SOCIO-BEHAVIOURAL FACTORS AND DENTAL CARIES SEVERITY IN A GROUP OF SCHOOL CHILDREN

Diana Daniela Daciana Zmarandache¹, Rodica Luca²

Abstract

The scope of the paper was to evaluate dental caries severity as a function of some socio-economic and behavioural factors.

Materials and method. A transversal clinical study performed on 396 children with ages between 6 and 12 years, involving examination and interviewing of the subjects was developed. The DMFT/S and dmft/s indices were calculated and the habits related to hygiene, diet and some socio-economic factors were registered.

Results. Caries indices were statistically lower in children who brushed their teeth 2-3 times/day (DMFT/S=1.5/2.6), in those using auxiliary hygiene means (DMFT/S=1.14/1.6) and also in those consuming predominantly meat (DMFT/S=0.88/1.19) and fruits/vegetables (DMFT/S=1.43/2.18). The indices were also lower in the children growing in families with a high socio-economic level (DMFT/S=1.47/2.08), whose mothers are employed (DMFT/S=1.41/2.14) and have universitary training (DMFT/S=1.35/1.67).

Conclusions. The indices of carious experience were influenced by certain socio-behavioural factors, which may provide explanations for the different types of cariactivity recorded.

Keywords: socio-behavioural factors, dental caries, child.

INTRODUCTION

Dental caries is a multifactorial disease in which, under certain circumstances, the involved factors act concomitantly for determining some obvious clinical manifestations. Numerous studies have shown that the carious disease is largely depending on certain social and behavioural factors [1-4].

The pattern of the diseases of oral cavity differs from one country to another, depending on the living standards, on socio-economic, environmental and behavioural factors (oral hygiene, alimentary habits), on the sanitary system of dental medicine of each community and also on the capacity of implementing efficient measures for the prevention of such diseases.

Previous studies developed in Romania confirmed the existence of some associations between the socio-economic status (SSE) of children and their oral health condition, which calls for extensive investigations in this field [5-7].

Considering the quite reduced number of studies devoted to the impact of the social and envirommental factors upon oral health and also the importance and actuality of such a theme, the present study aims at determining a possible influence of some social and behavioural factors upon caries occurrence, and the statistical significance of such an association.

MATERIALS AND METHOD

The investigation was performed in Fetești, an agro-industrial town of the Ialomiţa district, with a population of 33,294 inhabitants. A clinical, transversal study was realized on 396 pupils (201 boys and 195 girls) with ages between 6 and 12 years (average age: 9.08±1.92 years), from two randomly selected schools.

The children were examined according to the WHO in force (1997), in their class-rooms, under natural light, the instruments used being flat dental mirrors and periodontal probes [8]. No radiological examinations were made.

The files especially designed for the study recorded the presence and distribution of caries, of obturations and of the teeth absent because of caries, mention being made of the fact that the recordings made included only carious processes with absence of substance.
Quantification of dental caries severity was based on the calculation of four indices: dmft, dmfs, DMFT and DMFS.

In the examination day, the children were interviewed about some behavioural and socio-economic factors. 5 questions were asked about *behavioural factors*, 3 questions – about *oral hygiene*: (if they have tooth paste and tooth brush at home, which is the frequency of dental brushing and whether they use some auxiliary means of oral hygiene or not), 1 question – about the *main aliments they consume* (sweets, fruits and vegetables, farinaceous food, meat) and 1 question – about the *type of water consumed* (tap water, well water, natural or mineral water).

The questions related to *socio-economic factors* referred to: the extent of occupation of both parents (whether they are hired or unemployed), *their studies* (ten classes, lyceum, vocational education, university studies), the socio-economic condition of the family (SSE), the *background from which they come* (rural or urban) and the *number of children in the family*, the responses obtained being checked by the teacher of the class. Appreciation of parameter SSE – as low, average or high – was based on recordings about parents’ profession, on using the arborescent structure for the classification of professions in Romania, and on recordings of the number of children in the family (with the increase of which the rank of the child decreases, in parallels with parents’ experience on his/her growing) [9].

The investigations were developed according to the regulations in force, on also observing

Table 1. Dental caries severity according to behavioural factors

<table>
<thead>
<tr>
<th>Have tooth paste and tooth brush</th>
<th>Children (%)</th>
<th>DMFT</th>
<th>DMFS</th>
<th>dmft</th>
<th>dmfs</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES</td>
<td>96</td>
<td>1.27±1.53*</td>
<td>1.8±2.27*</td>
<td>5.13±3.75*</td>
<td>6.15±5.11*</td>
</tr>
<tr>
<td>NO</td>
<td>4</td>
<td>2.66±1.9 SS</td>
<td>3.57±3.4 SS</td>
<td>2.79±2.45 SS</td>
<td>11.35±9.1 SS</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency of brushing</th>
<th></th>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>1</td>
<td>2.74±1.83*</td>
<td>3.8±4.3*</td>
<td>5.25±2.5*</td>
<td>11.22±9.1*</td>
</tr>
<tr>
<td>1/day</td>
<td>34</td>
<td>1.79±1.9 NS</td>
<td>2.6±3.7 NS</td>
<td>4.61±3.1 NS</td>
<td>9.5±4.65 NS</td>
</tr>
<tr>
<td>2/day</td>
<td>38</td>
<td>1.5±1.7 SS</td>
<td>2.6±3.11 SS</td>
<td>3.5±2.1 SS</td>
<td>7.8±6.7 SS</td>
</tr>
<tr>
<td>3/day</td>
<td>27</td>
<td>1.4±1.95 SS</td>
<td>2.6±3.24 SS</td>
<td>3.4±1.9 SS</td>
<td>7.47±6.3 SS</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Auxiliary means</th>
<th></th>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>91</td>
<td>2.14±1.9*</td>
<td>2.6±3.42*</td>
<td>4.42±3.17*</td>
<td>8.48±7.16*</td>
</tr>
<tr>
<td>YES</td>
<td>9</td>
<td>1.14±1.64 SS</td>
<td>1.6±2.42 SS</td>
<td>3.12±2.35 SS</td>
<td>7.15±6.5 SS</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Main aliments consumed</th>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Meat</td>
<td>4</td>
<td>0.88±1.5*</td>
<td>1.19±2.1*</td>
<td>3.86±3.22*</td>
<td>8.3±7.74*</td>
</tr>
<tr>
<td>Vegetables/Fruits</td>
<td>20</td>
<td>1.43±1.8* NS</td>
<td>2.18±2.4* NS</td>
<td>4±3.38* NS</td>
<td>9.43±8.21* NS</td>
</tr>
<tr>
<td>Balanced diet</td>
<td>57</td>
<td>1.5±1.65 NS</td>
<td>2.44±3.2 NS</td>
<td>4.13±3.5 NS</td>
<td>9.8±10.6 NS</td>
</tr>
<tr>
<td>Farinaceous products</td>
<td>6</td>
<td>1.68±1.9 NS</td>
<td>2.6±2.5 NS</td>
<td>4.84±3.74 NS</td>
<td>10.32±8.9 NS</td>
</tr>
<tr>
<td>Sweets</td>
<td>13</td>
<td>1.86±1.8 SS</td>
<td>3.6±3.16 SS</td>
<td>5.13±2.23 SS</td>
<td>13.87±6.8 SS</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of water</th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Tap water</td>
<td>31</td>
<td>1.33±1.5*</td>
<td>2.13±3.3*</td>
<td>3.15±2.26*</td>
<td>6.85±6.76*</td>
</tr>
<tr>
<td>Well</td>
<td>4</td>
<td>1.61±1.5 NS</td>
<td>2.42±2.6 NS</td>
<td>3.85±3.03 NS</td>
<td>9.44±8.83 NS</td>
</tr>
<tr>
<td>Natural water</td>
<td>45</td>
<td>1.65±1.9 NS</td>
<td>2.49±3.4 NS</td>
<td>4.45±3.13 NS</td>
<td>10.14±8.2 NS</td>
</tr>
<tr>
<td>Mineral water</td>
<td>20</td>
<td>1.71±1.96 NS</td>
<td>2.75±3.86 NS</td>
<td>4.74±3.3 NS</td>
<td>11.8±11.1 NS</td>
</tr>
</tbody>
</table>

* reference value for statistical comparisons
the methodological norms of any research work; prior to the beginning of the inquiry, consent had been obtained from the part of school managers and parents. The obtained data, recorded in the inquiry files, have been statistically processed with the SPSS v 12.0 program. Data processing was based on ANOVA and Independent sample t tests, and the correlation among variables was determined by means of the bivariated correlation, respectively the Pearson coefficient (r). The significance level was settled at p=0.05.

RESULTS

1. Behavioural factors

96% of the interviewed children declared that they have tooth paste and tooth brush of their own, the remaining 4% ones do not having these means. The indices of caries severity were statistically significant (SS) higher in the children not having their own tooth paste and tooth brush (DMFT=2.66; DMFS=3.57; dmft=2.79; dmfs=11.35), comparatively with the values recorded for those having such means at hand (DMFT=1.27; DMFS=1.8; dmft=5.13; dmfs=6.15).

As to the frequency of dental brushing, approximately one third of the subjects wash their teeth once a day (34%), 38% – twice a day, the other ones – three times a day. A higher frequency of brushing evidences a SS reduction of the DMF/T and dmf/t indices (table 1). Even if, apparently, a disagreement occurred between the ratios of children having declared they do not have a tooth brush of their own, the difference may be explained by the fact that some children use the tooth brush of their parents, brothers etc., a situation actually recognized by the subjects.

Only 9% of the interviewed children use auxilliary means of oral hygiene, their indices of dental caries severity recording the following values: DMFT=1.14; DMFS=1.6; dmft=4.42; dmfs=10.5. For the others (91%), the indices had higher values, the difference being statistically significant (table 1).

If considering the type of predominant aliment in pupils’ diet, the lowest carioactivity was found in children consuming meat, namely in 4% of the examined subjects, the DMFT/S and dmft/s indices taking values of 0.88/1.19 and, respectively, 3.86/8.3. In the children consuming mainly sweets, the values of these indices were SS higher (1.86/3.6 and, respectively, 5.13/13.87) (table 1).

As to the type of consumed water, the lowest values of caries severity were registered in the children consuming mainly tap water (DMFT=1.33; DMFS=2.13; dmft=3.15; dmfs=6.85), while the higher ones appeared for those consuming especially mineral water (DMFT=1.71; DMFS=2.75; dmft=4.74; dmfs=11.8). However, the differences among indices are NS.

2. Socio-economic factors

61% of the mothers of the subjects work, the rest being housewives/unemployed, the percent values recorded for the working fathers being higher, of 88% (table 2). The indices of caries affection among children with hired mothers were SS lower than those recorded for children with housewives mothers (DMFT/S= 1.41/2.14; dmft/s=4.3/8 vs. 2.03/3.19 and 4.31/10.3). Fathers’occupation had no statistically significant influence upon the values of these indices (table 2).

Distribution of both parents as a function of their education level was similar. Approximately 1/5 of them attended 10 classes, more than one third of them graduated the lyceum, about one third attended a vocational school and only 12-13% of them had univeristy education. The values of the caries experience indices decreased with the increase of the professional level, a SS difference being recorded for the DMFT/S indices between children whose mothers had graduated only 10 classes (DMFT=1.97; DMFS=2.77) and those with university education (DMFT=1.35; DMFS=1.67) (table 2).

More than half of the families of the interviewed children (62%) registered an average SSE value, 23% – a low SSE, and only 15% of them – a high SSE. The indices decreased from one category to another, being SS lower in the families with a high SSE (DMFT=1.47; DMFS=2.08; dmft=3.4; dmfs=8.01), comparatively with the families with a low SSE (DMFT/S=2.02/2.92; dmft/s=5.78/12.17) (table 2).

Most of the interviewed children (96%) come from the urban zone. In spite of the lower
values of the dmft/s and DMFT/S indices recorded for the children of the urban medium, vs. those of the rural one, the differences were NS (table 2).

As to the number of children per family, most frequently, one (37%) or two (46%) children were present, the rest of 17% having three or more children (table 2). The highest values of the indices of carious experience occurred in the families with 3 or 4 children (DMFT=1.94; DMFS=3.12; dmft=4.3; dmfs=8), the values decreasing with the decrease of the number of children (DMFT=1.38; DMFS=2.02; dmft=3.9; dmfs=8.79), the differences being, nevertheless, NS.

### DISCUSSION

In Romania, relatively few studies have been devoted to the health condition of children as a function of certain socio-behavioural factors, for stating some possible associations between the odontal status and the habits of oral hygiene, parents’ occupation and education level, the SSE and the social medium from which they come.

The examined children showed that the indices of caries severity have been influenced by their oral hygiene and type of aliments predominantly present in their diet. 96% of the children have tooth paste and a tooth brush of their own, the percent value being higher than that recorded by Al-Omiri MK et al., in a study developed
on 570 pupils with an average age of 13.45 years from some public schools in northern Jordan. 83% of the Jordanian children have their own tooth paste and brush, 69% wash their teeth twice a day and 17% – irregularly [10].

In the present study, 2/3 of the children wash their teeth 2-3 times a day, and 1/3 – only once or never. The results are comparable with those of other investigations. In a study performed on 97 children from 2 schools of Bucharest, Funieru et al. reported a brushing frequency of 2 times/day in 84% of them, and of 1/day, respectively, in 14% of the children [7]. Beltrán-Valladares et al. performed a study in Mexico, on 396 children with ages between 6 and 9 years, 81.6% of them washing their teeth at least once a day, and 18.4% – less than 7 times/week [11].

91% of the examined children do not use auxiliary means of oral hygiene. The percent value is higher than that given by Al-Omri MK et al. – 86% [10]. Also, the percent is much higher than that reported in a study made on 2,481 Greek children and adolescents with ages of 12 and 15 years, of which 51.8% and, respectively 43.6%, did not use mouth wash containing fluoride [12].

The part played by certain aliments (sweets and farinaceous products) in causing dental caries is largely known [13]. In the present study, 13% of the children consume predominantly sweets and 6% – farinaceous food. These are lower values than those given by Hysi D. et al., in a study involving 372 children with an average age of 12 years, from Tirana, Albania, of whom 25% used to consume sweets several times a day, 20.2% – twice a day and 42.2% – once a day [14]. The value is also lower than the one registered in other countries, such as Hungary (35%), Poland (37.5%), Ukraine (36%) or Italy (37%) [15].

Recent studies have shown that the socio-economic factors do influence the dental caries, the ones considered in the present investigations being the occupation and studies of the parents, SSE, the origin and the number of children in the family.

For both parents, the indices of carious experience took higher values when one of them stays at home, even if it was only mother’s status (employed, housewife or unemployed) that influenced statistically significantly the value of the DMFT/S and dmft/s indices. The result disagrees with that of Pizzo G et al. in a study developed on 511 pupils from Sicily, with ages between 5 and 12 years [16]. Here, the ratio of housewife mothers was higher than in the present investigation (45% vs. 39%), while the children with mothers staying at home had more caries-free teeth than those with working mothers, which is probably due to the longer time they gave for child’s taking care (and implicitly, for oral hygiene).

The education level of the mother influenced statistically the DMFT and DMFS indices. The ratio of high-educated mothers (12%) reported here is quite close to that of Pizzo et al., namely of 12.28%. The 5 year-old children of Sicily with educated mothers had more caries than the others while, for the 12 year-old ones, the situation was similar to that of the present study, namely: the children with high-education mothers had less caries [16]. In most cases, parents represent models for their children, so that the education received in the family and the importance given to oral hygiene and, generally, to health, remain essential.

As to the SSE of the interviewed children, 23% of them showed a low SSE, 62% average SSE and 15%, respectively, a high SSE value. The ratios are similar to those obtained by Luca R. et al., in a previous study made on 177 adolescents (with an average age of 15.67 years), where 23% of the children showed a low SSE, 52.5% – a medium one and 23%, respectively, a high SSE [17]. In the present study, the SSE status represented a risk factor for the presence of caries, similar results being reported by previous studies [3,17-20], namely the presence of a higher number of caries in the families with a lower living standard. Higher incomes and a higher education level create favourable conditions for extended access to information and to health services. [20-22].

The children from the urban area evidenced higher values of the indices of caries severity than those of the rural medium, even if the differences were not SS. Different results were provided by Boitor et al., in a transversal clinical study developed on a group of 139 children, 67 from the rural and 72 from the urban (Sibiu).
environment, respectively, with the age of 12 years (± 8 month), according to which the children from the rural area showed higher values of carious experience [23].

**CONCLUSIONS**

Certain socio-economic (the extent of occupation and mother’s education, family SSE) and behavioural (oral hygiene and diet) factors influence the extent of caries severity and may explain the various types of carioactivity.

**References**