



Evaluation DMFT and CPTIN Indices and Related Personal Behaviors in the 12-Years-Old Students

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Received 2016 April 10; Revised 2016 April 23; Accepted 2016 May 10.

Abstract

Background: Dental caries and periodontal diseases are one of the most important oral health problems around the world. Children of all age groups are affected by dental caries. It seems that data collection on prevalence of tooth decays and treatment needs is necessary to provide preventive care.

Objectives: Therefore, the present study was done to evaluate DMFT and CPTIN indices and personal behaviors in the 12-year-old school children in the city of Zahedan.

Methods: In this descriptive-analytical study, Zahedan city was divided into two regions (based on socio-economical situation); 10 school (boys and girls) from each region and 47 students from each school, were randomly selected. DMFT and CPTIN indices of 942, 12-year-old school children (based on world health organization (WHO) criteria) were evaluated. Data were analyzed by SPSS 19, t-test, and chi-square.

Results: The mean DMFT in the studied population was 0.94 ± 0.5 (1.18 ± 0.5 in girls and 0.7 ± 0.38 in boys). Tooth decay component was the essential component of DMFT index (0.62 for boys and 1 for girls). A total of 70.7% (666 ones) of individuals 74.3% of boys (327 ones) and 67.5% of girls (339 ones) were caries free and 29.3% (276 persons) had dental caries. Dental caries rate in two genders no significantly differed ($P < 0.05$) 18% of students (12.7% in girls and 5.3% in boys) had a CPTIN score 0. 67% of individuals (32.7% in girls and 34.3% in boys) had a CPTIN score of 1. In addition, 15% of subjects (7.9% in girls and 7.1% in boys) had a CPTIN score of 2. Periodontal status in two genders significantly differed ($P < 0.01$). A total of 47.8% subjects who brushed before sleeping had good OHI-s while only 18.6% of subjects who never brushed had good OHI-s. This difference was significant ($P < 0.05$).

Conclusions: The mean DMFT score in 12 year old school children was lower than the global standards presented by WHO. Dental caries rate was low in studied population. Periodontal health status in girls was better than boys. People who brushed their teeth before sleeping had a desirable oral health status. For 12 year old children, oral health education is necessary in improving oral health.

Keywords: Decayed Missing Filled Teeth(DMFT), Oral Health, Dental Caries

1. Background

One of the goals of the ministry of health and medical education is maintaining and improving community health. According to oral health is an important part of general health of the body, it is necessary to plan and establish enough information about the prevalence of oral diseases, oral health and causes of dental caries (1).

Oral health problems including periodontal disease and tooth decay are preventable with change in the strategy of life style and personal behavior (2). This strategy has emphasized on sugar intake reduction, using fluoride compounds, and oral hygiene habits such as brushing and oral health education, that can help modify eating habits

and promote preventive behaviors. These are the main goals of improving programs of oral health in a community (1, 2).

The prevalence of caries and periodontal disease among the population in developed countries has declined (3).

Based on the world health organization (WHO) recommendation, the age of 12 is the essential age in preventive programs in oral health policy, because in this age, all permanent teeth erupted except the 2nd and third molars. If the tooth is lost, there is no alternative for it. Therefore, it is very important to take care of them. On the other hand, the child's mental capacity has greatly grown and social inter-

action and communication with peers, especially through school and leisure activities, expand (4).

In various studies, oral hygiene and dental health status of 12-year-old children have been assessed. The WHO in 2005 (5), reported that the DMFT (decayed missing filled teeth) of 12-year-old children is in the lowest rate.

The mean DMFT of 12-year-old Zahedan students (6) has been reported 1.12 ± 0.8 . In another study, the mean DMFT for 12-year-old children in urban areas of Sistan and Baluchestan (7) province was reported 1.34 ± 1.99 . (1.1 tooth decay, 0.14 missing, and 0.04 filled teeth) and 33.9% of people brushed their teeth 2 - 3 times a week; 40% of females and 27.6% of males had healthy gingivae.

In the research of Mittal et al. (8), the mean DMFT of 384 Indian students aged 12 was 1 ± 1.48 and 37.5% of students had tooth decay.

The mean DMFT of 12-year-old girl students in Kashan, have been reported 1.45 ± 1.73 . (1.12 tooth decay, 0.05 missing, and 0.28 tooth filled), 45.5% of students were caries free. The mean OHI-S (oral hygiene index) was 0.42 ± 1.46 and there was no significant correlation between DMFT and OHI-s (9).

According to the extensive performed researches in the world and importance of oral health and its effect on general health, the WHO has emphasized on importance of oral health (10).

Agbelusi and Jeboda (11), reported the mean DMFT of 1600 12-year-old students in non-government schools in 6 Lagos state of Nigeria as 0.46. The tooth decay component was the principal component of DMFT index. The oral hygiene (OHI-S) of students was moderate. The girls had lower calculus and gingivitis than boys and also had a better oral hygiene. The total level of dental care in the studied population was very low.

Periodontal disease is a common disease. If untreated, the bacteria related to disease provides the basis for heart disease development. The disease occurs in all age groups and in both sexes. Prevalence of periodontal disease rises with age increasing (12). In 1980, WHO recognized CPTIN index. Today this index is used to determine the periodontal status (13).

Mittal et al. (8), reported a CPTIN score of 80.2% of 12 year old Indian children is equal to 2 (most people had dental calculus). Therefore, 44.3% of students needed dental treatment.

The overall caries prevalence was 78.9% in the Hiremath et al. (14), study among Indian school children and most people need dental treatment.

2. Objectives

In regards to the general policies of the country, being the age of 12 is appropriate for assessment of oral health status in international comparisons and monitoring of process conditions.¹⁵ To view the priority of prevention over treatment in this study, oral hygiene, permanent dental health (DMFT), periodontal health (CPTIN), and some related factors such as oral health behaviors in 12 year Zahedan school children were evaluated.

3. Methods

Multi-stage cluster random sampling was employed for the selection of the studied population. This cross-sectional study was done on 12-year-old students in the city of Zahedan and the techniques of interviews, observations, and questionnaires were used for data collection. After coordination with Zahedan education center and information about the number and location of schools, Zahedan city was divided based on the socio-economical situation into two regions (favorable and unfavorable);¹⁰ school (girls and boys) from each region and 47 students from each school were randomly selected

After taking a consent form (from the parents), dental health (DMFT), oral hygiene (OHI-S), and periodontal health (CPTIN), indices of 942, 12-year-old boy and girl students, under clinical examination, was determined. The DMFT, Oral hygiene (OHI-S), and periodontal health (CPTIN) indices were assessed using the standard manner suggested by WHO (13-15). Oral health examination was carried out by a dentist. clinical examinations of participants was done in the classroom (at 9 am), under natural day light, using a dental mirror, probe (lightweight with 0.5 mm diameter), and exploring while the child is seated on a straight chair and the dentist is seated on a chair behind the student.

Dental caries was diagnosed according to the WHO criteria. Dental health index (DMFT:decayed(D), missing(M), and filling(F) teeth index was used for dental caries diagnosis (2, 14, 15).

For oral health behavior assessment, measurement of dental plaque and calculus is preferred. OHI-S index was introduced by Greene in 1964 in order to determine a simplified oral hygiene index used in epidemiological studies. OHI-S consists of two components (debris and calculus). Each index was determined based on the result and indicates the amount of debris and calculus observed on tooth surfaces (11). Six levels (four posterior and two anterior surfaces) were selected for examination. Buccal surface of maxillary first molar (26 and 16), lingual surface of

mandibular first molars (46 and 36), labial upper right central incisor (11), and left mandibular (31) were examined. Total debris index (DI-S) and calculus index (CI-S) shows the OHI-S index. The score of DI-S and CI-S is between 0 - 3 and OHI-S score range is variable between 0 - 6 and were classified as follows: Good 0 - 1.2, Moderate 1.3 - 3, and poor 3.1 - 6 (16).

CPTIN (community Index of treatment needs) is the most common criteria for evaluation of periodontal status in the population, which was introduced in 1980 by experts from the WHO and FDI. This index was divided into five scores: score 0 = healthy gums, score 1 = bleeding gums, score 2 = present of calculus, score 3 = shallow packet (PPD 4 - 5 mm), and score 4 = deep packet (PPD > 6 mm) (16). CPI index was evaluated using a ball point probe. Finally, the obtained data were analyzed by SPSS19 software, Chi-square, and t-test.

4. Results

In the present study, a total number of 942, 12 year old students 440 boys (46.7%) and 502 girls (53.3%) were examined.

A total of 70.7% (666) of individuals 74.3% of boys (327), and 67.5% of girls (339) were caries free; 29.3% (276) had dental caries. Dental caries rate in two genders (25.7% in boys vs. 32.5% in girls) had no significant difference ($P < 0.05$) Chart 1.

The mean DMFT in studied community was 0.94 ± 0.5 . The mean DMFT in girls was 1.18 ± 0.5 and in boys 0.70 ± 0.38 . Tooth decay component was the essential component of DMFT index (0.62 for boys and 1 for girls) and the lowest amount of DMFT related to missing (0.08 for boys and girls) filled teeth was 0.12 for boys and 0.16 for girls.

The mean OHI-S in these individuals was 1.43 ± 0.72 . The mean OHI-S in girls was 1.44 and in boys 1.42. A total of 422 individuals (44.7%) including 186 boys (42.3%) and 236 girls (47%) had good OHI-s, 474 individuals (50.3%) including 232 boys (52.7%) and 242 girls (48.2%) had moderate OHI-s, and 46 individuals (5%) including 22 boys (5%) and 24 girls (4.8%) had weak OHI-s. Oral health status of these individuals was moderate.

The mean OHI-S in two genders did not differ ($P = 0.39$). The number of girls with good OHI-s was higher than boys and the mean OHI-s was higher in boys.

In the current study the relation between OHI-s and DMFT was not significant ($P < 0.05$). The periodontal status of the studied population: 18% of students including 12.7% of girls and 5.3% of boys had health gingivae without calculus and bleeding. A total of 67% of individuals including 32.7% of girls and 34.3% of boys had bleeding on probing (BOP). And 15% of individuals including 7.9% of girls and

7.1% of boys had calculus. Periodontal status in two genders significantly differed ($P < 0.01$) (Table 1).

In the current study, the correlation between CPI and OHI-s was statistically significant ($P = 0.02$).

In the present study, the number of girl students who brush more than once a day were approximately two fold more than boys (70.4% vs 29.6%), in addition, the number of boy students who brush rarely were significantly higher (38% in girls, 62% in boys). The frequency of brushing was significantly different in two genders. ($P < 0.001$) (Table 2).

In the present study individuals who brushed before bed time had desirable oral hygiene status.

A total of 20.1% of participants with good OHI-s brushed before bed time. There was a significant correlation between brushing time and oral hygiene status ($P < 0.01$) (Table 3).

5. Discussion

This study aimed to determine oral and dental health indices includes DMFT, the periodontal health and oral health status, and some related factors such as oral health behaviors in 12 year school children at Zahedan.

Dental health index of one community indicating decay rate and preventive care. In this study the mean DMFT was 0.94 ± 0.5 , which corresponded with the goal of WHO (DMFT less than one) (1).

Dental caries constituted approximately 85% of the index. The preventive care is necessary in this age group (topical fluoride application, fissure sealant, oral hygiene education, and dental services). Dental index has been reported in Iran since 1990 to now, between 0.77 - 6.2 (1). According to these findings, the mean DMFT in the present study is in good condition and close to the lowest rate reported in Iran.

The mean DMFT in the present study (0.94 ± 0.5) is lower than the reported amount in other studies in Zahedan (Noorollahian et al. (6), (1.12 ± 0.8) and Ghanbariha et al. (7), (1.34 ± 1.99)). Lower dental caries rate and DMFT score in the present study may be due to a higher brushing frequency in the studied population (tooth brushing once a day in the present study was 44% while in the Ghanbariha et al. (7), study, 33.9% subjects brushed their teeth twice a week.

In this study the mean DMFT in girls was 1.18 and in boys 0.7. Tooth decay constituted the most component of DMFT and the lowest was missing. In contrast, Mittal et al. (8), reported that the mean DMFT in girls was 0.93 ± 1.56 and in boys 1.43 ± 1.04 , which was equal to 1 ± 1.48 . Similarity decays constituted the most part of DMFT (83.3%) and the lowest was the missing (1.88%).

Table 1. CPI Score in Studied Population According to Genders

CPI Score	Gender, No. (%)		Total, No. (%)
	Boy	Girl	
Score 0 (health gingiva)	50 (5.3)	120 (12.7)	170 (18)
Score 1 (BOP)	323 (34.3)	308 (32.7)	631 (67)
Score 2 (calculus)	67 (7.1)	74 (7.9)	141 (15)

Table 2. Frequency of Tooth Brushing in Studied Population According to Gender

Frequency of Tooth Brushing	Gender, No. (%)		Total, No. (%)
	Boy	Girl	
More than once a day	32 (29.6)	76 (70.4)	108 (100)
Once a day	167 (40.2)	248 (59.8)	415 (100)
Twice-thrice a week	85 (48)	93 (52)	178 (100)
Rarely	103 (62)	63 (38)	166 (100)
Never	53 (70.7)	22 (29.3)	75 (100)
Total	440 (46.7)	502 (53.3)	942 (100)

Table 3. Tooth Brushing Time in Studied Population According to OHI-s

Tooth Brushing Time	OHI-s, No. (%)			Total, No. (%)
	Good	Moderate	Week	
Morning before/ after breakfast	65 (39.2)	87 (52.4)	14 (8.4)	166 (100)
Noon after lunch	47 (47.5)	48 (48.5)	4 (4)	99 (100)
Before sleep	189 (47.8)	190 (48.1)	16 (4.1)	395 (100)
Others	53 (42)	68 (54)	5 (4)	126 (100)
Never	13 (18.6)	53 (75.7)	4 (5.7)	70 (100)
After breakfast and lunch	6 (75)	2 (25)	0 (0)	8 (100)
After breakfast and dinner	22 (64.7)	9 (26.5)	3 (8.8)	34 (100)
After lunch and dinner	11 (64.7)	6 (35.3)	0 (0)	17 (100)
Morning/noon /night	16 (59.3)	11 (40.7)	0 (0)	27 (100)
Total	422 (44.8)	474 (50.3)	46 (4.9)	942 (100)

In the present study, the prevalence of tooth decay was 29.3% while Amirabadi et al. (17), reported that 43.6% of school going children in Zahedan were affected by dental caries and the boys had higher DMFT. The dental caries rate in our studied population was lower than the Amirabadi study.

In the Hiremath et al. (14), study, dental caries prevalence was equal to 44.1%. This is higher compared to the present study. In the present study, unlike the Hiremath et al. study (14), the mean DMFT in boys was lower than girls. Higher dental caries rate and DMFT score in the present study may be due to parental preference to feed the girls for a longer time compared to the boys.

In this study, the mean OHI-S (oral hygiene index), was

equal to 1.43 ± 0.72 (moderate based on WHO criteria). This is similar to the results of Yee in areas of urban Nepal (18), Mielnik Błaszczyk et al. in Lublin (19), Agbelusi and Jeboda in Nigeria (11), and Afshari in Kashan (9). However, Ullah (16), reported a poor oral health status in 12 year old children.

In this study, 70.7% of subjects (74.3% boys and 76.4% girls) had no dental caries (caries free). In the study by Mittal et al. (8), 62.5% and in the study of Afshari et al. (9), 45.5% were caries free. Therefore, dental caries rate in 12 year old Zahedan students was low.

According to moderate oral hygiene level in studied students, it seems that a low caries rate can be due to environmental factors such as high fluoride in drinking water

in Zahedan city (20).

In the present study, oral health status of girl (1.44) and boy students (1.42) was almost identical together. It is similar to the studies of Agbelusi and Jeboda (Nigeria) (11) and Yee (Nepal) (18), however, in the Balwant (21)(India) research, the girls had better oral health, lower calculus, and gingivitis.

In this study, the time of tooth brushing had a significant effect on oral hygiene status. Subjects who brushed their teeth before or after meals (lunch / dinner) had better oral health status, while those who did not brush their teeth had no desirable oral hygiene. In addition, brushing at morning (before / after breakfast) had less impact on improving oral health rather than brushing before sleep. In this study, the percentage of girls who brushed more than once a day was approximately 2-times more than boys (70.4% vs. 29.6%), and vice versa, the percentage of boys who did not brush their teeth was almost 2 times more than girls (30.3% vs. 69.7%). This difference was statistically significant. In the study by Afshari (9), the boys who brushed more times had better oral hygiene and lower DMFT. Low frequency of brushing is effective on OHI-S and the oral health status (22).

In the current study, the girls had good oral hygiene, however, the rate of decay and oral health status of them was undesirable. It seems that other factors, such as correct brushing is often more effective than the frequency of brushing on improving the oral health status and decreased dental caries that should be mention in future studies.

Van der Weijden et al. (22), had shown that brushing twice a day and using fluoridated tooth pastes is effective in controlling and prevention of dental caries and gingivitis.

In the present study, there was no clear relationship between DMFT and OHI-S, however, in the Afshari et al. (9) study and Yee in Nepal (18), there was a clear relation between these two variables.

In this study, 18% of students had CPTIN score of 0 (health gums) and more than 80 % of students had inappropriate periodontal status (CPTIN score 1 , 2). A total of 13.7% of studied students had calculus (CPTIN score 2), therefore, the health status of periodontal tissue in studied population is undesirable. The education regarding appropriate dental care and dental procedures such as scaling and other treatments is needed in this community.

In the study of Mittal et al. (8), (2014, India) 80.2% of the studied population had a CPTN score 2 (more people had dental calculus). According to this finding 44.3% of students needed dental treatment.

In the present study, there was a significant relation between the OHI-S and CPTIN ($P = 0.02$), however, this rela-

tionship has not been assessed in other studies.

If the student in school or by parents training about the oral healthcare and oral hygiene behaviors, will acheive good results in terms of oral health status of children and decrease periodontal disease and caries level in older ages.

Mielnik Błaszczak et al. (19), has reported the best oral healthcare was occurred in 12-year-old children who teach in health promoting and dental care school.

5.1. Conclusions

Dental caries rate was very low in 12-year-old students in Zahedan. The mean DMFT and dental caries rate in 12-year-old Zahedan girl students was higher than boys . Oral health status of the studied population was moderate and there was no clear relation between dental health (DMFT) and oral hygiene indices. Periodontal health status of the people was undesirable.

However, health education for improving oral health in this age is necessary . Study on the nutrition of children and fluoride concentration of drinking water and related factors to dental caries occurrence in other age groups in Zahedan school children is required.

Acknowledgments

We would like to thank the oral and dental disease research center of Zahedan University of Medical Sciences for approval and financial support of this project.

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