Original Article

Factors Related to Dental Caries among the Patients Attending at the Outpatient Department (OPD) of Dhaka Dental College and Hospital

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Abstract

Dental caries is one of the most common health problem in the dental practices in both developed and developing countries including Bangladesh. The overall influence of dental caries on the general health of the community is harmful. The main objective of the study was to assess the factors related to dental caries among the patients attending at the Outpatient Department (OPD) of Dhaka Dental College and Hospital. The study was carried out during the month of January to June, 2002. Data were collected by the researcher himself with a pretested structured interview schedule from 167 patients selected by systematic random sampling procedure.

The study showed that (29.3%) patients were in the age group of 21-30 years. Their mean age was 30.04 years, SD was ±14.60 and age range was 12-72 years. Among the patients, 55.1% were males and 44.9% were females. 76.6% patients were Muslims, 15.6% were Hindus, and only 7.8% were Christians. Regarding the educational level, the maximum (63%) were below HSC education level, only 37% were HSC and above. The patients having more than four affected teeth, maximum (34.3%) were from illiterate mothers. Patients having mother's education HSC and above were nil in this group. The rates of dental caries were high among those who consumed excess sweets and who did not maintain oral hygiene adequately. Majority of the patients knew how dental caries occur and maximum of them thought that dental caries is a preventable disease.

The above study showed that no age and sex is without problem. The ignorance, illiteracy, low family income, inadequate practice of oral hygiene, consumption of excess sweets etc. are the major contributory factors for the occurrence of dental caries.

As dental caries is a multifactorial preventable disease, proper preventative measures including health education programme should be intensified to minimize the disease. Further study is also needed to assess the status of the problem and to find out the factors related to the disease.

Key words: *Factors of Dental Caries, Outpatient Department (OPD).*

Introduction

Tooth is one of the most important parts of oral cavity, which not only increases the beauty of the face but also helps in digesting food. It enables us to articulate and pronounce words correctly. David (1983) wrote, "A healthy tooth is a living part of the body. It is connected by lifelines of blood and nerve to a person's head and brain. To separate the tooth from the body or even to interrupt those lifelines means death of the tooth. It also means pain and injury to the body of the person". A sound tooth is important like other human organ[1].

The most important dental disease responsible for serious consequences to human being is dental caries. According to definition of WHO 'dental caries' is a "Localized post eruptive pathological process of external origin involving softening of the hard tooth tissue and proceeding to the formation of a cavity. Acids are produced at or near the surface of the tooth by bacterial fermentation of dietary carbohydrates particularly sugar, and that these acids dissolve the calcium phosphate crystals which make up over 95.0% of the mass enamel in the tooth. Dental caries develops in the presence of four interacting variables - cryogenic bacteria, bacterial substrate, susceptible tooth surface and time for the process to develop.

Some contributory factors responsible for the development of dental caries are -age, sex, dietary factors, oral hygiene, fluoride in food, water and socio-economic factors etc.[2]

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There is no nation free from dental caries. The prevalence of the disease varies from country to country. In the USA the prevalence of dental caries was found to vary from 20.0% to 80.0% depending upon different age group. While in Zambia about 37.3% of the children had dental caries. In our country dental caries is a common problem. The prevalence of dental caries is most common in childhood, but it may occur at any age depending upon the various causative factors of dental caries. A study showed that about 74.7% of children less than 12 years were affected by dental caries and 55.5% people aged between 23-40 years suffered from dental caries. About 88.0% in the age group 13-22 years had missed one or more teeth by dental caries or by its complications[3].

Prevalence of dental caries is taking a changing pattern for the last few years. Previously caries had been expressed to be a disease of rich and more privileged individual or group of the society. In recent years this pattern is changing. Prevalence and intensity of dental caries is now diminishing in developed regions of the world but is increasing in developing countries like Bangladesh. In industrialized counties caries declined about 40.0% in the last 10 years[4,5].

Though exact cause of dental caries is not known, but a strong association is found with some factors. Among the factors practice of oro-dental hygiene needs special attention. Cleaning of teeth with respect to its frequency, timing with consumption of food and material used for cleaning has special importance with regard to caries. Some types of food is claimed to have contributory effect in formation of caries. Sweetened and sticky food such as chocolate, toffees may act as substrate of cryogenic bacteria for production of acid. Some habits like chewing betel nut along with 'pan' may also contribute in producing caries. Once caries occurs the original teeth with its vigor and beauty cannot be found back. The formation of caries may be controlled through proper oro-dental hygiene practice and avoiding some contributory factors.

Materials and Methods

This was a hospital based cross sectional study. Considering the availability of expected number of patients, Dhaka Dental College Hospital was selected purposively as the site of data collection; Data were collected from conservative OPD where only carious patients are managed. The carious patients above 12 years age who have only the secondary teeth were the study population. The total study period was six months commencing from January to June 2002.

After taking written consent data were collected by the researcher himself with a pretested questionnaire (interview schedule) with Bangla version. Face to face interview and examination were done.

Sample size was calculated based on the statistical formula and it was 167. The subjects were selected by systematic random sampling procedure. Findings were analyzed by using Statistical Package for Social Science (SPSS).

Results and Observations

Table 1 - Distribution of the patients by age.

Age (in years)	Frequency	Percentage
<20	34	20.4
21-30	49	29.3
31-40	38	22.7
41-50	22	13.2
51-60	14	8.4
>60	10	6.0
Total	167	100.0

Mean=34.04±14.60, Median=32.00, Mode = 25

Table 1 shows that the minimum age was 12 years and the maximum 72 years. The maximum patients were in the age group 21-30 years than with increasing age, attendance decreased gradually. Only 6.5% patients were in the age group more than 60 years. The mean age was 30.04±14.60 years.

Table 2 - Association of the patients by number of affected teeth and monthly income of the family. (n=167)

Monthly family income	Number of affected teeth: One	Two	Three	Four	> Four	**Total**	**Test of Significance**
1000-5000	05	05	11	05	20	46	χ^2= 19.88
%	13.5	11.4	47.8	15.2	66.7	27.5	P value =.0005 Significant
5001-10000	15	24	07	18	05	69	χ^2= 13.16
%	40.6	54.5	30.5	54.5	16.6	41.4	P value =.0105 Insignificant
>10000	17	15	05	10	05	52	χ^2= 12.63
%	45.9	34.1	21.7	30.3	16.7	31.1	P value =.0132 Insignificant
Total	**37**	**44**	**23**	**33**	**30**	**167**	
%	**100**	**100**	**100**	**100**	**100**	**100**	

Table 2 shows that 66.7% patients from the family income 1000-5000 Taka were affected by more than four teeth. Whereas the rest of 33.3% were affected in this group from the family income above 5001 Taka.

Table 3 - Distribution of the patients according to frequency of daily tooth cleaning habits (n=167)

Frequency of tooth cleaning	Frequency	Percentage
Once	70	41.9
Twice	66	39.5
Thrice	17	10.2
>Thrice	09	5.4
Don't Clean	05	3.0
Total	**167**	**100.0**

Table 3 shows the distribution of the patients according to frequency of daily tooth cleaning habits, among the 167 patients 70(41.9%) cleaned their teeth once daily and only 5(3%) patients did not brush their teeth.

Table 4 - Association of the patients by educational status and number of affected teeth (n=167)

Educational Status	Number of affected teeth group						
	Up to Two Teeth		Above Two Teeth		Total		Test of Significance
	No.	%	No.	%	No.	%	χ^2= 21.35, df = I
Below HSC	22	27	54	63	76	100.0	P value = 0.000
Above HSC	59	73	32	37	91	100.0	(<0.001)
							Significant
Total	**81**	**100**	**86**	**100**	**167**	**100.0**	

Table 4 shows that among up to two teeth affected patients, maximum (73%) had educational level HSC and above, only 27% were below HSC whereas in more than two teeth affected patients maximum (63%) were below HSC, only 37% were HSC and above. The educational status and affected teeth is significantly associated (p<0.001).

Table 5 – Association between the number of affected teeth and type of food taken in between two main meals (n=139)

Type of food taken in between two main meal	Number of affected teeth						Test of Significance
	One	Two	Three	Four	> Four	Total	
Biscuits	18	20	10	19	15	82	χ^2= 4.50
%	62.1	58.8	52.6	63.3	55.6	59.0	P value =.3416
							Insignificant
Sweets	01	08	03	06	10	28	χ^2=9.89
%	3.4	23.5	15.8	20.0	37.0	20.1	P value =.0421
							Insignificant
Chocolate/ Chewin gum	08	05	05	05	02	25	χ^2= 3.37
%	27.6	14.8	26.3	16.7	7.4	18.0	P value =.4431
							Insignificant
Others	02	01	01	00	00	04	χ^2= 3.52
%	6.9	2.9	5.3	00	00	2.9	P value =.4748
							Insignificant
Total	**29**	**34**	**19**	**30**	**27**	**139**	
%	**100**	**100**	**100**	**100**	**100**	**100**	

Table 5 shows the association between the number of affected teeth and type of food taken in between two main meals. Among one tooth affected group, 18(62.1%) were biscuit consumers, 1(3.4%) were sweets consumers, 8(27.6%) were chocolate or chewing gum consumers. Among more than four teeth affected group 15(55.6%) were biscuits consumers. 10(37.0%) were sweets, 2(7.4%) were chocolate or chewing gum consumers.

Table 6 - Association of the patients by frequency of cleaning teeth and number of affected teeth (n=167)

Number of affected teeth	Frequency of cleaning teeth						Test of Significance
	Once	Twice	Thrice	>Thrice	Don't Brush	Total	
One	5	22	09	00	01	37	χ^2= 44.85
%	7.1	33.3	52.9	00	20.0	22.2	P value =.000001
							Significant
Two	13	26	00	03	02	44	χ^2=56.47
%	18.6	39.4	00	33.3	40.0	26.3	P value =.000001
							Significant
Three	14	05	03	01	00	23	χ^2= 27.98
%	20.0	7.6	17.6	11.1	00	13.8	P value =.000013
							Significant
Four	23	10	00	00	00	33	χ^2= 64.86
%	32.9	15.2	00	00	00	19.7	P value =.000001
							Significant
>Four	15	3	05	05	02	30	χ^2= 18.67
%	21.4	4.5	29.5	55.6	40.0	18.0	P value =.000912
							Significant
Total	70	66	17	09	05	167	
%	100	100	100	100	100	100	

Table 6 shows the association of the patients by frequency of cleaning teeth and number of affected teeth. In this study 7.1% patients were affected by one tooth and (21.4%) were affected by more than four teeth who brushed once daily, whereas 33% patients were affected by one tooth and only 4.5% patients were affected by more than four teeth who brushed twice daily.

Table 7 - Association of the patients by brushing instrument and material and number affected teeth (n=162)

Number of affected teeth	Material and instrument						Test of Significance
	Tooth brush & tooth Paste	Tooth brush & tooth powder	Finger & charcoal	Finger & tooth powder	Meswak	Total	
One	31	04	1	1	0	37	χ^2=99.85
%	30.7	20.0	5.3	7.1	0	22.8	P value =.000001
							Significant
Two	30	07	1	1	0	44	χ^2=87.11
%	29.7	35.0	5.3	7.1	0	27.2	P value =.000001
							Significant
Three	13	01	5	01	0	22	χ^2=29.73
%	12.9	5.0	26.2	7.1	0	13.6	P value =.000001
							Significant
Four	18	05	4	06	05	33	χ^2=18.94
%	17.8	25.0	21.1	42.9	62.5	20.4	P value =.000807
							Significant
>Four	09	03	08	05	03	26	χ^2=5.77
%	8.9	15.0	42.1	35.8	37.5	16.0	P value =.2169
							Significant
Total	**101**	**20**	**19**	**14**	**8**	**162**	
%	**100**	**100**	**100**	**100**	**100**	**100**	

Table 7 shows the association of the patients by brushing instrument and material and number affected teeth. among the tooth brush and tooth paste user about 30% were affected by one tooth and 8.9% were affected by more than four teeth, whereas among the finger and charcoal users, only 5.3% were affected by single (one) tooth and 42.1% were affected by more than four teeth.

Discussion

Frequency of tooth brushing has a great impact on the causation of dental caries. In this study about 7.1% patients were affected by one tooth and (21.4%) patients were affected by more than four teeth who brushed once daily, whereas 33% patients were affected by one tooth and only 4.5% respondents affected by more than four teeth who brush twice daily. This indicates that those who brushed twice daily are less sufferers than those who brush once daily. This gives the similar finding with the study by Kaimenyi *et al*[6] (1993)

Among the up to two teeth affected patients, maximum (73%) had educational level HSC and above, only 27% were below HSC whereas in more than two teeth affected patients maximum (63%) were below HSC, only 37% were HSC and above. This difference indicates that educational status has influence on the dental caries. Haque[7] (1996) in his study also showed that educated people are less suffers by dental caries.

Family monthly income has influence on dental caries, with the increase of family income there is decrease in the occurrence of dental caries. In this study it was found that 66.7% patients from the family income 1000-5000 Taka, were affected by more than four teeth. Whereas 33.3% were affected in this group from the family income above 5001 Taka. This gives similar result with the study of Bhuiyan4 (1988-1989) and Shahidullah[8] (1997)

In this study among the tooth brush and tooth paste user about 30% were affected by one tooth and 8.9% were affected by more than four teeth, whereas among the finger and charcoal users only 5.3% were affected by single (one) tooth and 42.1% were affected by more than four teeth. It was observed that the patients who used finger and charcoal as a tooth cleaning device are more sufferers than those who used tooth brush and tooth paste. These findings are in conformity with the study of Joarder[9] (1995).

Consumption of excess sweets is an important factor for dental caries. In this study 33% patients consumed more sweets and 67% did not.

Among them about 9.10% had single tooth affected, 27.30% had two teeth affected, 16.40% had three teeth affected, 20.0% had four teeth affected and 27.30% had more than four teeth affected.

In this study among the tooth brush and tooth paste user about 30% were affected by one tooth and 8.9% were affected by more than four teeth, whereas among the finger and charcoal users only 5.3% were affected by single (one) tooth and 42.1% were affected by more than four teeth. It was observed that the patients who used finger and charcoal as a tooth cleaning device are more sufferers than those who used tooth brush and tooth paste. These findings are in conformity with the study of Joarder[9] (1995).

Consumption of excess sweets is an important factor for dental caries. In this study 33% patients consumed more sweets and 67% did not. Among them about 9.10% had single tooth affected, 27.30% had two teeth affected, 16.40% had three teeth affected, 20.0% had four teeth affected and 27.30% had more than four teeth affected. Whereas among the patients who did not consume more sweet, 28.60% were affected by single teeth, 25.90% had two teeth affected, 12.50% had three teeth affected, 19.60% had four teeth affected and only 13.40% had more than four teeth affected. This shows that patients who took more sweets are more suffers by dental caries. This gives similar result with the study of Tinanaff[11] (2000) and with the study by Rashid A[10] (1993-94).

In this study 81 patients had lost one or more teeth by caries or by it complications. Among them who missed more than two teeth, 46.6% were below 40 years old and 53.4% were more than 40 years old, which means with increasing age tooth loss due to caries also increases. This shows same finding with the study by Bhuiyan[4] (1988-89)

Conclusion

The results of this study shows that the dental caries is a multi-factorial disease. The ignorance, illiteracy, food habit, inadequate practice of oral hygiene etc are the major contributory factors for dental caries. As the disease is multi-factorial, so single technique will not be sufficient to reduce the occurrence of the disease,

Treatment of dental caries is very expensive and not even available in all parts of the country, but elimination of the contributory factor for dental caries is not so difficult. Simple preventive measures like maintenance of regular oral hygiene can reduce the disease.

So every effort should be given to prevent the causative factors responsible for dental caries. From this study it can be concluded that dental caries is a preventable multi-factorial disease. Proper preventive measure such as regular tooth brushing and avoidance of excessive sweets can reduce the disease to a large extent.

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