CARIES PREVALENCE IN A SAMPLE OF 1ST TO 4TH GRADERS FROM THE CITY OF SIBIU

A. FLEANCU[1]

"Lucian Blaga" University of Sibiu

Keywords: *dental caries, schoolchildren, DMFT index*

Abstract: *The study's aim is to evaluate the dental status of schoolchildren from grades 1 to 4, for both the temporary and the permanent dentition. The article at hand addresses the prevalence of dental decay in the permanent dentition. The study sample included 574 schoolchildren from grades 1 to 4 from two different schools from the city of Sibiu, Romania. The sample is representative for the population of 1st to 4th graders; sex and grade distribution of the sample is homogenous. The examination was carried out by direct and indirect inspection using a dental mirror and palpatory, using a dental probe. The clinical findings were registered in patient charts and were then statistically analyzed using the software SPSS v.16. In order to evaluate the caries experience of the subjects, the DMFT index was used. The caries incidence of the permanent dentition for the entire studied sample was 67.2%. The mean value of the DMFT index for the entire sample was 1.71. The value of the DMFT index is mainly given by the component that indicates the number of decayed teeth.*

Cuvinte cheie: *carie dentară, elevi, indice DMFT*

Rezumat: *Studiul îşi propune să evalueze statusul oro-dentar al elevilor de clasele I-IV, atât pentru dentaţia temporară cât şi pentru cea permanentă. Articolul de faţă tratează problema afectării prin carie dentară a dentaţiei permanente la acest grup populaţional. Lotul studiat a fost compus din 574 de elevi ai claselor I-IV din municipiul Sibiu. Lotul de elevi este reprezentativ pentru segmentul populaţional respectiv şi este omogen din punct de vedere al distribuţiei pe sexe şi pe clase. Examinarea s-a făcut prin inspecţie directă şi indirectă cu ajutorul oglinzii stomatologice şi prin palpare cu sonda stomatologică, conform recomandărilor Organizaţiei Mondiale a Sănătăţii (OMS), observaţiile fiind înregistrate în fişe speciale şi prelucrate statistic cu programul SPSS versiunea 16. Pentru a evidenţia experienţa carioasă a subiecţilor s-au utilizat indicele DMF-T. La nivelul dentaţiei permanente, incidenţa cariei dentare pe întreg eşantionul este de 67,2%. Valoarea medie a indicelui DMFT este de 1,71. Valoarea DMFT este dată mai cu seamă de componentele care indică numărul dinţilor/suprafeţelor dentare afectate de carie.*

INTRODUCTION

Although dental caries prevalence has significantly decreased in Western countries, due to well-established and implemented preventive programs, it still constitutes one of the widest-spread diseases worldwide, and it is considered a public health issue, especially in developing countries.

The problem of dental decay represents one of the priorities on the World Health Organization's agenda (WHO); the organization recommends and supports the carrying out of national surveys on a regular basis, regarding caries prevalence, and also proposes preventive measures that should be implemented at community level.

The WHO objective for the year 2000, regarding caries prevalence in the permanent dentition of children states that, at the age of 12, the value of the DMFT index should not be greater than 3, and for the year 2020, the value maximum value of should drop to 1,5.

PURPOSE OF THE STUDY

The study's aim is to evaluate the dental status of schoolchildren from grades 1 to 4, for both the temporary and the permanent dentition. The article at hand addresses the prevalence of dental decay in the permanent dentition.

MATERIAL AND METHOD

This is a cross-sectional study that was carried out in 2009 on a sample of 574 schoolchildren from grades 1 to 4 from two different schools from the city of Sibiu, Romania. The schools were chosen as they were equipped with a dental office, offering optimal conditions for the clinical examination. The sample is representative for the population of 1st to 4th graders; sex and grade distribution of the sample was homogenous.

282 subjects (49%) were boys and 292 (51%) were girls.

159 pupils (28%) were from 1st grade, 145 (25%) were from 2nd grade, 143 (25%) were from 3rd grade and 127 (22%) were from 4th grade.

5 pupils were 6 years old, 114 were 7 years old, 146 were 8 years old, 120 were 9 years old, 131 were 10 years old and 58 were 11 years old.

Clinical methods: The examination was carried out according to WHO recommendations, by direct and indirect inspection using a dental mirror and palpatory, using a dental probe. The clinical findings were registered in patient charts and were then statistically analyzed using the software SPSS v.16 for Windows.

In order to evaluate the caries experience of the subjects, the DMFT index was used. The initials stand for the words decayed, missing, filled teeth. The index refers to the number of teeth that show active carious lesions, of those that were extracted due to caries complications and those that are filled.

Statistical methods: The *correlation* between two variables reflects the degree to which the variables are related.

[1]Corresponding Author: A. Fleancu,19 Negoi street, Sibiu, România; e-mail: andrei.fleancu@gmail.com; tel +40-0745606467
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The most common measure of correlation is the Pearson Product Moment Correlation (called Pearson's correlation for short). When measured in a population the Pearson Product Moment correlation is designated by the Greek letter rho (ρ). When computed in a sample, it is designated by the letter "r". Pearson's correlation reflects the degree of linear relationship between two variables. It ranges from +1 to -1. A correlation coefficient of +1 means that there is a perfect positive linear relationship between the variables. If the coefficient has negative values, the variables are in an inverse relationship to each other. The closer the value of the coefficient to 1 (or -1), the stronger the dependence of the variables to each other; if the coefficient is 0, there is no relationship between the variables.

Statistical significance is a mathematical tool used to determine whether the outcome of an experiment is the result of a relationship between specific factors or due to chance. In other words, the statistical significance of a result represents the probability that the relationship between variables within a sample is due to chance, and that, at population level, no such relationship exists.

The level of statistical significance is designated by the letter p.

In the present study, the statistical significance level was set at p=0,05.

RESULTS

The mean age for the 1st graders was 7 years and 3 months, for the 2nd graders, 8 years and 3 months, for the 3rd graders it was 9 years and 6 months and for the 4th graders, 10 years and 6 months.

The DMFT index' values ranged, in the present study from 0 to 10 (as shown in table 1).

Table 2 shows the number of cases with a specific value of the DMFT.

Table no. 1. Number of cases with a certain value of DMFT

DMFT	Number of cases	Percent
0	188	32,8
1	99	17,2
2	109	19,0
3	85	14,8
4	71	12,4
5	15	2,6
6	3	0,5
7	1	0,2
8	1	0,2
10	2	0,3
Total	574	100

The evolution of the index' mean values by age and by grade is shown in figure 1 and 2 respectively.

The components of the DMFT index (namely the number of decayed, missing or filled teeth) were designated D_T, M_T and F_T.

The evolution of the D_T and F_T components by age is shown in fig. 3 and the evolution by grade, in fig. 4.

The mean DMFT value for the whole sample was 1,71; in the first grade, its mean value was 1,08, in the 2nd grade its mean value was 1,43, in 3rd graders its mean value was 2,68 and in 4th graders it was 1,75 (fig. 2).

Table 1 shows that only 33% of the subjects had all permanent teeth caries-free (DMFT=0), 51% of them had DMFT values between 1 and 3 (17% with DMFT=1, 19% with DMFT=2 and 15% with DMFT=3) and the remaining 16% had DMFT values ranging from 4 to 10.

Table nr. 2. Absolute values of DMFT by grade

DMFT \ grade	1	2	3	4	Total
0	80	51	19	38	188
1	32	29	11	27	99
2	22	29	37	21	109
3	10	23	31	21	85
4	10	13	32	16	71
5	5	0	8	2	15
6	0	0	2	1	3
7	0	0	1	0	1
8	0	0	1	0	1
10	0	0	1	1	2
Total	159	145	143	127	574

Figure no. 1. Evolution of mean DMFT values by age

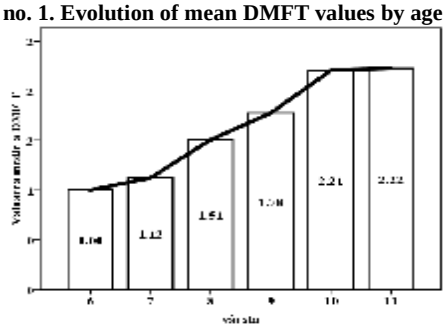


Figure no. 2. Evolution of mean DMFT values by grade

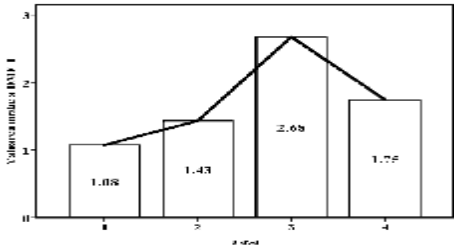


Figure no. 3. Evolution of D_T and F_T values by age

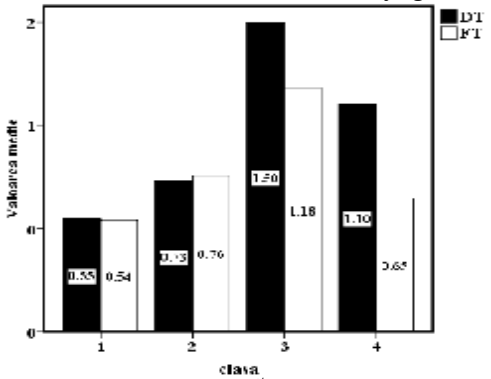
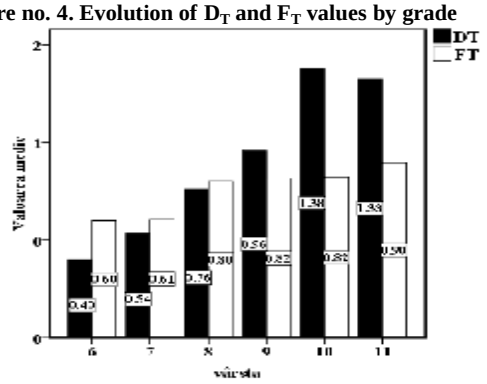


Table 2 shows that in 1st grade 80 individuals (50,3%) had permanent teeth that were not affected by caries, whereas in 2nd grade 51 pupils (35,2%), in 3rd grade 19 students (13,3%) and in 4th grade 38 individuals (30%) had caries-free permanent teeth.

Figure no. 4. Evolution of D_T and F_T values by grade



The DMFT indexes increased with age (fig.1), as shown from the correlation of the index' values with age (table 3).

Table no. 3. Correlation of the DMFT index' and its components with age

		D_T	F_T	DMFT
age	r	0,238	0,067	0,244
	p	0,000	0,110	0,000
	N	574	574	574

The Pearson correlation coefficient had a positive value, which indicates a linear realtion between the index' values and age.

The D_T component also increased with age (r=0.238), as the newly erupted permanent teeth are gradually affected by caries.

The F_T component increases with age, but its increase is less marked then the D-component's (r=0,067), due to the fact that the treatment of the carious lesions is not given the proper importance. The correlation of the values of the F-component with age was not statistically significant (p=0,110).

We aimed to analyze which of the components contributes most to the value of the DMFT index.

M_T being 0, the value of DMFT is given only by D_T and F_T.

Table 4 shows that, for the correlation of DMFT and D_T, the correlation coefficient was 0,670 and for the correlation with F_T it is 0,640, which means that the value of DMFT depends equally on the D_T and the F_T components.

Fig. 4 shows that in grades 1 and 2, the number of caries-affected teeth was aprroximately equal to that of filled teeth, whereas in third grade, the number of the former was 1.3 times higher than of the latter and in 4th grade, it was almost twice as high.

Table no. 3. Correlation of the values of the DMFT index with its components

		D_T	F_T
DMFT	p	0,670	0,640
	t	0,000	0,000
	N	574	574

Table no. 3. The difference between mean DMFT values of boys and girls

Index	sex	Number of cases	Mean value	Standard deviation	p	Mean difference
DMFT	boys	282	1,80	1,728	0,212	0,171
	girls	292	1,63	1,553		

Thus, if all decayed teeth could be filled, in the first two grades, twice as many teeth would have to be filled, in third grade 2.3 times more teeth and in fourth grade 2.7 times more teeth would have to be filled in order to counter the D-component and to maximize the F-component's contribution to the index' value.

When comparing the DMFT index' values of boys and girls, we found that in boys the values were higher, but the differencies were not statistically significant (p=0.212) (table 5).

CONCLUSIONS

- The caries incidence of the permanent dentition for the entire studied sample was 67.2%.

  By grade, the situation was as the following:
  - in 1st graders 49.7%;
  - in 2nd graders 64.8%;
  - in 3rd graders 86.7%;
  - in 4th graders 70%.

  In developed countries, the caries prevalence of the permanent dentition at age 12 is between 30 and 40%; thus, the percentage found in 4th graders in the present study is considerably high.

  In the other grades, the prevalence of dental caries was also at a high level, indicating an early onset of the disease in the permanent dentition.
- The mean value of the DMFT index for the entire sample was 1.71, and its values by grade were:
  - 1.08 in 1st grade;
  - 1.43 in 2nd grade;
  - 2.68 in 3rd grade;
  - 1.75 in 4th grade.

  In 4th grade, which includes children whose age is closest to that of the WHO recommendations for the year 2000 (12 years), the DMFT value was below the one recoomended by the WHO (below 3).

  The value is still high compared to the one of developed countries, where DMFT values of 1.1-1.2 (the U.S.A., Italy) or even below 1 (Denmark, Germany, Switzerland etc.) were reported.
- The value of the DMFT index is mainly given by the component that indicates the number of decayed teeth.
- The differencies between the DMFT values of boys and girls were not statistically significant, which indicates that the disease affects both sexes approximately at the same extent.

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