

# Clinical Study on the Prevalence of Tooth Decay in a Group of Children in First Year at Elementary School in Tîrgu Mureş

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**Objectives:** The purpose of this study was to determine the frequency of caries in a group of 7 year-old schoolchildren.

**Methods:** We carried out a survey on a group of 385 children, all pupils in first year at elementary school in Tîrgu Mureş. For the assessment of dental health we used the DMF index: DMF for permanent teeth, and dmf for temporary teeth.

**Results:** The average value of dmf index was 4.81 (SD 2.82) and the average value of DMF index was 0.92 (SD 1.05).

**Conclusions:** This study shows that in Tîrgu Mureş the actual level and pattern of dental caries development is extremely severe and there is an urgent need to improve and provide oral health through a preventive program.

**Keywords:** caries, deciduous teeth, permanent teeth, prevalence

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## Introduction

Dental caries is among the most widespread chronic, non-communicable diseases of mankind and it is certainly the only one without solid scientific analyses describing its real global prevalence at different ages [1].

In recent decades, dental caries presented a heterogeneous appearance globally, in terms of incidence among school-age children. In developed countries, as the socio-economic conditions have improved and effective preventive systems were introduced, there has been a dramatic decrease in dental caries [2,3]. In these countries the priority of the public health system was to provide oral health-related information to the child population, through educational campaigns [4,5].

In contrast with these data from developed regions, in developing countries there are ascending oral health problems [6], explained by the lack of national preventive programs. Recent studies performed in our country report high frequency indicators for caries [7,8,9].

The aim of this study was to determine the frequency of caries in a group of 7 year-old schoolchildren.

## Material and method

Before beginning this study we obtained the ethical approval and also a written informed consent from the parents of the subjects.

We carried out a survey over the course of four months on a group of 385 children, all pupils in first year at elementary school in Tîrgu Mureş.

The study sample was selected using the following inclusion criteria:

- Children attending an urban elementary school, regardless of their socio-economic, ethnic or religious status;
- Children in their first grade of school – the average age of pupils was 7 years (between 6 and 8 years).

The examiners were properly and professionally vested with mask, glasses and gloves (the latter were changed at each examination) and used previously sterilized flat dental mirrors and dental probes. The examination used the WHO criteria and it consisted of a visual inspection and a palpation with a dental probe, without exerting pressure on the enamel. No complementary tests were applied.

For the assessment of dental health the DMF index was used, which indicates the sum of caries, fillings and missing teeth. Due to the fact that the age of the subjects is characterized by the simultaneous presence of temporary and permanent teeth, two indices were used: DMF for permanent teeth and dmf for temporary teeth. The DMF index was used for every single tooth and the value was expressed by the number of teeth. The global DMF index represents the sum of the DMF and dmf indices.

The decayed-missing-filled index would not be assessed in the following cases:

- unerupted or insufficiently erupted teeth;
- missing teeth due to anodontia (absence of tooth bud);
- teeth extracted or absent for other reasons than caries (trauma, periodontal disease, orthodontic purposes);
- restored teeth (by fillings or fixed prostheses) for other reasons than caries;
- supranumerary teeth;

Rules in index assessment:

- if a tooth has simultaneously a filling and a carious lesion, only the carious score will be recorded;

- no tooth must be counted more than once;
- temporary restorations are considered carious lesions (D);
- the caries indicator is assigned for all carious lesions, regardless of the evolutionary stage of the decay;
- partially or fully dislocated permanent fillings are correlated with the filled indicator, but all restorations with recurrent caries are counted as decayed;
- a tooth is considered to be erupted when the occlusal surface or incisal edge is totally exposed in the oral cavity;
- a deciduous tooth is considered to be missing if it was lost 2 years before exfoliation age;
- a tooth is considered to be present even when the crown has been destroyed and only the roots are left;
- irrecoverable teeth, with indication of extractions are considered missing [10].

At the clinical examination, all subjects have been taught how to perform the correct tooth brushing technique using dental and brush models, and teachers were informed about the diagnosed dental problems and the dental treatment needs of the children, so thereafter they could advise the parents in this regard during semestrial meetings.

The data were statistically analyzed using Microsoft Office Excel and EViews 5.1. We used Student's t-test to compare the means of the two independent samples. A significance level of  $\alpha=0.1$  was chosen for the calculations.

## Results

Out of the 385 examined children 203 were girls (52.72%) and 182 (47.28%) were boys.

The age interval of the subjects was between 6 and 8 years, with the following distribution: 49 were 6 years old (12.72%), 294 were 7 years old (76.36%), and 74 were 8 years old (19.22%). The mean age of the subjects was 7.11 years (SD 0.49).

From the total of 385 children only 56 (14.54%) had no caries.

The average value of dmf index (in deciduous teeth) was 4.81 (SD 2.82), with the following components:

d component = 4.34 (SD 2.77);

m component = 0.14 (SD 0.44);

f component = 0.32 (SD 1.00).

The average value of DMF index (in permanent teeth) was 0.92 (SD 1.05), with the following components:

D component = 0.67 (SD 0.98);

M component = 0;

F component = 0.25 (SD 0.48).

The average value of the global DMF index was 5.73 (SD 3.40). The average value of dmf index for girls was 4.93 (SD 2.94). The average value of dmf index for boys was 4.69 (SD 2.74). Comparing the average values of dmf index for boys and girls we didn't find a statistically significant difference ( $p=0.75$ ).

The average value of DMF index for girls was 0.76 (SD 0.95). The average value of DMF index for boys was 1.16 (SD 1.14). Comparing the average values of DMF index for boys and girls we didn't find a statistically significant difference ( $p=0.21$ ).

The global DMF index average value for girls was 5.69 (SD 3.30). The global DMF index average value for boys was 5.81 (SD 3.59). Comparing the average values of global DMF index for boys and girls we didn't find a statistically significant difference ( $p=0.89$ ).

## Discussions

Schools participating in this study were located in different areas of the city, and the participant children had different socio-economic levels. Also, no ethnic or religious criteria were applied when selecting the children, thus the chosen sample was representative to assess the prevalence of dental caries in Țirgu Mureș.

The high DMF index value emphasizes the lack of interest for the treatment of temporary teeth decay, which demonstrates the absence of preventive programs that should be performed at early ages to prevent development and progression of dental carious lesions [11]. Since tooth decay in temporary teeth predicts future caries in permanent teeth, it is expected that in case of high caries incidence in deciduous teeth, the same situation will also be found in permanent teeth [12].

In assessing the risk of caries in permanent dentition caries experience is the most important predictor [13].

The increased DMF index proves the early impairment of the first permanent molar, which is required to perform its posteruptive maturation in difficult conditions, coexisting with decayed and mobile deciduous teeth, which favors plaque retention and arrests self-cleaning. For these reasons, macro-and microdefects of enamel don't benefit from salivary reparative mechanisms [14]. Thus, an oral environment with a high microbial load increases the risk of permanent teeth contamination with aggressive species and hence the occurrence of early carious lesions [15].

Along with this high microbial load, another very important factor in the caries development of the six-year-molars is the prolonged period of eruption of over a year until they reach the occlusal plane, which means a long non-functional stage, characterized by an insufficient self-cleaning and an impressive plaque accumulation [16].

In our study the gender of children did not represent a factor of influence regarding dental caries. The influence of sex upon the prevalence of caries was confirmed in several earlier studies [17], while other authors have not found any correlation between them [18,19].

Comparing the results obtained in our study for the global DMF index with those acquired by Prof. Petersen in 1992 [20], children from Țirgu Mureș actually show a slightly higher index value in the present research. Such high values point to the need of a national program for

prevention of dental caries that should be supported by the authorized institutions [20].

In 53% of the WHO member states the global DMF index was successfully reduced under the value of 3 in children aged 12 years [21].

A large-scale study conducted in Iceland showed at the beginning of 2010 a DMF index of 0.12 at the age of 6 years, 1.43 at the age of 12 years and 2.78 at the age of 15, but the assessment was conducted without the use of radiological examination [22].

In another study conducted in Brazil in 2012, assessing the prevalence of caries in children aged 6 to 7 years old, the observed values were 95.6% in the primary dentition and 63.7% for the permanent dentition. Mean values of dmft and DMF indices were 6.9 and 1.6, respectively [23].

In 1993 Livia Zarnea reported a proportion of 20% of caries carriers at the age of 2 years, 50% at 3 years, 80% at 5 years and 90–95% at 6 years [11]. In the present study the proportion of caries carriers at the mean age of 7 years was 85.72%.

The World Health Organization has proposed 90% of children under age 5 to be free from decay until 2010 [24].

## Conclusions

Oral survey examinations in children are an important first step in determining a child's oral health care needs. The conducted survey allowed individualization of carious lesions and identified individual dental treatment needs, but its role in controlling dental caries is limited.

According to our results, the advances in tooth decay prophylaxis cannot be found in the level of caries involvement of children from Țirgu Mureș. Our study shows that in Țirgu Mureș the actual level and pattern of dental caries development is extremely severe and there is an urgent need to improve and provide oral health through a preventive program that could involve along the dentists also the parents and the educators.

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