Oral health of the Croatian army recruits in 2001

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ABSTRACT

Aim Oral health of Croatian Army recruits has been researched. In 2001, 505 19-year-old recruits in the barracks in Koprivnica were clinically examined and asked about their health care habits.

Methods The oral status of all teeth (except wisdom teeth) was described by the DMFT index (decayed, missing, and filled teeth) and compared with the FST index (filled and sound teeth). The level of the recruits’ restored teeth was calculated by the formula FTX100/DFT.

Results The research showed the average DMFT index value of 7.32. The average value of the FST index was 23.56, and 47.8% of the teeth were restored. A statistically significant difference according to domicile was determined in the DT, MT, FT and FST index. The subjects from rural environments had more teeth affected by caries, and those from urban environments had more restored teeth (66.59%). The health condition of the subjects from urban environments is better (higher values of the FT index and slower cumulative distribution and statistical significance of the FST index).

Conclusion The FST index is more adequate than the DMFT index for application in populations with a higher level of teeth affected by caries. The research conducted contributes to the determination of dental health of the Croatian Army recruits as well as to the organisation of optimal preventive programs.

Key words: dental caries, recruits, DMFT, epidemiology
INTRODUCTION

Oral health assessment is based on the examination of incidence and frequency of dental caries. Its spread is determined by regional factors and dynamic migration of people and it is directly determined by nutrition, oral hygiene and type of fluoridation. Epidemiological studies of caries use methodological standards, especially the decayed, missing, and filled teeth (DMFT) index as an indicator of the cumulative effect of caries on permanent teeth during life. The data about smaller and specific groups are especially important, due to the interaction of various socio-economic states and habits (1, 2).

The system of health protection oriented towards planning and implementation of preventive measures against caries brought about the tendency of decline in caries prevalence in children and adolescents in all European countries (2-5).

Oral health of recruits was a subject of many epidemiological studies carried out in Australia (6, 7), the Czech Republic (8), Denmark (9), Germany (10, 11), Italy (12), Norway (13), Switzerland (14, 15), UK (16), Turkey (17), and Croatia (18, 19).

The purpose of our study was to assess oral health of Croatian army recruits by establishing the DMFT value depending on age and social communities the subjects came from.

PATIENTS AND METHODS

Caries prevalence was examined in the Dental Clinic of the Recruits Centre in Koprivnica. The study was carried out in 2001 and comprised 505 randomly chosen recruits at the age of 19. The subjects were classified according to their area of living (urban and rural).

Caries was diagnosed by standard instruments, diagnostic light and Kuhhorn probe. Caries was described by the DMFT index as follows: D=decayed, M=missing, F=filled and T=teeth. Teeth with diagnosed decay (D) were classified in D_{2-4} according to Marthaler (20). This clinical classification includes caries lesions with cavitations that can be identified by probing. Initial lesions were not considered. The level of restored teeth was calculated by the formula FTx100/DFT. Wisdom teeth were not examined, and the study also comprised subjects without caries (DMFT=0). The FST index (F=filled and S=sound teeth).

Clinical examination included the evaluation of dental status and was performed always in the same way, starting from the lower right quadrant. The data on potential risk factors for caries were entered in a form made for this purpose, containing the living areas, and oral and hygienic habits of the subjects (number of toothbrushing per day and reasons to visit the dentist per year). No radiographs were taken.

Multi-examiner training, calibration and validation courses were arranged by two independent examining teams, each consisting of a dentist and a dental nurse. Dental examinations were carried out by the authors of this study, who were calibrated between themselves by asking each other to examine the same group of recruits and to compare the findings.

The statistical analysis (average, standard deviation, t-test, chi-square tests, one phase variance analysis) was performed by means of the programme STATISTICA for Windows, Release 5.5 A (‘99 Edition). Statistical significance of p<0.05 was used.

RESULTS

Inter-examiner agreement between researchers S.R.D. and T.B. was measured with the t-test statistics on 50 subjects. It showed a statistical high correlation for the DMFT index (correlation was 0.996 with p<0.001) (Table 1).

The mean value for the DMFT was 7.32, ranging from 0 (9.3% of the subjects) to 28 (5.0% of the subjects). There were 3.15 decayed teeth

<table>
<thead>
<tr>
<th>Investigators</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>Standard error mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>T.B.</td>
<td>6.90</td>
<td>4.25</td>
<td>0.60</td>
</tr>
<tr>
<td>S.R.D.</td>
<td>6.82</td>
<td>4.22</td>
<td>0.60</td>
</tr>
</tbody>
</table>

*DMFT, Decayed, Missing, Filled, Teeth
(DT), 1.29 extracted and/or missing teeth (MT), and 2.88± teeth with fillings (FT). The mean value for the FST index was 23.56.

The average of the DMFT value for each subject’s area of living is shown in Table 1. The subjects of the rural area had more decayed teeth, and the urban subjects had more teeth with fillings (DT p<0.001, FT p<0.001). The subjects of the rural area had more missing teeth (MT p=0.004) and a lower FST index (p<0.001). But there was no statistically significant difference for the DMFT index.

The subjects (only 5.35%) who brush their teeth three or more times per day had significantly higher values of the FT (p=0.008) and FST index (p=0.026), and a lower DT index (p=0.007) than the subjects who brushed their teeth less than three times per day (Table 3).

The subjects (only 18.2%) who visit the dentist regularly have had a lower DT index (p<0.001) than the subjects who visited the dentist irregularly during a year. The FT and FST index were also significantly higher in the subjects who visit the dentist regularly (p<0.001). There was no difference for the MT index between these two subgroups (p=0.155).

The average amount of restored permanent teeth was 48.92%. The subjects from the rural environment have more teeth affected by caries and less restored teeth (33.25%), and those from the urban environment have more restored teeth (decayed, missing and filled teeth 66.59%), which was statistically significant (p<0.001).

Two way analysis of variance (ANOVA) confirmed the independent statistical significance for the restored teeth and the subjects’ area of living (p<0.001), and according to the number of toothbrushing (p=0.048), domicile (p<0.001) and the reason to visit the dentist (p<0.001).

The health condition of the subjects from the urban environment was better (higher values of the FT index and slower cumulative distribution and statistical significance of the FST index) than the subjects of the rural area. There was no statistically significant difference in the cumulative distribution of the DMFT index in relation to the subjects from different environments (Figure 1A, Figure 1B, Table 2).

### Table 2. Test differences of the DMFT index and FST index in subgroups of the subjects (average and standard deviations for caries frequency) by means of variance analysis*

<table>
<thead>
<tr>
<th>Subgroups</th>
<th>No of subjects</th>
<th>DMFT</th>
<th>DT</th>
<th>MT</th>
<th>FT</th>
<th>FST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>505</td>
<td>7.32±4.35</td>
<td>3.15±3.23</td>
<td>1.29±1.90</td>
<td>2.88±3.55</td>
<td>23.56±4.13</td>
</tr>
<tr>
<td>Urban</td>
<td>160</td>
<td>7.64±4.66</td>
<td>1.28±3.02</td>
<td>0.93±1.49</td>
<td>4.43±3.74</td>
<td>24.79±3.51</td>
</tr>
<tr>
<td>Rural</td>
<td>345</td>
<td>7.18±4.94</td>
<td>3.56±3.25</td>
<td>1.45±2.04</td>
<td>2.17±3.23</td>
<td>22.99±4.28</td>
</tr>
<tr>
<td>Probability statistical test</td>
<td>0.158</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

*DMFT, Decayed, Missing, Filled, Teeth; DT, Decayed, Teeth; MT, Missing, Teeth; FST, Filled and Sound Teeth

**Figure 1.** A) Cumulative distribution of the DMFT (Decayed, Missing, Filled, Teeth) index in relation to subjects from different environments; B) Cumulative distribution of the FT (Filled, Teeth) index in relation to subjects from different environments
DISCUSSION

Croatia is a country with characteristics of a socio-economic transition. The DMFT index is a good indicator of the degree of development and an important factor in designing and planning the national programmes of oral health starting from the earliest age (4).

The data about the DMFT values in populations of recruits are relatively numerous. Morgan et al. (6) determined the DMFT values of 6.8 in Australian Navy recruits. In subjects of Australian army recruits Hopcraft and Morgan (7) determined a decline in the level of caries experience, with the mean DMFT scores for recruits aged between 17-35 was 6.08. For the subjects of the same age (17-25 years of age) in this study DMFT scores were only 4.11. Krejcsa et al. (8) established the average DMFT value of 6.22 (DT: 0.87, MT: 0.02 and FT: 5.33) in 18-year-old Czech recruits. Andersen et al. (9) found a decrease of caries of 63% in Danish recruits in the period between 1972-1993 (DMFT 6.2. in 1993), Willerhausen et al. (10) found the average DMFT index of 13.0 in German recruits, and Klimek et al. (11) the value of 7.5. In Italian recruits the determined DMFT was 7.14 (12). Asmyhr et al. (13) revealed caries decrease in Norwegian recruits to the DMFT value of 10.2. In the study of Swiss recruits Menghini et al. (14) established the DMFT values of 10.1 (DT: 4.2, MT: 0.5 and FT: 5.4), and in 1996 Menghini et al. (15) found a decline in caries of 48%, which amounted to 5.06. In Royal Air Force recruits Richardson and McIntyre (16) revealed a caries decrease to DMFT 6.5. A study of Turkish recruits (17) established the DMFT values of 6, with a significant relationship between the DMFT value and sugar consumption. A common characteristic of all results in these studies is significant caries decrease in recruits, and the determined DMFT values which are mostly lower than those determined in our study of the Croatian army recruits.

Specific characteristics of various age and social populations in Croatia with respect to age and social status are discussed in many studies. In the former Yugoslavia there were great differences between caries prevalence between the developed and undeveloped Federal Republics. The average DMFT value for 12-year-olds amounted to 6.1 and for 18-year-olds as high as 10.9 (21). The spread of caries was exceptionally wide, and therefore, the DMFT index for the age range between 19 and 29 amounted between 10.18 and 12.48 (22). Lobnik-Gomilšek (23) found the average DMFT index of 8.06 for military recruits in the Federal Republics of the former Yugoslavia (for the subjects from rural areas 7.64 and urban areas 8.52). In Croatia the average DMFT value was 8.41 (DT: 3.87, MT: 1.15 and FT: 3.39), with a higher value in urban areas. According to our results for Croatian recruits, a decline in caries of 7.7% was found. In the analysis of single values share of DMFT it can be concluded that there is a decline of decayed teeth for 48%, whereas there is an increase of filled teeth for 25%. An increase in the number of missing teeth for 30% is unfavourable. Previous studies of Croatian recruits showed that the most common oral disease was dental caries (value 5.84), and in 2000 healthy teeth were found in only 4% subjects, but with better values of the investigated indices. The DMFT=6 value was lower, and the FST=25 value was higher (18, 19).

Epidemiological studies provide valuable data on the health status of groups of inhabitants, assessing the prophylactic measures that have been implemented. They also provide guidelines for improvement of oral health, which is especially important in European countries in transition (24-26).

<table>
<thead>
<tr>
<th>Subgroups</th>
<th>No of subjects</th>
<th>DMFT</th>
<th>DT</th>
<th>MT</th>
<th>FT</th>
<th>FST</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 time per day</td>
<td>264</td>
<td>7.25±4.84</td>
<td>3.54±3.30</td>
<td>1.28±1.99</td>
<td>2.43±3.26</td>
<td>23.18±4.30</td>
</tr>
<tr>
<td>2 times per day</td>
<td>214</td>
<td>7.50±4.94</td>
<td>2.84±3.16</td>
<td>1.34±1.84</td>
<td>3.32±3.75</td>
<td>23.82±3.97</td>
</tr>
<tr>
<td>3 times per day</td>
<td>27</td>
<td>6.67±4.35</td>
<td>1.89±2.52</td>
<td>0.93±1.30</td>
<td>3.85±4.15</td>
<td>25.19±3.16</td>
</tr>
</tbody>
</table>

Probability statistical test

0.659 -0.007 -0.571 -0.008 -0.026

*DMTF, Decayed, Missing, Filled, Teeth; DT, Decayed, Teeth; MT, Missing, Teeth; FST, Filled and Sound Teeth
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