Study regarding the DMFT/S, deft/s and SiC caries indices in 6 and 12 years-old children from Constanta city

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Abstract:

Even if, as a result of starting, in the year 2001, of the National Programme P.N.I.5 for prevention of dental caries, the prevalence of this disease has decreased in Constanta city, the periodical screening of caries prevalence and severity is still obligatory. The aim of this study was to assess the caries prevalence and severity in 6 and 12 years-old children from Constanta city, by evaluation of DMFT/S, deft/s and SiC caries indices. Materials and method: this epidemiological cross-sectional study was made on representative and randomly selected samples of children of 6 (n=92) and 12 years (n=188) from Constanta town (α=0.05; the sampling error was 0.07). The subjects were standardized examined using W.H.O. criteria for registration of DMFT/S, def/s and SiC indices. The results were statistically analysed using Excel, SPSS 12 *for Windows* and t-test. Results: In 6-years-old children the caries prevalence was 47.83% on permanent teeth and 81.52% on temporary teeth; the values for caries indices in 6-year-olds were: 1.09±0.27–DMFT, 1.69±0.47–DMFS, 2.77± 0.29–SiC, 4.82±0.76-deft, and 9.63±1.97–defs (C.L.95%), without statistically significant differences between boys and girls (p>α=0.05, t-test). In 12-years-old children the caries prevalence was 78.78%; the indices values in 12-years-old were: 3.69±0.47–DMFT, 5.68±0.80–DMFS, 7.39±0.65–SiC (C.L.95%), with higher values for girls than boys (p<α=0.05, t-test). The percentage of untreated decayed teeth was 98.02-%D and 89.19-%d in 6-years-old and 90.63-%D in 12-years-old. Conclusion: these results showed a lower caries prevalence than the one registered in the year 2000, a very high level of dental treatment needs in children and the need for additional caries preventive programmes in Constanta city. Key words: caries prevalence, DMFT/S Index, SiC Index.

Introduction

The oral dental public health, as part of the general health, has an important contribution in improving quality of life by the sistematically efforts of the society, including a large scale of concerns: epidemiology, preventive and community dentistry, education for the oral health promotion, approaching and solving oral dental diseases of people with special needs or exposed at risk factors, management of behaviour of patients with oral dental diseases and others.

In Romania the concerns in the field of prevention of oral dental diseases are insufficient, there are no veridical epidemiological studies to certify the oral health state of children, and the professionals direction has curative aspects in most of them. [6,7]

In our country the public oral health policy has to be directed toward preventing and approaching of the population part represented by children.

In year 2001 in Constanta District the epidemiological studies showed a very high prevalence of caries with values of 5,15 for DMFT and 9.01 for DMFS in 6 years-old children and 4.46 for DMFT and 7.55 for DMFS in 12 years old children. [1,3,5]

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As a result of starting, beginning with 2001 year, of the National Programme P.N.I.5 for prevention of dental caries [2,4] the prevalence of this disease has had an important decline, but the periodical screening of caries prevalence and severity is still obligatory considering the W.H.O. goals for oral health in Europe for the year 2020: at least 80% of 6-year-olds to be caries-free and the maximum value of DMFT index at age of 12 to be 1.5. [8]

The aim of this study was to assess the caries prevalence and severity in 6 and 12 years-old children from Constanta town, by evaluation of DMFT/S, deft/s and SiC caries indices.

Materials and method

This epidemiological cross-sectional study was made on representative and randomly selected samples of children of 6 (n=92) and 12 years (n=188) from Constanta town (α=0.05; the sampling error was 0.07), in march 2007.

The subjects were standardized examined by calibrated examiners. The clinical exam was made in the dental offices of Schools no.12 and 16 from Constanta city, in optimal light and with the usual dental instruments (plane mirrors, sterile gloves).

There were used the W.H.O. criteria of caries diagnosis and registration of DMFT, DMFS, deft, defs and SiC indices.

The results were registered on individual charts and were statistically analysed using Excel, and SPSS 12 *for Windows* programmes; for the samples comparison it was used t-test.

Results

For the age of 6 years-old (n=92; 43 boys, 49 girls) on permanent teeth the caries prevalence was 47.83% and the percentage of caries-free subjects was 52.17%.

DMFT index at age of 6 was 1.09±0.27 (table no.1), without statistically significant differences between boys and girls (p=0.51

> α=0.05, t-test). The DMFT index has had values between 0 and 4, and the absolute frequency of DMFT values (graphic no.1, graphic no.2) showed that even more than half of the subjects (52.17%) are caries-free, for an important percentage of subjects (18.48%) the DMFT index was higher or equal with 3.

Table no.1 - DMFT index in 6 years-old children

Mean	1.097826
Standard Error	0.140863
Median	0
Mode	0
Standard Deviation	1.351107
Sample Variance	1.82549
Kurtosis	-0.60826
Skewness	0.856969
Range	4
Minimum	0
Maximum	4
Sum	101
Count	92
Confidence Level (95.0%)	0.279806

Graphic no.1 - The absolute frequency of DMFT values (ni) in 6 years-old children
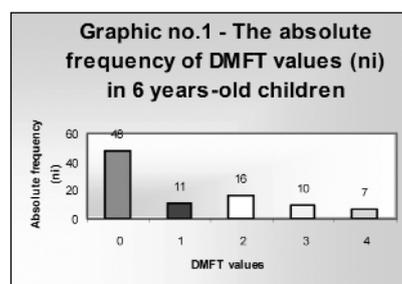
The mean number of permanent teeth with untreated caries (DT - decayed teeth) was 1.07±0.2, without statistically significant differences between boys and girls (p=0.50 > α=0.05, t-test); the number of extracted teeth at this age was zero and the mean number of filled teeth was 0.02±0.03 (table no.2). The structure of DMFT index showed that the percentage of untreated decayed teeth was 98.02% and the percentage of filled teeth was 1.98% (table no.3, graphic no.3).

Table no.2 - The mean number of decayed, missing and filled teeth in 6-years-old children

	D	M	F
Mean	1.076087	0	0.021739
Standard Error	0.139306	0	0.015287
Median	0	0	0
Mode	0	0	0
Standard Deviation	1.336172	0	0.14663
Sample Variance	1.785356	0	0.0215
Kurtosis	-0.48337	-	43.41037
Skewness	0.903512	-	6.668352
Range	4	0	1
Minimum	0	0	0
Maximum	4	0	1
Sum	99	0	2
Count	92	92	92
Confidence Level (95.0%)	0.276713	0	0.030366

Table no.3 - The DMFT index structure in 6 years-old children

D	M	F'	DMFT
1.076087	0	0.021739	1.097826
98.02%	0.00%	1.98%	100%

Graphic no.2 - The absolute frequency of DMFT values (%) in 6 years-old children

Graphic no.3 - The DMFT Index structure in 6 years-old children
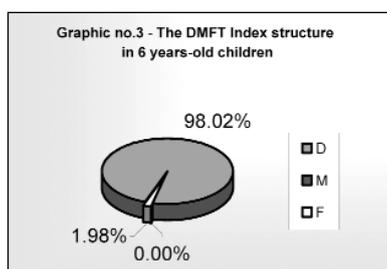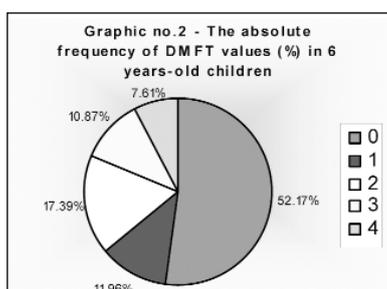
DMFS index at age of 6 was 1.69±0.47 (table no.4), without statistically significant differences between boys and girls (p=0.41 > α=0.05, t-test); this index has had values between 0 and 9, and its absolute frequency (graphic no.4, graphic no.5) showed that 19.57% (n=18) of the subjects has had a DMFS index higher or equal with 4.

Table no.4 - The DMFS index in 6 years-old children

Mean	1.695652
Standard Error	0.238815
Median	0
Mode	0
Standard Deviation	2.290636
Sample Variance	5.247014
Kurtosis	0.886152
Skewness	1.308986
Range	9
Minimum	0
Maximum	9
Sum	156
Count	92
Confidence Level (95.0%)	0.474377

In temporary teeth in 6-years-old children the caries prevalence was 81.52% and the percentage of caries-free subjects was 18.48%. The deft index at age of 6 was 4.82±0.76 (table no.5), without statistically significant differences between boys and girls (p=0.93 > α=0.05, t-test); this index has had values between 0 and 18, and its absolute frequency (graphic no. 6, graphic no.7) showed that for 67.39% of the subjects (n=62) the deft value was higher or equal with 3.

Table no.5 - The deft index in 6 years-old children

Mean	4.826087
Standard Error	0.3838
Median	5
Mode	0
Standard Deviation	3.681282
Sample Variance	13.55184
Kurtosis	0.419924
Skewness	0.566951
Range	18
Minimum	0
Maximum	18
Sum	444
Count	92
Confidence Level (95.0%)	0.762372

Graphic no.4 - The absolute frequency of DMFS values (ni) in 6 years-old children

Graphic no.5 - The absolute frequency of DMFS values (%) in 6 years-old children

The mean number of temporary decayed teeth (dt) was 4.30±0.70, without statistically significant differences between boys and girls (p=0.75 > α=0.05, t-test); the mean number of extracted temporary teeth was 0.28±0.14 and the mean number of filled teeth was 0.23±0.11 (table no.6).
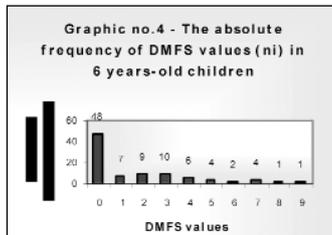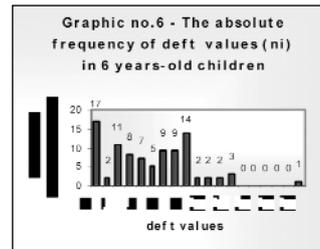

Graphic no.6 - The absolute frequency of deft values (ni) in 6 years-old children

Table no.7 - The deft index structure in 6-years-old children

d	e	f	deft
4.304348	0.282609	0.23913	4.826087
89.19%	5.86%	4.95%	100%

Graphic no.7 - The absolute frequency of deft values (%) in 6 years-old children
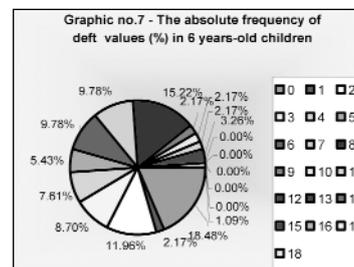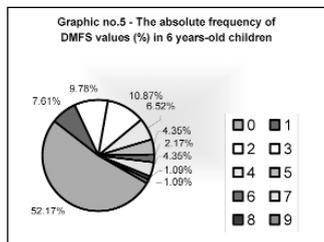
Table no.6 -The mean number of decayed, extracted and filled temporary teeth in 6-years-old children

	d	e	f
Mean	4.304348	0.282609	0.23913
Standard Error	0.353043	0.073031	0.05859
Median	4	0	0
Mode	0	0	0
Standard Deviation	3.386266	0.700488	0.561974
Sample Variance	11.46679	0.490683	0.315815
Kurtosis	-0.12223	6.709649	7.672316
Skewness	0.502409	2.682046	2.666202
Range	15	3	3
Minimum	0	0	0
Maximum	15	3	3
Sum	396	26	22
Count	92	92	92
Confidence Level (95.0%)	0.701276	0.145067	0.116381

The structure of deft index showed that the percentage of untreated decayed temporary teeth was 89.19%, the percentage of extracted teeth was 5.86% and the percentage of the temporary filled teeth was only 4.95% (table no.7, graphic no.8). The defs index at age of 6 was 9.63±1.97 (table no.8), without statistically significant differences between boys and girls (p=0.38 > α=0.05, t-test).
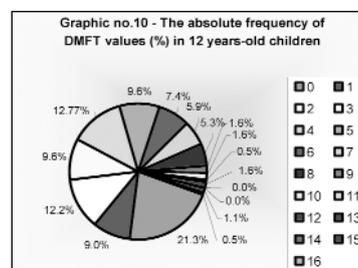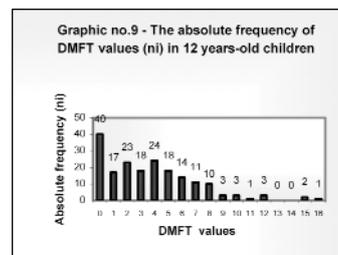
Table no.8 - The defs index in 6 years-old children

Mean	9.630435
Standard Error	0.993976
Median	7
Mode	0
Standard Deviation	9.533881
Sample Variance	90.89489
Kurtosis	-0.11558
Skewness	0.941365
Range	34
Minimum	0
Maximum	34
Sum	886
Count	92
Confidence Level (95.0%)	1.974411

Graphic no.8 - The deft index structure in 6 years-old children
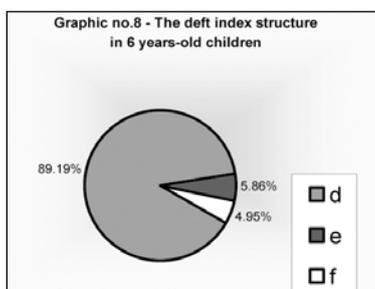
In 12-years-old children (n=188; 102 boys, 86 girls) the caries prevalence was 78.78% and the percentage of caries-free subjects was 21.22%. The DMFT index at age of 12 was 3.69±0.47 (table no.9), with higher values for girls than boys (statistically significant differences, p= 0.03 < α=0.05); this index has had values between 0 and 16, and its absolute frequency (graphic no.9, graphic no.10) showed that 57.45% of the subjects have 3 or more decayed, missing or filled teeth.

Table no.9 - The DMFT index in 12-years-old children

Mean	3.691489
Standard Error	0.240185
Median	3
Mode	0
Standard Deviation	3.293249
Sample Variance	10.84549
Kurtosis	1.348652
Skewness	1.062438
Range	16
Minimum	0
Maximum	16
Sum	694
Count	188
Confidence Level (95.0%)	0.47382

Graphic no.9 - The absolute frequency of DMFT values (ni) in 12 years-old children

Graphic no.10 - The absolute frequency of DMFT values (%) in 12 years-old children

The mean number of decayed teeth (DT) was 3.34±0.45, with higher values for girls than boys (with statistically significant differences, p=0.04 < α=0.05); the mean number of permanent missing teeth was 0.12±0.06 and the mean number of the filled teeth was 0.21±0.08 (table no.10).

The structure of DMFT index showed that the percentage of untreated decayed permanent teeth was 90.63%, the percentage of missing teeth was 3.46% and the percentage of filled teeth was only 5.91% (table no.11, graphic no.11).

Table no.10 - The mean number of decayed, missing and filled permanent teeth in 12-years-old children

	D	M	F
Mean	3.345745	0.12766	0.218085
Standard Error	0.232508	0.031524	0.045273
Median	3	0	0
Mode	0	0	0
Standard Deviation	3.187984	0.432232	0.620757
Sample Variance	10.16324	0.186824	0.38534
Kurtosis	1.478634	16.6955	16.56011
Skewness	1.096014	3.897558	3.748851
Range	15	3	4
Minimum	0	0	0
Maximum	15	3	4
Sum	629	24	41
Count	188	188	188
Confidence Level (95.0%)	0.458675	0.062188	0.089312

Table no.11 -TheDMFT index structure in 12-years-old children

D	M	F	DMFT
3.345745	0.12766	0.218085	3.691489
90.63%	3.46%	5.91%	100%

Graphic no.11 - The DMFT Index structure in 12 years-old children
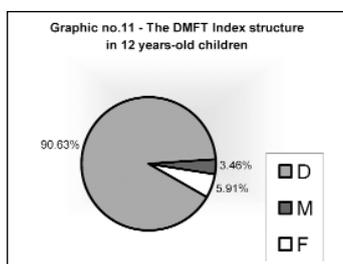
The SiC index (Significant Caries Index) in 12-years-old (the average of DMFT in 1/3 with the highest values of DMFT of the study group) has had the value of 7.39±0.65 (table no.12), with higher values for girls than boys (statistically significant differences, $p=0.01 < \alpha=0.05$).

The DMFS Index in 12-years-old children was 5.68±0.80 (table no.13), without statistically significant differences between boys and girls ($p=0.17 > \alpha=0.05$); this index has had values between 0 and 28, and its absolute frequency (graphic no.12) showed

that a number of 18 subjects (19.57%) have had 4 or more decayed, missing or filled teeth surfaces.

Table no.12 - The SiC index in 12 years-old children

Mean	7.396825
Standard Error	0.3252
Median	7
Mode	5
Standard Deviation	2.581196
Sample Variance	6.66257
Kurtosis	2.607118
Skewness	1.624679
Range	11
Minimum	5
Maximum	16
Sum	466
Count	63
Confidence Level (95.0%)	0.650066

Graphic no.12 - The absolute frequency of DMFS values (ni) in 12 years-old children
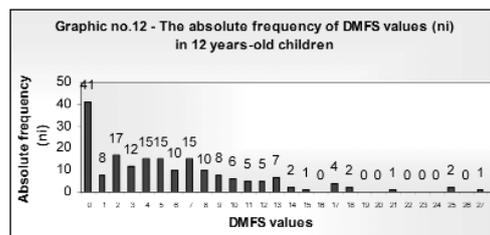
Table no.13 - The DMFS index in 12 years-old children

Mean	5.68617
Standard Error	0.407452
Median	5
Mode	0
Standard Deviation	5.586694
Sample Variance	31.21114
Kurtosis	2.631843
Skewness	1.439372
Range	28
Minimum	0
Maximum	28
Sum	1069
Count	188
Confidence Level (95.0%)	0.803792

Discussions

The oral dental health status of the population represents a main field of public oral dental health as part of general health, with significant influences on individuals quality of life.

W.H.O. has a special department for these problems, which acts for improving the oral health in children from the countries in stage of development. The bettering of the human condition have become a major problem, the main objective being to ensure the health of each individual, family and groups. The W.H.O. programmes as „Health for all" is an example of the world concern in this field.

Romania has little concerns in this field, there are no extended epidemiological studies to show the children state of oral health, and the professional aspect is in most of the cases directed to curative aspects.

A real progress in the prevention of dental caries is the applying in Dobrogea region, since year 2001, of the National Programme P.N.I.5 for caries prevention by oral weekly rinsing with „Fluorostom" solution (NaF 0.275%).[2,4].

In the present study in 6-years-old children in permanent teeth the caries prevalence was 47.83%, and the percentage of caries-free subjects was 52.17%. Considering the subjects age, it is concerning to have a caries prevalence by almost 50% in young permanent teeth. The DMFT in 6-years-old was 1.09±0.27, 18.48% of subjects being at a high caries risk. DT (decayed teeth) was 1.07±0.2 (%D is 98.02%), and the mean number of the filled teeth was only 0.02±0.03.

On temporary teeth the caries prevalence was 81.52% and the percentage of caries-free subjects was 18.48%. The deft index was 4.82±0.76; dt was 4.30±0.70 (%d was 89.19%); defs index was 9.63±1.97. There were no statistically significant differences between girls and boys in indices registered at 6-years-old.

For 12-years-old the caries prevalence was 78.78% and the percentage of caries-free subjects was 21.22%. DMFT index at 12-years-old was 3.69±0.47, and more than a half of the subjects (57.45%) have had a DMFT index higher or equal with 3, so a high caries risk; DT was 3.34±0.45 (%DT was 90.63) and the mean number of filled permanent teeth was 0.21±0.08. The SiC index has had a value of 7.39±0.65, and DMFS index was 5.68±0.80. The caries indices in 12-years-old children were bigger for girls than boys.

In 1981 W.H.O. established as goals for the oral health for the year 2000 the followings: at least 50% of children aged 5 – 6 years should be caries–free and on average, no more than three DMFT should be found in children aged 12 years.[8] Even if in the western countries, as a consequence of the preventive programmes applied in the last 30 years, the number of decayed, missing and filled teeth (DMF) has had an important decline till the year 2000 at values of 0,7 - 1,1-1,2, a lot lower than the W.H.O. proposed values, in Romania this index is still higher than 4, and in Dobrogea is more than 5. The epidemiological studies made in the year 2001 in our district have obtained for Constanta city the next values for caries indices: in 6 years-old children 5.15 –

DMFT and 9.01-DMFS; in 12 years-old children 4.51-DMFT and 7.55-DMFS.[3, 5] A new epidemiological cross-sectional study was made in 2005, after four years of applying the preventive programme with "Fluorostom" solution; it has obtained for 12-years-old the next values: 3.85 for DMFT and 5.75 for DMFS in Constanta city.

The present study showed that, even if DMFT index has had an important decline in the last years in Dobrogea, not even in the year 2007 we couldn't reach the W.H.O. objectives for the year 2000, registering for 6-years-old a caries prevalence of 47.83% for permanent teeth and of 81.52% on temporary teeth and a DMFT index of 3.69 ± 0.47 at 12 years-old. The importance of this data is amplified by the percentage values of untreated decayed teeth (%D), such as 98.02% for 6-year-old and 90.63% for 12-year-old.

Regarding the European W.H.O. objectives for the year 2015, one of the goals is to achieve a SiC Index of maximum 3 for 12-year-old [8], but the SiC values obtained in the present study is 7.39 ± 0.65 at 12-years-old.

Even if these results showed clearly the decreasing of caries prevalence in Dobrogea in the last years as a result of the efforts for supporting and applying of P.N.I5 Programme, the values registered for caries indices are still much more higher than the ones from developed European countries and the ones proposed by W.H.O.; these values indicate as well an extremelly high level of dental treatment need for 6 and 12 - years-old children, and they represent a proof of the necessity to apply additional and supported preventive programmes in Constanta city and also in the whole Dobrogea region in order to achieve the W.H.O. goals for children oral health.

Conclusions

1. In 6-years-old children the caries prevalence was 47.83% on permanent teeth and 81.52% on temporary teeth.

2. The values for caries indices in 6-year-olds were: 1.09 ± 0.27–DMFT, 1.69 ± 0.47–DMFS, 4.82 ± 0.76-deft and 9.63 ± 1.97–defs (C.L.95%), without statistically significant differences between boys and girls ($p>\alpha=0.05$, t-test).

3. In 12-years-old children the caries prevalence was 78.78% and the percentage of caries-free subjects was 21.22%.

4. The caries indices at age of 12 were: 3.69 ± 0.47–DMFT, 5.68 ± 0.80–DMFS and 7.39 ± 0.65–SiC (C.L.95%), with higher values for girls than boys ($p<\alpha=0.05$, t-test).

5. The percentage of untreated decayed teeth was 98.02-%D and 89.19-%d in 6-years-old and 90.63-%D in 12-years-old children.

6. The results of this study showed a caries prevalence lower than the one registered in the year 2000, but higher than the values from European developed countries, a very high level of dental treatment needs in both age-groups and the necessity of additional caries preventive programmes in Constanta in order to achieve the W.H.O. objectives for oral health in children.

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