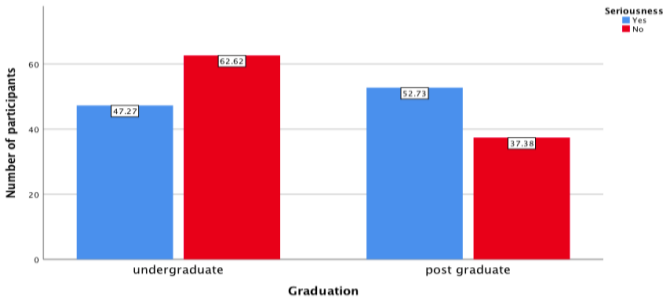

Fig.7: Bar diagram depicting the association between the graduation levels and seriousness of about ocular complications. X-Axis represents the graduation of participants and Y axis represents the number of the study participants with responses about awareness on ocular complications. 52.73% of the postgraduates took the complications seriously when compared to 47.27% of the undergraduates. Post graduates had more awareness about seriousness of ocular complications than the undergraduates,with a statistically significant difference (Pearson Chi-Square test; =0.04 ,p<0.05).

CONCLUSION

Results from our study have revealed inadequate levels of knowledge among dentists about ocular complications due to dental infection. Their aptitude about the same must also be improved. Proper guidelines must be included to prevent any emergency or complications. Further more information should be made available and awareness must be created through workshops, CDE programmes or seminars.

AUTHOR CONTRIBUTIONS

Author 1 (Subashri.A) carried out retrospective study by collecting data and drafted the manuscript after performing the necessary statistical analysis. Author 2 (Dr.Dhanraj) aided in the conception of the topic, participated in the study design, statistical analysis and supervised in preparation of the manuscript and helped in study design and coordinated in developing the manuscript. All the authors have equally contributed in developing the manuscript.

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Conflict of interest

There are no conflicts of interest.

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