Prevalence of Dental Caries in Anterior Teeth in South Canara Population- a Three Year Epidemiological Study

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ABSTRACT *In the recent years the global distribution of dental caries presents a varied picture, most of the countries with low caries prevalence are experiencing an unprecedented increase in caries prevalence and severity of dental caries. The aim of the present study was to evaluate the prevalence of caries in the anterior teeth in the South Canara population. The epidemiological investigation was carried out amongst 6000 patients visiting the outpatient department of A.B.Shetty institute of dental sciences and satellite centres over a period of 3 years diagnosed according to the W.H.O criteria 2000. All the data was coded and evaluated using the SPSS software 15.0 software package for statistical analysis. There was a strong correlation found between age, geographical location, type of diet, oral hygiene habits, malalignment of teeth and anterior teeth caries but no significant association was found between anterior caries and occupation.*

INTRODUCTION

Dental caries is the localised chemical dissolution of the tooth surface which is caused by the metabolic events taking place in the biofilm covering the affected area. It has also been thought of as a chronic infection of the calcified tissues of the teeth in which the microbial agents are members of the normal commensal flora. The infection usually starts with the demineralisation of surface layer of the enamel which progresses through the dentin due to which the pulp becomes inflamed and finally necrotic.[1]

Dental caries is a plaque related, multi factorial chronic infection of the oral cavity. The factors enhancing the progress of dental caries are found to be dietary carbohydrates, saliva, oral microflora, and susceptible tooth surfaces.[2]

Caries is known to develop in the form of a white spot lesion which is reversible. Although as it progresses to cavitation it becomes an irreversible disease [3]. There are some areas on the tooth surface which are more susceptible to demineralisation such as the pit and fissures on the occlusal surface and the proximal tooth surfaces. Also the lower incisors are less susceptible to caries due to the large amount of saliva produced by the submandibular salivary glands in that area. Xerostomia and frequent exposure to radiation has also known to cause dental caries [4]. Van Palenstien et al conducted a study which showed that the frequency of sugar intake is more decisive than total consumption of sugar in the formation of dental caries.[5]

The main causative organisms in the oral cavity contributing to the initiation of enamel and root surface caries have been found to be Streptococcus mutans and Streptococcus sobrinus (Specific plaque hypothesis). Dental caries has also been known to occur in relation to dental plaque that is free from S.mutans (Nonspecific plaque hypothesis).[6] However the other organism which are associated with extension of caries process into dentin rather than initiation phase of disease are the Lacto bacillus species.

Knowledge and information on the prevalence of caries and the severity of the condition forms the basis for the eminence and essence of the caries prevention programs and treatment needs in a population and especially anterior teeth pose a greater burden as it financially and negatively affects the quality of life of an individual.

Hence the present study was aimed at determining the prevalence of dental caries in anterior teeth, the effect of age, gender, location, occupation, diet and the positioning of teeth in the oral cavity on the prevalence of dental caries.

METHODOLOGY

A study was conducted on 6000 patients over the period of 3 years from August 2011 to August 2013, to collect information on the prevalence of dental caries in the anterior teeth in the patients reporting for first time to the outpatient department of A.B. Shetty Memorial Institute of Dental Sciences, NITTE University and to the rural satellite centres.

Ethical clearance was taken from the central ethical committee of the institution under NITTE University. Materials used in the clinical examination mainly consisted of explorers, dental floss, cotton rolls, mouth mirror, wedges to separate the teeth and illuminating light. The patients were examined for anterior carious tooth under good illumination.

A Diagnostic criteria for clinical examination was followed wherein, caries was detected according to WHO Criteria[8] that "The caries was recorded as present when a lesion in a pit or fissure or on a smooth surface had detectable softened floor, undermined enamel or softened wall. On Proximal surface it had to be certain that the explorer had entered the lesion. Where any doubt existed caries was not be recorded as present."

All the data was then coded and the prevalence of carious anterior teeth was evaluated according to age, gender, diet and occupation using the SPSS 15.0 software package for statistical analysis.

RESULTS

The following graph represent the results obtained from our survery.

The graph below shows the type of caries(according to G.V.Blacks classification) which is most prevalent in anterior teeth. The prevalence of caries was seen more in the inter-proximal areas as compared to the cervical region. It also shows us the correlation between the diet and dental caries. It was observed that patients who consumed a non vegetarian diet had lesser incidence of caries as compared to the patients who consumed a vegetarian diet. however the patients who consumed a mixed diet showed the highest caries levels. Also the correlation between the oral hygiene practices and dental caries is seen wherein the patients brushing twice a day have less caries incidence than those who brushed once daily.The following bar graph shows a correlation between malignment and dental caries.here it can be seen that malalignment is a predisposing factor to the formation of caries.The correlation between the location of the patient and caries shows an increase in the incidence of caries in the rural population in comparision to the urban population.It shows the incidence of caries to be more in the females when compared to the males.
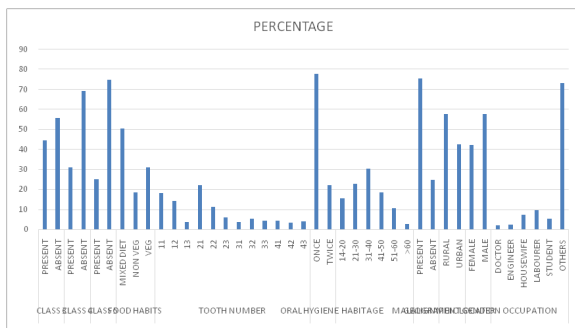
DISCUSSION

Dental diseases are a known sententious public health burden in India, with dental caries affecting 60 to 65 percent and periodontal diseases affecting an estimated 50 to 90 percent of the general population. The emanation of widespread poor oral health is usually seen on the personal, population, and health systems level, as caries and periodontal disease deteriorate individual health and wellbeing, decrease economic productivity, and act as significant risk factors for other systemic health ailments.

The study found out distribution of carious anterior teeth between the two genders. In accordance with the research conducted by Lucas J R et al , our study showed females are typically found to exhibit higher prevalence rates than males[7]. This finding is generally true for diverse cultures with different subsistence systems. Higher caries prevalence among females is often explained by one of three factors ; earlier eruption of teeth in girls, hence longer exposure of girls' teeth to the cariogenic oral environment ; easier access to food supplies by women and frequent snacking during food preparation, and pregnancy. Nonetheless , the incidence of premolar caries was found to be more in males and females in the same population in a study done by Mithra Hegde et al(2010).

The assessment of anterior carious teeth among the various age groups was also determined. Out of the 6000 patients examined maximum prevalence of carious anterior teeth was seen in the age group of those between 31 years and 55 years (30.4%). On applying the chi square test, the difference among various age groups was found to be significant. Similar results were recorded in studies conducted by Cleaton-Jones and Hugoson[.8,9]

A strong interrelation was seen between the vegetarians ,

non-vegetarians and caries which is similar to findings of Khan et al.[10] . Fluoride is considered important for health because of its beneficial effect on the prevention of dental caries and on bone development. The present study was conducted in south Karnataka which is located on south coast of India , sea food forms the major component of non-vegetarian diet in this particular population. It is probably due to increased intake of sea food, rich in fluoride which may have led to decreased caries prevalence in population on non-vegetarian diet.. Also, it is well established that more the acid exposure of hard dental tissue, higher is the caries.[11] Saliva is responsible for neutralisation of acid produced by microorganisms acting on sugar substrate but when fermentable carbohydrate was not added to the saliva, putrefaction replaced fermentation, alkalinity replaced acidity, and no decalcification is usually observed.[12], [13]Putrefaction is the result of protein consumption, so it might be suggested that the persons who consume plenty of protein rich food in comparison to sugar, will develop less amount of acid in their mouth and relatively be protected from dental caries. It might be the reason for less number of cases among the non-vegetarian (Mixed diet) population. The present study was conducted in south Karnataka which is located on south coast of India, sea food forms the major component of non-vegetarian diet in this particular population.[14]

This study shows the prevalence of carious anterior teeth in the urban and rural populations. In the 6000 patients examined, prevalence of carious anterior teeth in urban areas was 42.4% and in rural areas it was 57.6%. On applying the chi square test, the difference in locations i.e.urban and rural was found to be significant. The pvalue is <0.0005 which is less than 0.05. Thus, the relationship between prevalence of caries in anterior teeth and various locations is found to be statistically significant. Dental diseases in rural India are primarily due to socio-cultural factors, such as inadequate or improper use of fluoride products and a lack of knowledge about oral health and hygiene, and systemic infrastructure deficiencies that prevent proper screening and dental care of oral diseases. Dawn E. Diehnel T and H. Asuman Kiy Ak conducted a study with comparable results(2001).[15]

It has been known that malaligned teeth enhance the accumulation of plaque in the area which further help in the progression of caries. Of all the patients examined the present study showed a 75 % of caries incidence in patients with malaligned teeth. A significant association was found between malalignment of anterior teeth and dental caries in our study which is not consistent with the findings of Helm and Petersen who inferred that there is no relation between malocclusion and dental caries.[16]

It was also found that the most common carious anterior tooth was the right maxillary central incisor (22%) followed by the right maxillary lateral incisor (14.33%) and the left maxillary central incisor (11.25%). There were least number of cases of carious anterior teeth reported in left mandibular central incisor and the left and right mandibular lateral incisors. These results are similar to the findings of Berkhus (1931) who also found that the prevalence of caries in anterior teeth was maximum in maxillary central and lateral incisors. A study done by Mustafa Demerci et al concluded that the mandibular incisors show decreased prevalence of caries most probably due to continuous bathing of the teeth by the saliva secreted by the submandibular and sublingual glands[17]. The reason for the difference between the arches may also relate to gravity and the fact that saliva with its buffering action would tend to drain from the upper teeth and collect around the lower. However in a study done by Mithra Hegde et al (2010) among the same population , revealed an incidence of 30.9% in premolar teeth.

The present study showed an inverse relationship between the incidence of caries and the frequency of brushing. The population who observed brushing once daily had a caries

incidence of 77.96 % and those who brushed twice daily was found to be 22 %.Therefore, it can be concluded as better oral hygiene habits lead to a decrease in the prevalence of caries which was also reported in a study conducted by Petti S Tarsitani G, Panfili P, Simonetti D (1997).[18.]

Caries was found to be present mainly in the interproximal areas of the maxillary central and the lateral incisors (44 %) and the least in the cervial area of the anterior teeth.(25%). These results are in accordance with the study done by Mustafa Demerci et al.[17]

CONCLUSION

According to the present study we conclude that the anterior teeth caries has high prevalence and is a major factor for seeking dental treatment. There is a strong correlation between age, location, type of diet, oral hygiene habits, gender of the population, malalignment of teeth and anterior teeth caries but no association exists between anterior decay and occupation,.

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