

## Assessment of DMFT and its influencing factors in guidance school students in Piranshahr city, Iran

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*Date of submission: 27 Sep 2016, Date of acceptance: 18 Mar 2017*

### ABSTRACT

DMFT index is one of the best dental epidemiological indices, which represents the oral health status of the population and has been accepted by authorities and international organizations such as the World Health Organization. The aim of this study was to assess the permanent teeth DMFT index in guidance school students to determine the influencing factors such as brushing, tea and sugar consumption, number and type of snacks, parents educational status, family member number, economic situation, and visiting the dentist status. In this descriptive, cross-sectional study, 320 female students (12 years old) from guidance school were randomly selected in Piranshahr Town. Their health data was obtained by referring to their health files to determine DMFT. In order to establish any possible relationship between factors affecting DMFT, a questionnaire was designed by authors and completed by the students. The data was statistically analyzed using independent T-test and ANOVA. The mean DMFT in the students was  $2.53 \pm 2.28$ . The frequency of brushing, snack consumption, visiting the dentist, family economic status had significant correlation with the DMFT index ( $P < 0.05$ ). The daily tea drinking, sugar consumption, number of family members, parents educational qualification had no significant correlation with the index ( $P > 0.05$ ). The average of DMFT in Piranshahr guidance school students was higher than World Health Organization guidelines; thus, to improve the present situation, it is necessary to design a proper plan. More attention to families dental and oral health is necessary via mass media, health service centers and health teachers in schools.

**Keywords:** DMFT, Dental Caries, Socio-Economic Status

### Introduction

Teeth decay is a major problem in terms of

social and health as the most common communicable and chronic infectious disease in the world, which involves more than 99% of people regardless of gender, age, and race.<sup>1-3</sup> Although, in recent decades, significant advances have been achieved in the field of oral

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**Citation:** Mirzamohammadi H, Jafari A, Rezaee R, Daraei H, Shahsawari S, Rezaei Sh, et al. Assessment of DMFT and its influencing factors in guidance school students in Piranshahr city, Iran. J Adv. Environ Health Res 2017; 5(1): 16-22

health, oral and dental problems still remained as a health problem especially related to lifestyle in developing and even some developed industrial countries. The control and prevention is highly relevant to change in people's attitude and practice that should be started in families from early stages of life.<sup>4,5</sup>

Most researchers believe that teeth decay is a complicated phenomenon mainly occurred by interaction of host factors, diet, and microorganisms<sup>6</sup>. Generally, bacterial plaque is the major cause of teeth decay and mouth disease<sup>7</sup>. Microorganisms in the plaque adheres firmly to the teeth surface. Sugar and starches in food are broken down and converted to acids and other substances. This may lead to cavities and teeth decay. Diet, food use, frequency of food intake, as well as saliva properties, (influencing the type of microorganisms in dental plaque and teeth resistance) are important factors in dental caries<sup>6</sup>.

Snacks are a part of daily nutrition and frequency of food intake, given that students spending half of their day in school are forced to use the snack food. In addition to the aforementioned factors, it has been reported that oral health of schoolchildren is affected by dental caries depending on the type of food consumed, socio-economic status, and parents' knowledge<sup>6,8</sup>.

One of the essential ingredients in teeth structure is fluoride. The most important way to intake fluoride is through drinking water. The World Health Organization (WHO) recommends 0.8 and 1.5 mg/L fluoride in drinking water in hot and cold seasons respectively<sup>9</sup>. According to the Iranian National Standards, the concentration of fluoride in public drinking water sources is 0.6 to 1.2 mg/L.<sup>10</sup>

One of the most important indicators of oral health of people and especially children is DMFT (Decay, Missing, Filling Teeth) index indicating the decay rate and the number of extracted teeth due to caries and the number of treated cases<sup>1,6</sup>. In last meeting in Geneva (1997), WHO announced that by 2010 to bring DMFT index down to one or less in 12-year-old children as a main goal<sup>11</sup>.

In the view of the Iran overall policy including priority of prevention over treatment and with regard to WHO report of high value index in 1.86 in Iran,<sup>10</sup> the present study aimed at evaluating dental health and determining the mean of DMFT of permanent teeth in female students of guidance school in Piranshahr, Iran. Moreover, the relationship between DMFT with brushing, tea and sugar, snack food consumption and type, parental education, family member number, economic and visiting the dentist were examined. In addition, the relationship between water fluoride concentration and the index was investigated during three consecutive years.

### Materials and Methods

This descriptive, cross-sectional study was conducted in 2016. A population of girl students of guidance school in Piranshahr Town was selected randomly as sample. Data of fluoride concentration in drinking water for three consecutive years was obtained from health center. The method for determining the concentration of fluoride was based on SPANDS method.<sup>10</sup> The sample size was calculated according to the following equation:

$$n = Z^2 P(1 - P)/d^2$$

Where: n=Sample size

Z = Z statistic for a level of confidence (95% level of confidence used, therefore Z value is 1.96)

P = expected prevalence of proportion (70%)

d = precision (0.05)

According to the following equation and taking into account the 95% confidence level, the prevalence of caries of 70% and precision of 0.05, sample size was 320 people. From the six guidance school girls and among the different levels of classes (seventh, eighth and ninth) students were randomly selected in proportion to their population.

The necessary data was obtained to determine DMFT index, based on data recorded by the age of 12 in their health certificate. To investigate the factors influencing the index, a

questionnaire was prepared; after confirming its validity and reliability, it was completed by students. The correlation of the influencing parameters and DMFT index was statistically analyzed by one-way ANOVA and independent T-Test and  $P < 0.05$  was reported as significant.

## Results and Discussion

Table 1 presents the concentration of fluoride in drinking water distribution networks and water resources in Piranshahr during 2013 to 2015. In accordance with the minimum standards in all samples fluoride was less than 0.6 mg/L.

Table 2 presents the components of DMFT

**Table 1** Fluoride concentration in drinking water in Piranshahr during 2013 to 2015

Water type	Sampling location	The average concentration of fluoride in water mg/L		
		2013	2014	2015
Distribution network	Zone 1	0.01	0.60	0.191
	Zone 2	0.36	0.11	0.147
	Zone 3	0.01	0.07	0.155
	Zone 4	0.156	0.02	0.174
	Zone 5	0.02	0.05	0.28
	Zone 6	0.29	0.09	0.156
Well and spring	Kohnekhaneh spring	0.07	0.34	-
	Daraei well	0.01	0.37	-
	Industrial town well	0.02	0.24	-
	Soghanloo artesian well	-	0.11	-
	Haghighi well	0	0.22	0.123
	10000 m <sup>3</sup> spring	0.01	0	0.153

among students in Piranshahr Town. According to Table 2, average of DMFT in this study was 2.54. It is almost similar to Hazavehei et.al study based on the results of the first level of guidance school students in Hamedan (2.25),<sup>3</sup> and higher than that of Kermanshah girl students in 2010 reported by Nokhostin et.al (1.65).<sup>12</sup>

However, the present result is lower than Davari et.al result studied on 15-year-old boys in 2001 and 2008 in Yazd City (4.8 and 3.1).<sup>13</sup> In general, according to the WHO classification

of DMFT among children of 12 year-old, 0.1 to 1.1 is very low, 1.2 to 2.6 low, 2.7 to 4.4 medium, high 4.5 to 6.6 and more than 6.5 very high,<sup>14</sup> DMFT index range in the study area was low and very far from the standard established by WHO in 2010. The main component of the index is related to decayed teeth with average of 2.1 and the lowest component with an average of 0.21 is related to filled teeth. Therefore, serious planning is essential to improve the status quo.

**Table 2** the components of DMFT among students in Piranshahr city

Index type	N	%	average	SD	min	max	P-value
(Decayed teeth) DT	239	74.7	2.1	2.09	0	13	0.000
(Missing teeth) MT	49	15.3	0.22	0.59	0	4	
( Filled teeth) FT	30	9.37	0.21	0.87	0	8	
DMFT	256	80	2.54	2.28	0	13	

Table 3 shows the results of relationship between the average DMFT and frequency of brushing and dental checkup. According to Table 3, there is a significant inverse relationship between the number of brushing

and DMFT ( $P=0.000$ ). Similar results by Sajadi et.al was reported on the relationship between the DMFT index with brushing frequency.<sup>1</sup> However, no significant relationship between

teeth brushing and teeth decay was observed in Yousefi et al, study.<sup>15</sup>

However, it is obvious that this status can be improved by employing experienced health teachers in schools, training oral and dental health to children and monitoring the running programs.

With regard to the role of fluoride in teeth protection, it is expected that the use of fluorinated toothpastes be effective in dental caries reduction. Therefore, assessment of toothpastes in this study showed 86.2% of students use fluoride contained toothpastes.

However, despite the expected statistical analysis using independent T-test, there was no significant relationship between the type of toothpaste (with or without fluoride) and DMFT index ( $P= 0.1$ ) that may be due to the unfamiliarity with the correct brushing method

or enough brushing time. As shown in Table 3, it was found a significant relationship between DMFT index and the number of dentist visits. Ismail and Sohn also found that children who regularly visit the dentist had less teeth decay.<sup>16</sup> But, Eskndrizadeh et.al found no significant difference between dentist visits and DMFT index.<sup>17</sup>

However, with respect to the relationship between these two parameters, 47.8 % of students were not visited by dentist. The reasons are expressed as lack of health insurance coverage for dental services and economic status of poor families

Therefore, full coverage of dental services by insurance companies may result in more dentist visits and thus decay decrease.

**Table 3** The results of relationship between the average DMFT and frequency of brushing and dental checkup

Variable	Status	N	Percent	DMFT	
				Average and SD	P-value
Brushing frequency (in a day)	None	28	8.75	3.71 ± 3.23	0.000
	Once	177	55.3	2.81 ± 2.26	
	Twice	115	35.95	1.83 ± 1.81	
Visiting by dentist	Not visited	153	47.8	2.27 ± 2.31	0.000
	For treatment	143	44.7	3.05 ± 2.22	
	Max once in a year	24	7.5	1.16 ± 1.52	

Table 4 shows the correlation between DMFT with the use of snacks, tea and sugar. According to ANOVA test, there is a significant relationship between consumption of snack and DMFT index ( $P=0.02$ ). Faezi et.al also reported the relationship between increase in DMFT index with increase in decay agents in consumption of snacks.<sup>6</sup> However, Nematollahi et.al showed that DMFT index in the children using more milk and dairy products is less than those using little dairy products.<sup>18</sup> In a similar study in preschool children in Mashhad, Taliban et.al showed no relationship between diet with teeth and gum health.<sup>19</sup>

With regard to the effect of tea on dental health, tea consumption in students was evaluated and the results are presented in Table 4. It is interesting that no significant relationship was observed between DMFT index and the daily consumption of tea ( $P=0.175$ ) as well as the daily consumption of sugar ( $P=0.061$ ).

Tea contains fluoride and can help prevent teeth decay, on the other hand excessive intake of sugar, due to the presence of sucrose, is the most important cause of teeth decay.<sup>19</sup> Considering the simultaneous intake of tea and sugar, the positive effects of drink decrease on dental health.

According to Table 4, with increasing the consumption of sugar, the average of DMFT has regularly increased from 2.12 in the group eating much sugar to 3.03 in the group not eating sugar. However, this difference is not statistically significant. Malek Mohammadi et.al found that consumption of sugar in infants (as a food aid) is related to increased levels of teeth decay.<sup>20</sup>

Table 5 shows the relationship between family size and economic situation of families with DMFT index. According to Table 5, there is a significant relationship between economic and DMFT index ( $P=0.014$ ). As seen, with the improvement of the economic situation DMFT

index decreased. It seems that improving economic situation of families could easily pay for dental services and dental costs run more

smoothly (of course in the case of food culture correction).

**Table 4** the status of DMFT in students and the use of snacks, tea and sugar

Variable	Status	N	Percent	DMFT Average and SD	P-value
<b>Snacks</b>	Not eaten	154	48.1	2.42 ± 2.01	0.02
	Not decay causing	67	20.9	1.95 ± 1.98	
	Decay causing	99	31	2.86 ± 2.51	
<b>Daily drinking tea</b>	No drinking	43	13.4	2.25 ± 2.23	0.175
	1 cup	56	17.5	1.94 ± 1.69	
	2 cups	81	25.3	2.68 ± 2.32	
	3 cups	68	21.3	2.73 ± 2.48	
	4 cups and more	72	22.5	2.82 ± 2.42	
<b>Sugar consumption</b>	No consuming	50	15.6	2.12 ± 2.13	0.061
	Low	100	31.2	2.22 ± 1.9	
	Moderate	112	35	2.75 ± 2.34	
	High	58	18.1	3.03 ± 2.73	

The results of study by Wulaerhan et.al showed that by increasing the family's annual income, teeth decay decreased.<sup>21</sup> Another study showed that by increasing the family income, the DMFT also increased.<sup>22</sup> Regarding the effect of family size on DMFT index, results showed no differences (Table 5). But Faezi et.al showed a

direct correlation between the index and the number of family members. They announced that with increasing number of children, DMFT index increased.<sup>6</sup> Moreover, Hallett and Rourke reported that in children with birth rank of 4 or higher, the prevalence of dental caries was more than those of 1, 2 or 3 children.<sup>23</sup>

**Table 5** Relationship between family size and economic situation with DMFT index.

Variable	Status	N	Percent	DMFT Average and SD	P-value
<b>Economic status</b>	Poor	38	11.9	3.34 ± 2.62	0.014
	Moderate	186	58.1	2.65 ± 2.33	
	Good	75	23.4	2.01 ± 1.87	
	Very good	21	6.5	1.95 ± 2.06	
<b>Family member (people)</b>	4 or less	84	26.25	2.43 ± 2.15	0.478
	5	118	36.9	2.7 ± 2.62	
	6	76	23.75	2.26 ± 1.8	
	7 or more	42	13.1	2.81 ± 2.28	

**Table 6** Relationship between DMFT index with parents' education level

Variable	Status	N	Percent	DMFT Average and SD	P-value
<b>Father education</b>	Uneducated	42	13.4	2.4 ± 1.79	0.253
	Primary	103	32.9	2.95 ± 2.43	
	Guidance school	63	20.1	2.3 ± 1.7	
	High school	77	24.6	2.45 ± 2.38	
	University degree	28	8.9	2.14 ± 2.99	
<b>Mother education</b>	Uneducated	122	38.6	2.7 ± 2.37	0.407
	Primary	112	35.4	2.67 ± 2.51	
	Guidance school	37	11.7	2.54 ± 1.82	
	High school	38	12	2 ± 1.66	
	University degree	7	2.2	1.7 ± 1.6	

Table 6 presents the relationship between DMFT index with parents' education level. According to ANOVA test, no significant relationship exists between DMFT index and father's ( $P=0.253$ ) and mother education ( $P=0.407$ ). Sajadi *et.al* also reported no significant relationship between the index and parental educational level.<sup>1</sup> But Faezi study showed a significant difference between DMFT and parents educational level.<sup>6</sup> The results of Nibras *et.al* in Baghdad showed that the mothers of students having higher education, had higher average DMFT, while there was no significant relationship between father's educational level and DMFT.<sup>24</sup> In this study, only nine percent of fathers and two percent of mothers had university degree. Regarding to the key role of mothers in children's oral health, increasing their knowledge in this field can be effective in improving children's health, especially DMFT index.

### Conclusion

In this study, dental health and the mean of DMFT of permanent teeth in girl students of guidance school in Piranshahr and the relationship between DMFT by brushing, tea and sugar, snack food consumption and type, parental education, family member number, economic and visiting the dentist was evaluated. The results of this study showed that the mean DMFT in the students was  $2.53 \pm 2.28$ . The frequency of brushing, snack consumption, visiting the dentist and family economic status had a significant correlation with the DMFT index ( $P<0.05$ ). The daily tea drinking, sugar consumption, number of family members, parents' education level had no significant correlation with the index ( $P>0.05$ ). The average of DMFT in Piranshahr guidance school students was higher than WHO guidelines and lifestyle has a major impact on the index.

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