

Dental Caries and the Influence of Associated Factors: A Cross-Sectional Study

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Received: May 2020

Accepted: May 2020

ABSTRACT

Background: The study was planned to assess the prevalence of dental caries among the suburban and urban population in Pakistan. The objective of the study was to evaluate the association of dental caries with oral hygiene status, socioeconomic status and dental service availability. **Methods:** Cross-sectional descriptive study. A total of 200 patients were included in the study. Decayed, filled, and missing teeth (DMFT), oral hygiene status, SES, and presence/absence of dental care facility were recorded. A specially prepared proforma was used to record all the data regarding oral hygiene practices, socioeconomic background, and dental treatment availability for the study. **Results:** Comparison of mean D, M and F status revealed a high tendency towards decayed teeth. Mean DMFT score was found to be 4.41. Maximum DMFT was recorded among 50 years and above age group, followed closely (2.39) by 40-49 years. Increased caries prevalence was seen in people with poor oral hygiene and belonging to low socioeconomic status. Caries rate was also high in areas with a lack of dental care facilities. **Conclusion:** Oral hygiene practices, dietary habits and access to dental care services played an important role in the prevalence of dental caries. It was observed that socioeconomic status plays a significant role in access to dental care facilities.

Keywords: Dental caries, SES, Oral Hygiene, Dental care facility, DMFT.

INTRODUCTION

Dental caries, the most common oral disease, shows a striking difference in its distribution all over the world. The global distribution of dental caries presents a varied picture.^[1] In several industrialized countries, a reduction of dental caries incidence and improvement of gingival health care are evident because of the preventive measures undertaken. In developing countries, migration of people from rural areas and urbanization causes a change in lifestyle and dietary habits, which in turn affects oral health. The scenario in Pakistan also shows a similar increase in prevalence with other developing countries. Many surveys regarding oral health have revealed increasing trends in dental caries prevalence among children and adults.^[2] Socioeconomic status, low education status of parents and parental attitude has an impact on the establishment of oral health habits in children. There has been a global change in prevalence, severity, distribution and pattern of dental caries.^[3] Most of the twentieth century, caries was seen as a disease of the economically developed countries, with low prevalence in developing countries.^[4] There are several interrelated reasons for this

pattern. The most obvious is diet. High consumption of refined carbohydrates in economically developed countries led to the selective proliferation of cariogenic bacteria and the consequent rise in the prevalence of dental caries in those countries.^[5] In the eighties, the prevalence in most western countries had steadily declined while at the same time, the prevalence of dental caries in lesser developed countries was on the rise.^[6] The relationship between increased industrialization, urbanization, consumerism, consumption of refined carbohydrates and dental caries has been suggested in many studies.^{3,4,7,8}

DMFT:

For measuring the severity of caries DMFT index is used: "Decay-missing-filled-tooth".^[3] It is almost universally employed index for measuring dental caries, this index is based on the fact that dental hard tissues are not self-healing, established caries leave a scar of some sort, the tooth either remain decayed or if treated it is extracted or filled.^[3] This is the method of choice for the World Health Organization in its basic survey technique and is applied to all teeth.

Calculation of Index:^[3]

- 1) Individual DMFT:
Total each component i-e D, M and F separately, then total D+M+F= DMFT
- 2) Group Average:
Total D, M, F for each individual, the divide the total DMF by a number of individuals in the group

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i.e average DMFT= total DMFT / total no. of subjects examined.

Oral hygiene status:

The Community Periodontal Index (CPI) for measurement of oral hygiene status was introduced by WHO to provide profiles of periodontal health status in countries and to enable countries to plan intervention programs for effective control of the periodontal disease.^[9,10] In addition, the CPI data might be helpful in the surveillance of oral health at the country and international levels. Although this index is the mean of assessing the extent and severity of the periodontal disease,^[11] it has been widely used for descriptive periodontal epidemiologic studies and needs assessment in developed and developing countries.

CPI scores:

Score 0 = healthy periodontal conditions;
Score 1 = gingival bleeding;
Score 2 = gingival bleeding and calculus;
Score 3 = shallow periodontal pockets (4 to 5 mm);
Score 4 = deep periodontal pockets (.... 6 mm).

The most severe score or sign of periodontal disease (CPI score 4) varies worldwide from 10% to 15% in adult populations; however, the most prevalent score in all regions is CPI score 2 (gingival bleeding and calculus), which primarily reflects poor oral hygiene.^[9,10] Considerable differences in the occurrence of periodontal disease are found by urbanization. The impact of socio-environmental factors was suggestive of distinct profiles of periodontal diseases observed in populations living in certain geographic regions.^[12]

The Community Periodontal Index (CPI) had been used as follows:^[13]

Good oral hygiene = score 1
Average oral hygiene = score 2
Poor oral hygiene = score 3

Socioeconomic status (SES):

There were various options for defining socioeconomic groups. One of them consisted of using per capita GNP to form groups, so that internal homogeneity is maximized.^[14]

The methodological option had been to use measures of the effect or impact of socioeconomic status on health. Measures of effect are based on fixed categories of the socioeconomic variable (e.g., primary schooling versus university education). Measures of impact, in contrast, use categories defined by a socioeconomic indicator quantifiable in population terms (e.g., highest income quintile versus lowest income quintile), so that if the distribution of the indicator varies, the measurement of inequality also got modified.^[15]

Low SES: monthly earning of < Rs.6000
High SES: monthly earning of > Rs.50,000

Middle SES: monthly earning between Rs.6000-50,000

Presence of dental care:

The aims were to estimate dental treatment needs and to relate a number of background factors such as, the number of dental services available, socioeconomic factors, and education level in seeking dental treatment needs.

MATERIALS AND METHODS

This study was carried out in the Department of Operative Dentistry, UCD, Lahore. The duration of the study was one year, from 27th January 2016 to 27th January 2017. About 200 patients were included. Non-probability purposive sampling technique was used. To avoid inter-examiner variability, all the patients were seen by a single examiner. The patients were examined by using mouth mirror, explorer and CPITN probe. The WHO oral health assessment form 5 (1997) was used for recording dentition status. A specially prepared proforma was used to record all the data regarding oral hygiene practices, socioeconomic background, and dental treatment availability. The data obtained were statistically analyzed using SPSS version 15 software. Chi-square is used to test the association between categorical variables. ANOVA to test the difference in DMFT scores of various age groups, the level of significance is considered 0.05. The student T-test is applied to test the difference in DMFT scores in both sexes.

RESULTS

Comparison of mean D, M and F status revealed a high tendency towards decayed teeth 2.45, while 1.25 were missing and only 0.71 were filled in the sample. Mean DMFT score was found to be 4.41. Mean DMFT was high (2.95) among 50 years and above age group, followed closely (2.39) by 40-49 years. Patients less than 20 years of age had high DMFT (2.00). However, patients of 20-29 and 30-39 age group showed an almost similar trend of (1.95) and (1.97), respectively. In females, DMFT was found to be (1.97) as compared to males (1.95), it showed a trend towards slightly higher in females, as compared to males. High DMFT (1.98) was found in patients belonging to low SES. There was also a raised trend (1.93) in patients with middle SES as compared to (1.91) of high SES. Results were statistically significant (p-value <0.01) in showing predominant DMFT (1.99) in people with poor oral hygiene as compared to average (1.97) and good oral hygiene (1.74). The absence of facilities denoted an increased DMFT (1.98) as compared to the presence of facilities (1.93). The result was statistically significant (p-value 0.04).

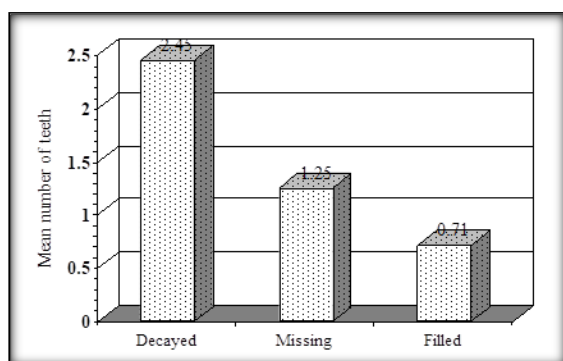


Figure 1: Comparison of Mean number of Decayed, Missing and Filled Teeth with each other

Table 1: Comparison of Mean DMFT score with respect to Age groups

Age of patients	(n)	Mean	Std. Dev.	F-value	p-value
< 20 Years	42	2.00	0.297	1.732	0.14
20-29 Years	79	1.95	0.221		
30 - 39 Years	41	1.95	0.120		
40 - 49 Years	27	2.39	0.230		
50 and above	11	2.95	0.110		

Table 2: Comparison of Mean DMFT score with respect to Gender

Sex of Patient	(n)	Mean	Std. Dev.	t-value	p-value
Male	80	1.95	0.219	0.344	0.56
Female	120	1.97	0.180		

Table 3: Comparison of Mean DMFT with respect to Socioeconomic Status

Socioeconomic Status	(n)	Mean	Std. Dev.	F-value	p-value
High	11	1.91	0.302	2.184	0.115
Middle	69	1.93	0.261		
Low	120	1.98	0.129		

Table 4: Comparison of Mean DMFT with respect to Oral Hygiene Status

Oral Hygiene Status	(n)	Mean	Std. Dev.	F-value	p-value
Good	19	1.74	0.452	15.736	< 0.01
Average	76	1.97	0.161		
Poor	105	1.99	0.098		

Table 5: Comparison of Mean DMFT with respect to Dental Care Facilities

Availability of Dental Care Facility	(n)	Mean	Std. Dev.	t-value	p-value
Yes	81	1.93	0.264	4.16	0.04
No	119	1.98	0.129		

DISCUSSION

Oral health has progressed remarkably in most developed countries due to various rapid advances in the field of preventive dentistry. In developing countries and especially in the underprivileged group's oral diseases are on the increase. This can

be due to limited access to dental care, technology and vocational qualification. This study attempted to find the prevalence of caries and the possible association between various factors that can affect the caries status of the population. The Health Survey of Pakistan took place in 1991-94.^[16] The survey looked at the dental health of adults and only took note of decayed and missing teeth. According to that survey, the DM score for 15-24-year-olds was 2 but this score went up to 21 in 65 year age group.^[14,9] The available data on dental caries prevalence in Pakistan showed that Pakistan could be classified as a low caries country. 50% of the children between the ages of 12-15 years were caries-free, but on the negative side 97% of all carious lesions were untreated.^[17,18] In this study results were similar to the previously reported data. Decayed teeth were predominant with Mean DT score (2.45), while the Mean MT score for missing teeth was (1.25) and the filled component MF score was (0.71). The negligence and total lack of treatment were apparent in all age groups, especially in 30 years and above population. This finding also connects with the lack of dental care facilities, especially for people in the low-income group.

Comparison of Mean DMFT with an age of the patient showed patients within the age range of 50 and above years made the most prominent group being affected by caries with a mean DMFT score (2.95). Another striking finding was increased mean DMFT score (2.39) among patients age 40 years and above. This finding is similar to other studies in which the need for dental treatment was greatest among adults aged 25-54 years.^[19,20] Its been anticipated that needs increase with population growth as the teeth are retained longer. The barriers mentioned were the cost of treatment, fear of the dentist, immobility and the feeling that they should not bother the dentist.^[20]

Patients between 30-39 years showed mean DMFT (1.97), a slightly low score as compared to above age groups. All these findings are consistent in showing a high score of decayed and missing teeth as compared to filling.^[21-23] Patients less than 20 years of age showed a high mean DMFT score (2.00), while Patients of 20-29 years age group showed mean DMFT score of (1.95), So generally in young patients and young adults DMFT score was found to be high.^[5,24]

The recent most pathfinder survey was done in 2004.^[25] According to this survey the DMFT scores for 12-year-old, 15-year-old, 35-44 year old and 65 years old were 1.38, 1.94, 8.02 and 17.73 respectively.^[25] Our results were pretty the same with high mean DMFT scores in adults and the elderly population as compared to young and young adults.^[16,25] Another interesting finding was that the female group had a higher level of caries with mean DMFT score (1.97) as compared to

males (1.95). These results are consistent with the studies done in America and Europe, but the studies done in India narrate that males have a higher DMFT score.^[22,23] This difference has been attributed to the earlier eruption of teeth in females, 26, but this explanation is hard to support when the differences are seen in older age groups. As mentioned earlier, it's hard to say anything on this difference of results from the rest of the world, as more surveys and understanding of this disease pattern is required in our population. In this study, 200 patients were examined, taken randomly. Results of this study showed 60% of the patient seeking treatment for dental caries belonged to the lower class, while 34.5% belonged to the middle and only 5.5% belonged to the upper class. This shows a high trend of caries towards lower socioeconomic status.^[27-31]

The mean DMFT score in the low socioeconomic group was (1.98). In middle SES it was (1.93), while in high socioeconomic status it was (1.91). People from the low socioeconomic group had slightly high DMFT scores as compared to others. These results showed a trend towards studies in which no significant difference was found between social classes and the effect of diet on caries prevalence.^[23,5,19] In this study patients with poor oral hygiene had a greater mean DMFT score of (1.99), followed very closely by average oral hygiene group (1.97). The good oral hygiene group had a (1.74) score. These results were similar to those reported in other studies.^[32,34,35]

Results showed a higher mean DMFT (1.98) in patients who did not have had any dental care facilities as compared to other groups in which the mean DMFT was (1.93). Results were statistically significant and showed an increased need of dental care facilities. Apart from that, it also showed a lack of awareness and negligence on the part of the patient for seeking dental treatment.^[19,20,35]

CONCLUSION

Within its limitations, this study provides valuable information on the caries prevalence and associated risk factors in the population. Oral hygiene practices, dietary habits and access to dental care services played an important role in the prevalence of dental caries. It was observed that the socioeconomic status, parent's educational status and mass media influenced oral health but without a significant contribution. People belonging to low SES do not get sufficient information on oral health-related diseases and methods of their prevention. All these findings are consistent in showing a high score of decayed and missing teeth as compared to filling. It suggests an imminent need for dental care facilities, especially in the underprivileged population.

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How to cite this article: Ehsan A, Afridi JI, Abid H, Yusuf M. Dental Caries and the Influence of Associated Factors: A Cross-Sectional Study. *Ann. Int. Med. Den. Res.* 2020; 6(4):DE18-DE22.

Source of Support: Nil, **Conflict of Interest:** None declared