Original Article

Profile of dental health in Raipur city (Chhattisgarh) India

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Abstract:

　　　Introduction- Dental caries is a serious public health issue and collecting data on its prevalence, incidence, and trends is an important field in oral epidemiology. The DMF index is a standard method for assessing dental caries experience in populations. The world Health Organization (WHO) recently published a global overview of oral health, a statement which described the WHO Oral Health Programmes approach to promoting further improvement in oral health during the 21st century. So the present study was conducted to assess the profile of dental health in Raipur city (C.G.), India. **Material and Methods-** A cross sectional community based study was conducted in the urban (slum and non-slum) areas of Raipur City (C.G.) from December 2002 to December 2003. Multi stage simple random sampling technique was exercised for data collection. The list of all census blocks of Raipur city was obtained from the municipal Corporation, Raipur. Sample size was calculated by employing statistical formula $4pq/L^2$. Data was compiled in MS Excel and checked for its completeness and correctness. Then it was analyzed. **Results-** Awareness in five major dental problems was 63% where as only 37% of the respondents were unaware, but in spite of awareness, the prevalence of dental caries is very high. Only 1/5th of the respondents were aware about the pyorrhea, which is significant marker of oral hygiene. Average Total DMF Index was 5.010. Percentage needing care was 10.60%, percentage of teeth lost was 4.81% and percentage of filled teeth was 23.28%. Maximum DMF Index was recorded in 60+ age- group (9.167), followed by 30-60 years (5.4) and minimum in 0-2 years age group (0.021). **Conclusion-** The prevalence of dental problem and type of anomalies was found to be higher among study subjects. Dental caries had significantly associated with daily frequency of meals, Chewing habits (betel nut, tobacco, and pan), post meal mouth rinsing practices and type of drinking water.

Key words: DMF index, Dental problem, Oral health, Raipur, Chhattisgarh

Introduction:

　　　Healthy teeth and oral cavity have been described as a symbol of good health by the scientists. Increased dental crowding and dental asymmetry can be indicative of severe or chronic stress. Periodic indicators of stress provide information on the age at which stress episode occurred. Two common examples of such periodic stress indicators are, first, Harris lines, i.e. disruption in linear bone growth, and second, enamel hypoplasia, i.e. disruption in tooth enamel matrix formation. [1]

　　　Dental caries is a serious public health issue and collecting data on its prevalence, incidence, and trends is an important field in oral epidemiology. The DMF index is a standard method for assessing dental caries experience in populations. While linear increases in caries with age in both children and adults indicate that caries affects individuals throughout life, longitudinal surveys indicate a decline in dental caries experience over the past two decades, yet dental caries remains a prevalent oral disease among the children and adults. [2]

　　　In 1938, KLIN AND PALMER first described and used the DMF index for caries prevalence. DMF index has gained worldwide acceptance and as a result it has become possible to

make direct comparison of caries prevalence between populations with widely varying characteristics.

In view of this, WHO and International Dental Federation have set certain goals for Health by the year 2000AD, which were from Goal 1 to Goal 6. Goal 1 was 25% of 5-6 year olds must be caries free and Goal 2 was the global average should be no more than 3 DMF teeth at 12 year age. Both were identified as the Basic Global Indicators of oral health. [3]

Recent dental studies have developed new strategies for evaluating inequalities in dental caries distribution, in an attempt to improve the effectiveness of health actions in a context of an overall decline of caries prevalence and severity in children. Health programmes demand selective information for exploring the association of disease levels and covariates for characteristics of socioeconomic status (SES) and access to services, and for determining whether health services should be directed towards targeting individuals, areas with higher levels of dental needs or to a whole population [4] New resources on disease measurement should also contemplate enhancements in the ability of health organizations to evaluate the effectiveness of their own interventions, and perform health impact assessment (HIA) [5] so that their proposals do not inadvertently damage health or reinforce inequalities.

The world Health Organization (WHO) recently published a global overview of oral health, a statement which described the WHO Oral Health Programmes approach to promoting further improvement in oral health during the 21st century. The report emphasized that despite great improvements in the oral health of populations across the world, problems still persist. This is particularly so among underprivileged groups in both developed and developing communities. WHO sees oral health as an integral part of general health. Oral disease and conditions, including oral cancer, oral manifestations of HIV/AIDS, dental trauma, craniofacial anomalies etc all have broad impacts on health and well-being. Oral health and general share common risk factors related to dies, the use of tobacco, and the excessive consumption of alcohol. [6, 7, 8, 9]

With the above background the present study was conducted to assess the profile of dental health in Raipur city, Chhattisgarh.

Materials and Methods:

A cross sectional community based study was conducted in the urban (slum and non-slum) areas of Raipur City (C.G.) from December 2002 to December 2003. Multi stage simple random sampling technique was exercised for data collection. The list of all census blocks of Raipur city was obtained from the municipal Corporation, Raipur. Sample size was calculated by employing statistical formula $4pq/L^2$. [The estimated prevalence of dental caries was taken to be 68% with an allowable error of 1.75% (0.0175). [10] All 846 census blocks of the study area were listed and 30 Census blocks selected by Random sampling technique. Raipur has a population of 5, 39,831 with 1, 05,178 families. Out of these 30 blocks, 21 were non-slum, whereas 9 were slums. These 30 blocks have 3,669 families with a population of 20,365. Among these 3,669 families, 600 (2819 subjects) families were selected by random sampling technique. In each block, 20 families were selected by the same technique. Door to door survey was conducted. Depending on availability, survey was conducted in early morning hours, from 7:30 to 9:30 AM. The subjects were interviewed after getting informed consent. All subjects were examined to assess dental cavity and oral hygiene in full day light using a probe and mirror. The houses which were found closed, replaced by nearby house.

DMF index:

The DMF index [11] is the average number of permanent teeth per person which are decayed (D), missing because of caries, (M), or filled (F). It is quantitative expression of the lifetime caries experience of permanent teeth. In the calculation of DMF index, the numerator is the total number of DMF teeth and the denominator is the total no. of people examined.

As it was difficult to differentiate a missing primary tooth which had been exfoliated naturally and missing primary tooth lost b/c of caries, the 'M' component in the DMF index was omitted and the DF index, as recommended in 1962, was employed in the DMF index was omitted and the DF index, as recommended in 1962, was employed in assessing caries experience primary teeth.

The Prevalence rate indicates the percentage of the population affected and the DMF indicates the average number of teeth affected per person.

For Counting of teeth:-

A- No tooth must be counted more than once. It is either decayed, missing, filled, or sound.

B- Decayed, missing and filled teeth should be recorded separately.

C- Those teeth that have restoration with recurrent decay should also be counted.

D- List as missing only those teeth which have been lost due to decay, the following should not be taken as missing

a- Unerupted teeth

b- Missing teeth due to accident.

c- Congenitally missing teeth.

d- Teeth that have been extracted for orthodontic reason.

E- Deciduous teeth also included in DMF teeth.

F- All teeth had been counted (molar teeth also involved)

Calculation of the Index

A. Individual DMFT: D+M+F=DMFT Index

B. Group Average DMFT Index:

 Total DMF

C. Percent Needing Care:

Total number of decayed tooth

Total number examined

D. Percent of teeth lost:

Total number of missing teeth

Total number examined

E. Percent of filled teeth:

Total number of filled teeth

Total DMFT

Data was compiled in MS Excel and checked for its completeness and correctness. Then it was analyzed using online statistical calculator and chi square test was applied with value of < 0.05 was considered statistically significant for interpretation of finding.

Results-

Table -1. Background characteristics of study population

Back ground characteristics	Total
Age in years	
0-2	93(3.30%)
2-6	194(6.88%)
6-13	526(18.65%)
13-30	955(33.87%)
30-60	914(32.42%)
>60	137(4.88%)
Sex	
Male	1442 (51%)
Female	1377 (49%)
Community	
Non slum	1829(64.9%)
Slum	990(35.1%)
Type of family	
Joint	176(29.3%)
Nuclear	600(100%)
Socio economic Class	
High	1061(37.63 %)
Middle	698(24.76 %)
Low	1060 (37.60%)
Educational Status	
Post Graduate/Graduate	696(24.7%)
Higher Secondary	309(10.8%)
High/Middle School	812(28.8%)
Primary School	592(20.9%)
Illiterate	418(14.8%)

In the present study, majority (33.87%) of the respondents belonged to the age group between 13-30 years and 30-60 years (32.42%) which together constituted 2/3rd of the surveyed population. Male respondents were more than females in every age group in the study except in the geriatric age group. About 2/3rd respondents were residing in non slum areas and 70.7% were belonged to nuclear families. Of the total, 37.63 % and 37.60 %

respondents were belonged to high and lower socioeconomic status (SES) respectively. Majority (85.20%) of the respondents were literate. However, 28.80% were educated up to high or middle school. **(Table-1)**

Table: - 2. Status of Awareness and Type of anomalies among Study Population

Variables	No. (%)
Awareness regarding Dental Problems	
Dental decay	2123 (83.38%)
Toothache	2427 (95.32%)
Bleeding Gum	1323 (51.96%)
Foul smelling(Halitosis)	1569 (61.62%)
Pyorrhea	561 (22.03%)
Type of anomalies	
A. Mal-position of teeth	115(42.75%)
B. Crowding of teeth	32(11.89%)
C. Spacing of teeth	24(8.92%)
D. Extra teeth	98(36.44%)
Awareness Status of changing brush	
Adequate	43(1.67%)
Excellent	16(0.62%)
Inadequate	2503(97.71%)

Awareness in five major dental problems mentioned in the table was 63% where as only 37% of the respondents were unaware, but in spite of awareness, the prevalence of dental caries is very high. Only 1/5th of the respondents were aware about the pyorrhea, which is significant marker of oral hygiene. The prevalence rate of malocclusion in the study was 9.54%. The most common problem was mal-position of teeth (42.75%), whereas spacing of teeth was least noticed (8.92%). Awareness of proper replenishment of the tooth brush was only in less than 1% of the respondents. **(Table-2)**

Table: - 3. Different variables in relation to dental carries among Study Population

Variables	Carious Person	Non-Carious Person	Total	X^2 test, d.f., p value
Daily frequency of meals				
Less than or equal to 4	502(49.75%)	507(50.25%)	1009(35.79%)	X^2=614.99, d.f.=1, p<0.001
More than 4	1650(91.16%)	160(8.84%)	1810(64.21%)	
Type of food				
Vegetarian	1194(77.33%)	350(22.67%)	1544(54.77%)	X^2=1.861,d.f.=1, P>0.10
Mixed Vegetarian	958(75.13%)	317(24.86%)	1275(45.23%)	
Chewing Habits Betel nut/Tobacco/Pan				
Daily and occasional Habitant	1642(78.00%)	463(22.00%)	1114	X^2=22.62,d.f.=1,P<0.001
Non Habitant (Never used)	380(88.99%)	47(11.01%)	881	
Post meal mouth rinsing practices				
Rinse the mouth	831 (73.34%)	302 (26.64%)	1133 (40.19%)	X^2=9.44,d.f.=1,P<0.001
Not rinse the mouth	1321 (78.35%)	365 (21.65%)	1686 (59.81%)	
Type of Drinking water				
Ground Water	457(76.03%)	144(23.97%)	601 (21.31%)	X^2=20.09%,d.f.=2 P<0.001
Surface Water	509(82.76%)	106(17.24%)	615(21.81%)	
Mix (some time ground some time surface)	1186(73.98%)	417(26.02%)	1603(56.88%)	

2/3rd of the respondents had meal consumption frequency 4 or more. Correlation between the of meals and dental caries indicates a direct relation between the two. The direct relationships between dental caries and frequency of meals is statistically significant (**p<0.001).** More than ½ of the respondents were vegetarian in their dietary practices, rest were mixed vegetarians. Prevalence of caries was higher in vegetarians (77.33%) than mix-vegetarians (75.13%). Prevalence of dental caries cannot be correlated significantly with dietary habits. **(p>0.10).** More than 3/4th of the respondents were habitant of chewing Betel nut / Tobacco/ Pan. Chewing habits have a statistically significant inverse relationship with dental **(p<0.001).** Only 40.19 % of the respondents were doing Post meal mouth rinsing practices. Improper rinsing could be positively correlated with the prevalence of dental caries in this study. (X2=9.44, DF=1, P<0.001, which is highly significant.) Majority of the respondents consumed mixed water supply (56.88%).82.76% of the persons who consumed surface water were having carious teeth, followed by persons consuming ground water (76.303%) and lastly, persons drinking maxed water (73.98%). A highly significant relationship between dental caries and type of water consumption has been derived in this study. (p<0.001) **(Table-3)**

Table:-4. DMF Index In Relation To Age and Sex of Study Population

Age (Yes)	Number Of Teeth Examined	Sex with Carious Person	Persons	D	M	F	DMF (Group and sex wise)	Total DMF Index
0-2 (93)	973	M	2	2	0	0	0.033	0.021
		F	0	0	0	0	0.000	
2-6 (194)	3298	M	73	244	35	28	3.009	2.824
		F	55	183	32	26	2.619	
6-13 (526)	12180	M	262	1196	91	202	5.474	4.880
		F	176	803	86	189	4.244	
13-30 (955)	27480	M	431	1809	297	613	5.617	4.995
		F	278	1167	289	596	4.356	
30-60 (914)	24,598	M	356	898	778	836	5.333	5.450
		F	417	952	731	787	5.575	
60+ (137)	1781	M	47	93	411	6	9.444	9.167
		F	55	109	632	5	8.987	
Total	**70,130**		**2152**	**7456**	**3382**	**3288**		**5.010**

D = Decayed, M = Missed, F = Filled Teeth.

Average Total DMF Index was 5.010. Percentage needing care was 10.60%, percentage of teeth lost was 4.81% and percentage of filled teeth was 23.28%. Maximum DMF Index was recorded in 60+ age- group (9.167), followed by 30-60 years (5.4) and minimum in 0-2 years age group (0.021). Mean DMF for males was higher than that of female, but statistical significance could not be derived. Another interesting trend emerges on analysis of

the DMF index trends that DMF Index increased gradually with age, showing two spurts of increase, one during 6-13 years age and the other after 60 years of age. **(Table-4)**

Discussion

In the current study, prevalence of mal-occlusion was found to have 9.54%. There were other studies on malocclusion also, but they showed age specific findings. Prevalence of malocclusion were found 55.3% and 29.2% as reported by Singh *et al* and Gauba *et al* in 12-16 years age group respectively. **[12, 13]**

In the present study, there was significant association between frequency of meal and dental caries. Studies of Kapoor et al **[14]** and Tiwari et al **[15]** also support the current study. Prevalence of dental caries was higher in vegetarians than mixed vegetarians. Sognnaues observed that non-vegetarians/mixed vegetarians had slight though negligible resistance to caries, than vegetarian population **[16].** Sherfudhin H. et al also observed similar increased prevalence of dental caries in vegetarians than non-vegetarians**. [17]**

Nagraj R.G. et al, highlighted that chewing pan, tobacco, it has been found that prevalence of dental caries decreases with increasing frequencies of betel nut chewing, the finding being similar to this study**.[18]** Significant relationship was found between dental caries and type of water consumption in current study. This might be due to the lack of fluoride in drinking water. Estimation of fluoride in the round water samples taken from the study area revealed the fluoride level as 0.510 ppm (fluoride level in surface water was lesser than this). (As reported by data collection center, GWS, Raipur, Chhattisgarh, 2002)

The relationship between low fluoride levels and increased prevalence of dental caries has been observed by Anis Worth Churcbil , Ast. B.D., Dean H.T.et al [**19**] Trandley et al **[20]** Shaws et al **[21]** and V.Ramchandran **[22]** in their respective studies.

Siddhu et al **[23**] observed the importance of trace elements in drinking water as a preventive measure for caries. This should not be misinterpreted, as fluoride level in the study area was not itself; it may still be a contributing factor. A study by Goyal R.C. et al also revealed the same increase in prevalence of dental caries with age, and that mean DMF was higher in males than females**. [24]** The prevalence of dental caries in the study was 5.010, which comes under high prevalence rate, according to the Alma Ata Declaration. **[25]** We do not qualify the criteria for dental health for all as per Alma Ata Declaration. Another important point to note that the prevalence rate was higher (5.010)

than the notified prevalence rate in India (1.17-4.96) **[25]**

Conclusion

The prevalence of dental problem and type of anomalies was found to be higher among study subjects. Dental caries had significantly associated with daily frequency of meals, Chewing habits (betel nut, tobacco, and pan), post meal mouth rinsing practices and type of drinking water. The awareness level of healthy dental habits was found to have in adequate among study subjects. There is a need of integrated approach which includes health promotion activities, advocacy etc. Health education regarding proper dental care practices should be provided through mass media education program and dentist/dental hygienist to increase the awareness among community. Free government comprehensive dental health services should be carried out on regular basis. As there is paucity of data in this particular field so, it is required that the study should be further expanded across the Chhattisgarh state to extract the more relevant data.

Finally it is essential to maintain and foster health services research most importantly to update our information on the cost-effectiveness of public health interventions to reduce the dental health problem.

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