Comparison of teeth parameters and their related factors in 6- to 12-year-old children

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Abstract

Aims: Recognizing tooth health condition in each region is essential in order to take prevention measures. Dental exam is the most effective way of determining tooth health condition. The aim of this study was to determine decayed, missing and filled teeth (DMFT and dmft) indices and their related factors in 6- to 12-year-old children of military and non-military personnel.

Methods: This cross-sectional descriptive-analytical survey was performed on 201 of 6- to 12-year-old children of military and 200 of 6- to 12-year-old children of non-military personnel referred to Imam Khomeini dental clinic in Tehran in year 2009. Dental exam was done by a dentist and results were recorded in world health organization standard form. Data was analyzed by SPSS 11.

Results: Overall 9359 teeth were examined. Frequency of decayed, missing and filled teeth were 1224 (23%), 185 (4%) and 695 (13%), respectively. Frequency of decayed, missing and filled teeth were 238 (8%), 0 (0.0%) and 16 2 (4%), respectively. In general, mean dmft and DMFT were 5.29±3.52 and 1.01±1.47, respectively.

Conclusion: Mean of DMFT and dmft indices don’t have a significant statistical difference in military and non-military personnel’s children. Tooth decay has a significant correlation with age, parents’ educational level, birth order and primary prevention dental care. These factors should be considered extensively in order to keep children’s teeth healthy.

Keywords: 6- To 12-Year-Old Children, Military Personnel, "Decayed, Missing & Filled Teeth Indices" (DMFT & dmft)

Introduction

Tooth decay [or dental caries] is the most common chronic disease that is caused by sugar consumption, activity of microorganisms and as a result, the loss of calcified tooth tissue. Today with the advancement of science and technology, new materials and techniques have been created to be replaced with the lost tooth tissue. It is evident that none of these methods has the function of the very primary and normal tissue; therefore the most principal way of tooth care is prevention. The consequence of dental caries is dental pain, treatment-induced anxiety, eating restrictions and the subsequent growth disorder. Oral health is affected by family factors, nutrition, cultural; education etc. oral hygiene is the determining factor in decreasing or absence of dental caries so that rotting and losing individual's teeth are as indicator of society health. In some countries, Tooth decay rates are declining due to the health care. DMFT Index (index of decayed, missing, filled teeth) is the best epidemiological index in dentistry and it can indicate the severity of dental caries of individuals (DMFT and dmft indices are related to the permanent and primary teeth respectively) [2]. Day to day we are witness of decreasing DMFT index [3]. For example, during the years 2000 to 2005, the index rate in Australia, Britain, Holland and Denmark was 0.3, 0.7, 0.8 and 0.8 respectively. However the index rate in developing countries such as Bolivia, Gabon, and Tamil Nadu was 4.7, 4.4, 3.94, respectively [4].

Many studies about dental caries have been done in Iran. Study of DMFT index in 12-year-old children in Tehran showed that the mean index in 1990 was equal to 3.52 but at the end of the study it came out to be 2.83. The percentage of children with caries-free permanent teethes had been increased from 7.6% to 25%. The results showed that dental caries as infectious disease affected by several factors such as parental education, family economics, family population, care before and after delivery and observing oral hygiene [5, 6].

Country study of the oral-health office showed that the DMFT index of Iranian children was 1.05±0.01. Percentage of caries-free individuals in this age group has been reported to be 47.7% [7]. In a study done by Mayer et al. in Tehran, Semnan and Dibaj villages, the mean surface index (DMFS) of 6-year-old children was determined to be respectively 7.1±6.1, 9.1±9.2, and 7.2±7.4 [8]. The aim of the World Health Organization is to have 12-year-old children in the Eastern Mediterranean Region till 2010 with DMFT
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Identifying the existing conditions of that region is necessary for measures done to prevent dental disease in each region. For this purpose, it needs to precisely investigate that region in line with registration of condition and available facilities. Dental examinations are the most effective way to determine the oral health status and needs of school children or other groups in society. Decay rate in developed countries has had a declining trend since 1974 with epidemiological studies and applying the principles of dentistry and appropriate preventive measure [10].

The purpose of this study was to determine the dmft and DMFT indices and their related factors in 6- to 12-year-old children of military personnel and civilians.

Methods

This cross-sectional descriptive-analytical survey was conducted in 2008. 401 subjects including 6- to 12-year-old children of military and 200 of 6- to 12-year-old children of non-military personnel were selected by available sampling method. The subjects' tooth was examined by dentist and the results were recorded in the standard form of the World Health Organization. According to the World Health Organization a tooth surface was considered to be decayed [4]. Subjects' demographic characteristics and factors related to caries index were registered and collected in other forms by questioner using interview with the children attendant. Different factors such as age, sex, toothbrushes, use of dental floss, snacks and dairy products consumed throughout the day and night, frequency of dental checks by dental practitioner, the number of children per family, parent education and occupation, prevention treatment, and awareness of parents of the first eruption of permanent tooth were examined. Collected data were entered into the SPSS 11 software and were analyzed using central index, statistical distribution and chi-square test, Fisher exact test, student t-test and ANNOVA [11].

Results

202 (%50.4 of the total) patients were male and 199 (%49.6) were female. Their average age was 8.63±1.71 years. Father education level of 244 (%66.5 of the total) children was academic and that of others (%33.5) was non-academic. 83 (22.3%) of the total) children were from single-family and other children (77.7%) were from family containing two or more children. 359 (96% of the total) children were brushing their tooth. 140 (37.4% of the total) children were brushing irregularly, 50% of them brushing once a day and 32 (6.8%) of them brushing twice a day. 83 patients (%24.6) were brushing less than 20 minutes after eating. 72 (19.7%) of them were using dental floss, and among them 40 (%55.6) subjects were using it before brushing. 84 (%27.3 of the total) subjects consumed snacks.

Table 1- Comparison of the mean dmft index of the children under study according to age

<table>
<thead>
<tr>
<th>Teeth condition</th>
<th>Age</th>
<th>Mean</th>
<th>SD</th>
<th>Level of significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decayed (d)</td>
<td>6</td>
<td>2.36</td>
<td>2.60</td>
<td>0.0001</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>4.19</td>
<td>3.65</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>3.61</td>
<td>2.98</td>
<td></td>
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<tr>
<td></td>
<td>9</td>
<td>3.09</td>
<td>2.55</td>
<td></td>
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<td></td>
<td>10</td>
<td>2.54</td>
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<td></td>
<td>11</td>
<td>1.93</td>
<td>2.37</td>
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<tr>
<td></td>
<td>12</td>
<td>1.24</td>
<td>2.14</td>
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<tr>
<td></td>
<td>Total</td>
<td>3.01</td>
<td>2.95</td>
<td></td>
</tr>
<tr>
<td>Missed (m)</td>
<td>6</td>
<td>0.20</td>
<td>0.53</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>0.46</td>
<td>0.86</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>0.51</td>
<td>1.03</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>0.59</td>
<td>0.73</td>
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<td>1.05</td>
<td></td>
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<tr>
<td></td>
<td>11</td>
<td>0.37</td>
<td>0.96</td>
<td></td>
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<tr>
<td></td>
<td>12</td>
<td>0.16</td>
<td>0.62</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>0.47</td>
<td>0.88</td>
<td></td>
</tr>
<tr>
<td>Filled (f)</td>
<td>6</td>
<td>2.96</td>
<td>2.46</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>1.73</td>
<td>1.86</td>
<td></td>
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<tr>
<td></td>
<td>8</td>
<td>2.36</td>
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<tr>
<td></td>
<td>9</td>
<td>1.79</td>
<td>1.68</td>
<td></td>
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<tr>
<td></td>
<td>10</td>
<td>1.77</td>
<td>1.96</td>
<td></td>
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<tr>
<td></td>
<td>11</td>
<td>1.49</td>
<td>2.09</td>
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<tr>
<td></td>
<td>12</td>
<td>0.36</td>
<td>0.75</td>
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<tr>
<td></td>
<td>Total</td>
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<td>2</td>
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</tr>
<tr>
<td>dmft index</td>
<td>6</td>
<td>4.71</td>
<td>3.70</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7</td>
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</tr>
<tr>
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<td>12</td>
<td>1.76</td>
<td>2.60</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>5.26</td>
<td>3.51</td>
<td></td>
</tr>
</tbody>
</table>

Only 11 people (%3.2) had no use of dairy products. 75 (%22.2) people had referred to the dental practitioner two times last year for regular dental examinations without a specific complaint. 41 (12.5%) people had referred to the dental practitioner two times last year due to the tooth problems. 108 people (35.1%) , 5 (2.7%) people and 78 people (42.2%) had undergone Fluoride therapy, fissure sealants and preventive restorations, respectively. Knowledge of 239 (72.5%) parents about the time of the first eruption of permanent teeth was incorrect. Parents of 48 patients (24%) of children of military personnel and 75 patients (9.44%) children of civilian people, had non academic education and other had university education.
9359 teeth were examined, among which 5390 teeth (57.5%) were milk teeth and 3969 (42.5%) were permanent. Frequency and relative frequency of the decayed milk teeth (d), missing (m) and filled (f) were respectively 1224 (23%), 185 (4%) and 695 (13%) and the rest were healthy. Frequency and relative frequency of decayed permanent teeth (D), missing (M) and filled (F) were respectively 238 (8%), 0 (0) and 162 (4%) and the rest were healthy tooth.

Mean of dmft index in boys was 44.1±93.0 and in the girls was 49.1±8.1 and this difference was not statistically significant (p=0.0001). Differences in dmft rate and the rate of DMFT in the children who had been using goody were respectively 5.02±3.41 and 0.83±1.37. Children whose parents had correct knowledge about the time of the first eruption of permanent teeth had lower missing and decayed but more filled teeth in respect to children whose parents were unaware and their dmft and DMFT indices were respectively 5.01±3.2 and 0.97±1.4. The mean of dmft for Children using preventive dental procedure was 5.47±3.32 and the average of DMFT was 1.29±1.57.

The mean difference between the index of group studied in terms of father education, number of children, the use of preventive dental treatment was statistically significant (p<0.05). However, The mean difference between the groups studied in terms of the

<table>
<thead>
<tr>
<th>Teeth condition</th>
<th>Age</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
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<td></td>
<td>8</td>
<td>0.43</td>
<td>0.94</td>
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<td></td>
<td>9</td>
<td>0.79</td>
<td>1.31</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>0.90</td>
<td>1.24</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>1.37</td>
<td>1.56</td>
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<td>12</td>
<td>1.04</td>
<td>1.27</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>0.61</td>
<td>1.51</td>
</tr>
<tr>
<td>Filled (f)</td>
<td>6</td>
<td>0.26</td>
<td>0.96</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>0.09</td>
<td>0.44</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>0.21</td>
<td>0.65</td>
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<td></td>
<td>9</td>
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<td>0.95</td>
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<td>0.83</td>
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<td>12</td>
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<td>1.20</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>0.42</td>
<td>0.95</td>
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<tr>
<td>DMFT index</td>
<td>6</td>
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<td>1.30</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>0.19</td>
<td>0.62</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>0.64</td>
<td>1.15</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>1.28</td>
<td>1.62</td>
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<tr>
<td></td>
<td>10</td>
<td>1.73</td>
<td>1.59</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>2.04</td>
<td>1.67</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>1.92</td>
<td>1.44</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>1.03</td>
<td>1.48</td>
</tr>
</tbody>
</table>

The missed tooth (M) was zero for all ages.

The mean difference between the index of group studied in terms of father education, number of children, the use of preventive dental treatment was statistically significant (p<0.05). However, The mean difference between the groups studied in terms of the

<table>
<thead>
<tr>
<th>Children→ Teeth status</th>
<th>Military</th>
<th>Non-military</th>
</tr>
</thead>
<tbody>
<tr>
<td>d</td>
<td>2.95±2.93</td>
<td>3.20±3.07</td>
</tr>
<tr>
<td>m</td>
<td>1.01±0.58</td>
<td>0.69±0.35</td>
</tr>
<tr>
<td>f</td>
<td>2.07±1.91</td>
<td>1.96±1.58</td>
</tr>
<tr>
<td>dmft index</td>
<td>5.44±3.47</td>
<td>5.13±3.57</td>
</tr>
<tr>
<td>D</td>
<td>0.66±1.16</td>
<td>1.12±0.54</td>
</tr>
<tr>
<td>M</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>F</td>
<td>0.46±0.918</td>
<td>0.96±0.36</td>
</tr>
<tr>
<td>DMFT index</td>
<td>1.48±1.12</td>
<td>1.470.90</td>
</tr>
</tbody>
</table>

The mean difference between the index of group studied in terms of father education, number of children, the use of preventive dental treatment was statistically significant (p<0.05). However, The mean difference between the groups studied in terms of the
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indicators such as maternal education, tooth-brushing, tooth-brushing time, the use of dental floss, snacks and dairy use, visiting the dentist, fluoride therapy, the use of preventive dental treatment, knowledge of parents about the time of the first eruption of permanent teeth were not statistically significant (p>0.05). The average difference between DMFT and dmft indices in children who had military and civilian parents were not statistically significant (p>0.05; Table 3).

Discussion

In this study, the mean dmft index was 5.29±3.52. Dr. Pakshir recorded the mean dmft of 6-year-old children as 4.8 and that of 12-year-old children as 5.1 [12]. Meyer-Lueckel also found mean dmft to be 3.4 in 6-year-old children [8]. The results of these two studies are inconsistent with the results of present study and the index value is higher in this study. The mean DMFT index was 1.01±1.47. Tagliaferro et al. gained the mean DMFT index for the years 1976, 1984, 1990, 1995, 2001 and 2006 in Brazil respectively 9.9±3.96, 6.98±3.80, 4.30±3.11, 4.29±3.44, 1.53±2.07 and 53.1±90.0. Only the average index in 2006 is less than that of this study [13].

The investigation of absolute and relative frequency of primary teeth shows that the highest value is related to decayed primary teeth. Pakshir calculated the percent of 6-year-old children without rotten primary tooth as 8.13% that does not match with the current study. In permanent teeth the lowest rate is observed in the lost permanent teeth. This study showed that the dmft rate will increase from 6 to 9 years of age and then it will reduce up to 12 years of age. In this study, the mean dmft in 6-year-old children was less than the mean dmft reported by Dr. Pakshir but more than the figure calculated by Meyer-Lueckel and the DMFT mean in 12-year-old was more than the figure from Pakshir’s study. Chu et al. conducted a study entitled "oral health status and health habits of children aged 6 years" in rural Cambodia. According to their Examination on 120 6-year-old children, the mean DMFT index was 7.9±5.5 and it was more than the figure of the present study. They also examined 196 children aged 12 years and reported that the mean DMFT index was 6.1±1.1. This figure is also inconsistent with the results of this study [14].

In our study, d component had the highest rate among 7-year-olds in dmft parameter. The highest rate of m component was observed in 10-year-olds and the highest component of f was seen in 8-year-olds. The results of Pakshir’s study showed that the D component of the DMFT index has the highest rate and it is consistent with the present study. In our study, boys had higher mean dmft index than girls. Saeed Moallemi et al reported that the mean dmft was 4.2±2.9 for boys and was 3.4±2.6 for girls and this difference was statistically significant (p<0.01). The results of this study regarding the effect of gender on tooth decay are consistent with A. Vinea’s result but differ from Saeed moallemi et al [15]. The highest dmft and d component were seen in the children of large families (three/four or more children).

This study showed the rate of permanent tooth decay increase in the age of 6 to 11 years but has a decreasing trend in the age of 12. The country study of variation trend of DMFT index for permanent teeth of Iranian children aged 6 to 12 years old conducted by the office of oral health showed that the DMFT of children aged 6, 9 and 12 years old are respectively 0.2±0.02, 0.9±0.05 and 1.5±0.01 and these figures are inconsistent with the results of this study.

In this study, the mean DMFT for 12-year-old children is less than the mean DMFT study of Al-tamimi and Palenstein in Medina, Saudi Arabia, and is more than that of Hardman and Vanpalein study in Nepal [16, 17]. In this study there is not a significant correlation between DMFT indexes and educational level. Danesh Kazemi and Davari also did report significant relationship between the DMFT index with educational level and occupation of parents [18]. The highest DMFT were found in children who did not have educated fathers, respectively. Saeed Moallemi et al. showed that the relation between dental caries of children with educational level of parents is statistically significant.

In this study there was a significant relation between DMFT and dmft indices with age, the number of children in a family, the use of dental floss, use of preventive dental treatment (p>0.05), while other Independent variables such as parental education, toothbrushes, handling regular brushing, frequency and time of handling, use of dairy and snacks, tooth doctor visits, fluoride therapy, parental knowledge about the time of the first eruption of permanent teeth, had no statistically significant effect on DMFT and dmft indexes (p>0.05). There was no significant difference between mean dmft and DMFT indices of children whose parents are military and non-military (p>0.05). In the study of Danesh Kazemi and Davari, No significant relation was seen between mean DMFT with education level and occupation of parents that was consistent with the present study. Study results done by Pourhashem showed that the mean DMFT has an inverse correlation with parental education level and frequency of tooth brushing, but direct relation
with the number of children of a family that was inconsistent with the findings of the present study [6, 18].

Conclusion

Tooth decay is a multi-factorial infectious disease affected by several factors such as age, the use of snacks, the use of preventive dental treatment, parental education and the number of children in a family that it is necessary to take modifiable variables into serious consideration in order to keep the tooth healthy.

Acknowledgement: All colleagues who cooperated in this study are appreciated. In addition, authors thank the deputy head and research assistance of Imam Khomeini clinic, and especially Dr. Mehrdad, the honorable colleague.

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