FREQUENCY OF DENTAL CARIES AND ASSOCIATED RISK FACTORS IN PATIENTS ATTENDING COLLEGE OF DENTISTRY, ALJOUF UNIVERSITY — SAUDI ARABIA

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ABSTRACT

The objective of the study was to determine the frequency of dental caries and associated risk factors among patients examined at College of Dentistry, Aljouf University, Saudi Arabia. The study group consisted of 576 subjects with a mean age of 30.4 ± 9.9 years and 65% males. Carious defects, fillings and missing teeth due to caries were diagnosed and DMFT scores were calculated according to WHO guidelines. Oral hygiene practices and habits were also recorded. Data were collected through a proforma. The prevalence rate of dental caries in the study group was 94%. The mean DMFT was 6.58 ± 3.7 whereby the D (Decayed) component had the highest proportion 4.44 ± 3.1, and M (Missing) component the lowest 0.79 ± 1.6. On average the F (Filled) component was 1.39 ± 1.9. The mean of DMFT component by gender was statistically significant (p < 0.05) while the difference in the mean of D and F components by age group was statistically insignificant (p < 0.05). The molars (69%) were the most affected teeth by caries followed by premolars (21.5%) and anterior teeth (9.5%). The results indicated high levels of dental caries as well as dental treatment needs among the study participants.

Key Words: *Adults, Dental Caries, frequency.*

INTRODUCTION

Dental caries is often defined as an infectious, microbiologic disease characterized by extensive de-mineralization of the inorganic components and dissolution of the organic components of teeth.[1] It is widely distributed in populations irrespective of age, gender, race, nationality and it is often called 'the scourge of the century'. It is sometimes called as a 'socioeconomic disease' due to its higher prevalence among certain socio economic classes in the society. Some consider it a 'lifestyle disease'. Caries is one of the most common afflictions in human beings, causing pain and discomfort to millions of people worldwide thus leading to millions of dollars being spent in managing the condition. Almost 50% of tooth loss happens due to dental caries and its complications.[2]

Dental caries has high incidence and prevalence among almost all populations and its impact is cumulative and thus increases in severity with ageing. Caries prevalence in developed countries have come down due to improvement in quality of life, better understanding of the disease process, increased public awareness, advances in technology and fluoride application. But it is still a major challenge to the oral health care programmes in developing countries and thus considered to add significantly to their disease burden. This is primarily because of change in dietary habits and life styles.[1]

Most of the epidemiological studies on caries are done on children even though adult population also share many risk indicators. The most prominent of those risk indicators is age. According to almost all studies caries increases with age.[3] In the past studies have found caries prevalence to be higher in females where as some could not find significant differences

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between males and females.[4] Some studies also reveal the strange but significant co-relation between socio-economic status and educational qualification of the population.[5]

In 1982, World Health Organization adopted DMFTindex as the standard measurement of caries prevalence. WHO defined the acceptable dental health level in terms of average decayed, missing and filled teeth index (DMFT) for adults in different age groups. These were: 4 DMFT at age 18 years, 6 DMFT for age 35-44 years and 12 DMFT for age 65 plus years.[6] World Health Organization and Federation Dentaire International (FDI) established goals to achieve 50% of children aged 5-6 years to be caries free and global average of DMFT not to be >3 for 12-year-old children.[7] However, even after 14 years, the proportion of caries free children is far less and DMFT score in 12-year-old children is much greater than WHO and FDI stated goals, which were to be achieved by 2000. Similarly, according to WHO's basic global indicator of oral health 2000, DMFT >6.6 for the children aged 12 years is considered very high, between 4.5-6.5 is high and 2.7-4.4 is moderate.[8]

In the Kingdom of Saudi Arabia high caries prevalence is seen across all age groups. Keeping WHO guidelines in mind, it can be clearly seen that children in Saudi Arabia have moderate to very high DMFT estimates. The situation is particularly alarming because high burden of caries not only can cause economic and social hazards but it can negatively affect growth, development and learning in the children. It is to be highlighted here that most of these studies have been done in the school going population and there is dearth of studies among adult population.[9] Since oral health has great impact on the general health of the people and since public health programmes needs funding from governmental agencies, evidence based management protocols should be drawn out on the basis of well conducted researches and surveys, both in children and adult population.

This particular DMFT based study was designed to help us understand the prevalence of dental caries among the local population. DMFT survey would help co-relate the variables and devise an evidenced based protocol for managing the caries among the local population.

METHODOLOGY

This prospective cross sectional descriptive study was conducted in College of Dentistry, Aljouf University, Saudi Arabia. A total of 576 patients reported to the out patient department of the college during the period from February 2014 to September 2014were recruited into the study utilizing convenient sampling.

The sample size was calculated with estimated true proportion 0.5 at 0.95 confidence interval with desired precision of 0.05 at population size of 200000 subjects. An informed consent was taken from each participant. The approval of the ethical committee of the college was obtained prior to the start of the study.

The inclusion criteria were healthy patients above the age of 16 years and with a minimum of 16 natural teeth present. Patients with systemic disease and early status of caries that could not be diagnosed positively were excluded. Third molar was also not included in the present study. The patients were divided into four age groups, 16-25 years, 26-35 years, 36-45 years, 46 years and above. After taking the demographic information, oral hygiene status was evaluated utilizing Simplified Oral Hygiene Index (OHI-S). Interpretation of index was: good = 0 to 1.2, fair =1.3 to 3.0, and poor =3.1 to 6.0.10.

Brushing frequency, sweet intake and whether the patients know caries or not were also recorded. The patients were examined in a dental chair using chair light, mouth mirror, and blunt probe. The WHO 1997 criteria for caries diagnosis were used to diagnose and record DMFT index. The data collected from the participants were transferred to the computer and analyzed by using the SPSS 17 version (SPSS Inc, Chicago, IL, USA). P value ≤ 0.05 was considered significant.

Collaboration of the Authors

The study "Frequency of Dental Caries and associated risk factors" was designed by Dr Iftikhar Akbar. The research was carried out at college of dentistry, Aljouf University, Saudi Arabia to find out the frequency of caries in that area by Dr M Nadeem Baig assistant professor in community dentistry with the final year Students and two demonstrators. The students and demonstrators collected the data from patients who came to the outpatient department of the college. The methodology was written by the demonstrators. Dr Nadeem Baig did the analysis and interpretation of the data being community dentistry teacher. The collaboration was done through email. The statistical analysis and methodology was sent through email to Dr Iftikhar and Dr Beenish. Dr Iftikhar wrote the introduction and discussion of the study. Dr Beenish compiled the results which were received through email after completing statistical analysis by using SPSS 17 version. Draft and final version of the article was completed by Dr Iftikhar. All the authors did the proof reading of the article.

RESULTS

Five hundred and seventy-six patients were examined. The prevalence of dental caries was 94%. The age of the participants ranged from 16 to 60 years with the

TABLE 1: MEAN OF DMFT AND ITS COMPONENTS BY GENDER

Gender	Number examined (%)	Mean ± SD			
		D	M	F	DMFT
Males	376 (65)	4.63 ± 3.2	0.75 ± 1.4	1.33 ± 1.8	6.66 ± 3.6
Females	200 (35)	4.09 ± 2.8	0.88 ± 2.0	1.51 ±2.1	6.42 ± 4.0
Total	576 (100)	4.44 ± 3.1	0.79 ± 1.6	1.39 ± 1.9	6.58 ± 3.7

The difference in the mean of DMFT component in relation to gender was statistically significant (p = 0.01)

TABLE 2: MEAN OF DMFT AND ITS COMPONENTS BY AGE GROUP

Age groups	Number examined (%)	Mean ± SD			
		D	M	F	DMFT
16-25 years	255 (44.3)	4.53 ± 3.3	0.61 ± 1.3	1.33 ± 1.7	6.40 ± 3.8
26-35 years	171 (29.7)	4.26 ± 2.7	0.74 ± 1.3	1.35 ± 1.9	6.29 ± 3.4
36-45 years	105 (18.2)	4.44 ± 2.9	1.12 ± 1.9	1.33 ± 2.1	6.87 ± 3.4
46 years and above	45 (7.8)	4.64 ± 3.4	1.31 ± 2.9	2.09 ± 2.6	8.04 ± 4.8
Total	576 (100)	4.44 ± 3.1	0.79 ± 1.6	1. 39 ± 1.9	6.58 ± 3.7

Difference in the mean of M and DMFT components in relation to age groups was statistically significant (p = 0.00 and 0.02 respectively).

TABLE 3: DISTRIBUTION OF CARIOUS TEETH BY TOOTH TYPE

Location	Tooth type			Total (%)
	Molars (%)	Premolars (%)	Anterior (%)	
Maxilla	743 (29)	305 (11.9)	185 (7.2)	1233 (48.1)
Mandibular	1026 (40)	247 (9.6)	57 (2.3)	1330 (51.9)
Total (%)	1769 (69)	552(21.5)	242 (9.5)	2563 (100)

mean age 30.39±9.88 years, while most of the patients falling in the age group of 16 to 25 years (44%). Males accounted for 376 (65%) and females for 200 (35%).

The DMFT of the sample ranged from 1 to 28. Table 1 and 2 presents the mean DMFT with regard to gender and age groups. The mean DMFT was 6.58 ± 3.7. The mean of D component was 4.44 ± 3.1, while M component was 0.79 ± 1.6and that of F component being 1.39 ± 1.9.

An insignificant difference among the mean D, F and M of males and females was found utilizing Independent sample t-test (p =0.09, 0.08, 0.22 respectively), while the mean DMFT component was statistically significant (p = 0.01). The difference in the mean of D and F components by age group were statistically insignificant (p = 0.96 and 0.10), however the mean difference of M and DMFT components were statistically significant (p = 0.00 and 0.02).

The distribution of the DMFT components showed that the D score was the major component and it was higher in males compared to females. Regarding age groups, decay was highest in age group 46 years and above. Table 3 summarizes the prevalence of dental caries with regard to tooth type. The molars were the most affected teeth by dental caries (69%), followed by premolars (21.5%) and anterior teeth (9.4%).

Regarding oral health, 55% had poor oral hygiene, 25% had fair while only 20% of the patients had good oral hygiene. Frequent sweet intake was associated with young boys and low socioeconomic status. Thirty five percent of the subjects reported tooth brushing once a day, 20% two times a day, 24% occasionally and 21% had never used tooth brush. 35% of the adult patients had knowledge about the dental caries while 75% were unaware of the caries.

DISCUSSION

Oral health is regarded as an evidence of health of a human being.[11] In developed world oral health has been improved to a large extent. However in countries such as Saudi Arabia, oral health has been a huge cause for concern and dental caries has been on top of the agenda in this regard. There has been no research made on this important topic in Aljouf region.

The current research has found less awareness regarding dental caries on part of patients in Saudi

Arabia, making people more prone to developing caries. The countries with lowest caries level were the Netherlands in 1992-1993, with a DMFT of 0.9, and Finland in 1991 with a DMFT of 1.2. In Ireland caries has continued to decline with mean DMFT 2.4 in 1984 to 1.2 in 1997-1998.

Similar changes have been reported for United States, Canada and Australia. The two countries with high DMFT were Latvia with a mean DMFT 7.7 in 1992 and Poland with a mean DMFT 5.1 in 1991. More recent data indicate a reduction in caries level in these two countries to 4.0 and 3.8 DMFT respectively. Studies in China, India, Pakistan, Central America, South America and Mexico all indicate declining caries levels. In many instances the changes in caries level has been attributed to the use of fluorides in tooth paste, water or salt.[12]

The mean DMFT in the present study was found to be 6.58±3.7, which was higher compared to the studies done in India, Tanzania[13] and Kenya[14] where mean DMFT were reported to be 5.1, 4.67 and 3.4 respectively. However it was lower than the study published in Turkey (11.4). The mean DMFT increased with age in the current study and it was in agreement with the previous published research in Turkey, China and Tanzania.[15,16,17]

The present study showed that there is fluctuation in D component while M component increased with age. Present results were similar to the previous studies as far as M values were concerned while there was contradiction regarding D component.[13,15] These studies stated that an decrease in D component with age can be attributed to the fact that dental caries development is due to consumption of food rich in carbohydrates which is popular among the teenagers, however the increase in D component in present study could be due to the varying trends of oral hygiene habits and high sugar consumption among the aged Saudi population. The increased in M component might be explained due to the fact that dental caries is a cumulative process and with aging the untreated caries is likely to be more in older individuals which leads to tooth extraction. Another assumption might be that old individuals have higher pain threshold 18 and visit hospital when dental caries will be at an advanced stage ending up with tooth extraction.

The current study found that the molars were the most affected teeth by dental caries. Similar findings were found by previous studies in Uganda[19], Zambia[20], Nigeria[21] and Tanzania.[22] The probable explanation could be anatomy and time of eruption of the molar teeth make them more prone to dental caries. The mandibular molar teeth were more affected by caries compared to maxillary molars. The same results were reported by another study.[23] The presence of deep pits and fissures, lack of flushing action of saliva and difficult to brush them make the lower molars susceptible to dental caries. Mandibular anterior teeth were the least affected by dental caries, and this might be due to constantly flushing action of saliva and tongue.

Present study showed caries prevalence of 94%, compared with 95.1% from Indonesia, 90% from Norway, 85% from Turkey and 84% from Austria.[24] There were some inherent limitations of the study. The present study recruited adult patients, who attended college of dentistry, Aljouf University and this does not reflect actual occurrence of dental caries in the community. Second the sample size was not large enough to be true representative of the community. Third the age range of the study population was quite large with relatively few patients in same age subgroups and this was based on the fact that this was a college based study.

The present study shed light on the dental health of adult population in most of the Aljouf region and thus laying a foundation for the health policy makers and government to design preventive strategies and treatment programmes for dental diseases, so as to improve the living standard of the people through quality dental services.

CONCLUSION

The findings showed that dental caries in Aljouf region is high. The caries observed more in younger (16-25 years) age group. There is high D component and low F component of DMFT mainly due to lack and to some extent low utilization of restorative dental services. The effect of caries on individuals and communities as a result of suffering and pain, reduced quality of life and increased economic burden is considerable.

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