

Caries prevalence in a 7- to 15-year-old Albanian schoolchildren population

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Summary

The aim of this study was to determine the caries prevalence in urban and suburban Albanian schools. A large sample (n= 2617) of subjects, aged 7-15, was examined by a clinical observation without radiograms. The sample comprised 1257 males and 1360 females. For each subject an anamnestic questionnaire about feeding, fluoride, dentist attendance and familiar informations was obtained. Gender and age differences were compared by Chi-square test. The total dmft index (decayed, missing and filled teeth in deciduous dentition) was 2.082; dmft in males was 2.137, in females was 2.032. The total DMFT index (Decayed, Missing and Filled Teeth in permanent dentition) was 2.327; DMFT in males was 2.253, in females was 2.396. Decayed teeth was principal component of both dmft and the DMFT index. Caries prevalence results higher in girls than boys in deciduous and in permanent teeth.

Key words: prevalence of caries, oral hygiene habits, Albanian schoolchildren.

Introduction

Dental caries is an infective transmittable bacterial disease characterised by a multifactorial pathology; it is a preventable disease and it can be stopped and even potentially reversed during its early stages. People remain susceptible to the disease throughout their lives (12, 19). It is widely accepted that factors such as socioeconomic status, educational level, and behavioural factors (e.g. usual reasons for dental attendance, frequency of tooth cleaning and use of additional methods for tooth cleaning like flossing) have an effect on oral health (5).

In the developed countries, decline in dental caries prevalence has been attributed to population-based preventive programmes with use of fluoride, improved participation in oral health programmes and changes in oral hygiene and sugar intake habits. On the other hand, in many developing countries an increase in dental caries has resulted from unhealthy dietary habits, limited use of fluoride and poor access to oral health services. In many developing countries, most oral health services provide symptomatic treatment with little priority given to restoration and prevention. The urbanisation and adoption of Western lifestyles into many developing countries in the absence of public prevention programmes have also caused a sudden increase in dental caries. Dental caries affects 60-90% of schoolchildren in most developed countries, and in several developing countries the prevalence rates are increasing (2). Many epidemiological studies on the prevalence of caries in different ethnic groups have been published in the last years. They reported a prevalence of caries that varied in the different populations (4, 6, 7, 11, 14).

Epidemiological surveys to monitor the changes in oral health status have not been conducted in Albania on a regular basis or by specialised institutions. Sporadic studies by the dental school or by people who are conducting research for higher degrees have been undertaken. The data from the last epidemiological study conducted in 2000 (using WHO indicators and age-groups) are: 6 years old (caries free 83.7%), 12 years old (DMFT 3.02), 18 years old (DMFT 4.7). Other national studies of dental caries experience for 12-year-olds indicated that in 2005 the national mean Decayed, Missing, or Filled Teeth (DMFT) index was 3.1. A more recent study shows DMFT 3.8 in a 12 years old schoolchildren population (9). The data show worse oral health status in children compared with the situation before 1990. Reasons for higher oral disease prevalence are: increases in consumption of refined foods and fizzy drinks and of a wide variety of sweets, under utilisation of fluoride supplements or sealants, the lack of widespread and regular use of toothbrushes and fluoride toothpaste, the lack of dental health education and promotion, the privatisa-

tion of the dental services and the resultant high prices and largely ineffective public dental services (3,9). Other reasons for this situation are the following: low fluoride level in drinking water (below 0.3 ppm), lack of financial resources for applying a caries prevention strategy all over the country and absence of national caries and oral health preventive programme.

Aim of this study was to determine the caries prevalence in a schoolchildren population of Tirana.

Subjects and methods

Study population

A cross-sectional study was carried out and the study target population consisted of subjects, between 7 years and 15 years of age, attending the public schools in Tirana (Albania). The fifteen examined schools, ten in the town and five in the province of Tirana, were chosen by the Statistical Department of Teaching Direction of Tirana, using a stratified selection technique, in order to represent the distribution of socio-economical conditions during the school year 2009-2010. Classes within schools were sampled systematically and all students attending the sampled classes were examined. Written consent was obtained from the schoolchildren and their parents, before starting examination. A questionnaire was structured containing questions on socio-demographic factors, perceived oral and general health, oral hygiene, fluoride assumption and oral diet.

Sample size was calculated assuming a 50 per cent prevalence ratio for any characteristics with a 95 per cent confidence interval. This assumption leads to the highest sample size with precision 1.9%. Two thousand six hundred and seventeen students, 1257 males and 1360 females, were randomly selected according to multistage stratified cluster sampling design. This is in accordance with WHO guidelines for national pathfinder surveys which ensure the participation of a satisfactory number of people that may present different disease prevalence in the conditions being examined (14, 17).

Selection criteria for examination were: presence of deciduous cuspid and deciduous second molar in primary dentition and mixed dentition, presence of permanent cuspid and first molar in permanent dentition. The exclusion criteria for this study were: subjects with craniofacial anomalies (clefts and syndromes) and no Albanese students.

Clinical examination

The examination was carried out by five examiners. Before clinical registration, they took part in a course on methods of clinical research and orthodontic diagnosis. A pilot study on 50 children was conducted before beginning the present investigation to ensure the accuracy of diagnosis and to standardize the procedures; no statistically significant differences were found ($P>0.05$). The schoolchildren were examined in the medical room of the schools. The oral conditions were assessed by using latex gloves and mouth mirrors. The examination

lasted 20 minutes per child, following the WHO guidelines. To assess dental caries DMFT (Decayed, Missing and Filled Teeth) index was used. The systematic examination includes the crown and exposed root of every primary and permanent tooth, each crown and root are assigned a number based on the result of that exam. The numbers are recorded in boxes corresponding to each tooth to provide a DMFT chart. Data were collected in an individual clinical chart that comprised anamnestic questionnaire and clinical examination measurements.

Statistical methods

Data were registered in Microsoft Excel 2007 and elaborated by Statistical Package for the Social Sciences Windows, version 15.0 (SPSS, Chicago, Illinois, USA). Descriptive statistics were calculated for every measured variable, in order to evaluate the studied sample. Categorical variables were analysed using the chi-square test of Pearson to determine differences. The P value for statistical significance was set at 0.05, so any value less than $P<0.05$ was interpreted as statistically significant. The relationship between caries prevalence and oral hygiene was assessed by Chi-square test.

Results

A total of 2617 subjects, 1257 males (48.40%) and 1360 females (51.60%), 7 to 15 years old, were examined. Table 1 describes the composition of the sample by age and gender.

Table 2 shows dmft results: the total dmft index (decayed, missing and filled teeth in deciduous dentition) was 2.082: dmft in males was 2.137, in females 2.032. The subjects presenting caries in deciduous dentition were 1115 (42.60% of the total sample), 561 females (41.25%) and 554 males (44.07%). The subjects presenting missing teeth in deciduous dentition were 242 (9.24% of the total sample), 114 females (8.38%), 128 males (10.18%). The subjects presenting filled teeth in deciduous dentition were 132 (5.04% of the total sample), 71 females (5.22%) and 61 males (4.85%). The highest number of subjects ($n=193$) presented only one decayed deciduous teeth and they were 7.4% of the sample, 104 females (7.6% of the sample) and 86 males (6.8% of the sample). One missing teeth in deciduous dentition was registered in the majority of the subjects ($n=133$, 5.1% of the sample), 63 were females (4.6%) and 70 were males (5.6%). One filled teeth in deciduous dentition was observed in 60 schoolchildren (2.3% of the total sample), 32 subjects (2.4%) were females and 28 were males (2.2%).

The total DMFT index (Decayed, Missing and Filled teeth in permanent dentition) was 2.327; DMFT in males was 2.253, in females was 2.396 (Tab. 3). The subjects presenting caries in permanent dentition were 1235 (47.19% of the total sample), 647 females (47.57%) and 588 males (46.77%). The subjects presenting missing teeth in permanent dentition were 391 (17.56% of the total sample), 196 females (14.41%), 195 males (18.36%).

Age	Total Sample			Composition sample by age	Composition sample by gender	
	M n	F n	M + F n	M + F %	Males %	Females %
7	132	137	269	10.3%	49.10%	50.90%
8	101	140	241	9.2%	41.90%	58.10%
9	143	145	288	11.0%	49.70%	50.30%
10	127	145	272	10.4%	46.70%	53.30%
11	136	151	287	11.0%	47.40%	52.60%
12	140	153	293	11.2%	47.80%	52.20%
13	164	142	306	11.7%	53.60%	46.40%
14	167	179	346	13.2%	48.30%	51.70%
15	147	168	315	12.0%	46.70%	53.30%
Total	1257	1360	2617	100.0%	48.40%	51.60%

Table 1. Composition sample (n = 2617) by age and gender.

	Males	Females	Total
dmft	2.137	2.032	2.082
decayed			
subjects (n)	554	561	1.115
subjects (%)	44.07	41.25	42.60
missing			
subjects (n)	128	114	242
subjects (%)	10.18	8.38	9.24
filled			
subjects (n)	61	71	132
subjects (%)	4.85	5.22	5.04

Table 2. dmft (deciduous teeth).

The subjects presenting filled teeth in deciduous dentition were 863 (32.97% of the total sample), 467 females (34.33%) and 396 males (31.50%). The highest number (n=421) of subjects presented one decayed permanent teeth and they were 16.1% of the sample, 210 females (15.4% of the sample) and 211 males (16.8% of the sample). One missing permanent teeth was registered in most of the subjects (n=209, 8.0% of the sample), 104 were females (7.6%) and 105 were males (8.4%). One filled permanent teeth was observed in 276 schoolchildren (10.5% of the total sample), 140 (10.3%) were females and 136 were males (10.8%). Decayed teeth was the principal component of both the dmft index and the DMFT index (Tab. 2 and 3).

Table 4 reports dmft and DMFT according to the age: the highest value of dmft (5.178) was observed at eight

years, in the permanent dentition the highest value of DMFT (3.609) was registered at the age of fifteen years. Table 5 shows dmft and DMFT according to age and gender with inferior and superior confidence interval (Sup CI, Inf CI): in 7-9 years group median of total DMFT was 5.84, in 10-12 years group median of total DMFT was 4.25 and in 13-15 years group median of total DMFT was 3.36. DMFT in males was 2.253 and in females was 2.396; the difference between gender was not significant (P>0.005).

Caries prevalence results higher in girls than boys in deciduous and in permanent teeth, but this difference is not statistically significant.

Frequencies and percentages of first dental visit by age groups are described in Table 6.

Significant correlation obtained by Chi square index at any age was found between low oral hygiene and DMFT (P=0.000), described in Figure 1.

Level of oral hygiene in the total sample is reported in Table 7. Oral hygiene was classified in three grades of evaluation (good, not sufficient, absent): the subjects presenting a good level of oral hygiene were only 1117 (42.6% of the total sample), the majority of examined subjects (n= 1203, 45.9% of the sample) presented a not sufficient condition of oral hygiene. Oral hygiene by age and gender is reported in Tables 8 and 9.

No significant correlation was observed between the different socio-economical level, oral use of fluoride and natural/artificial feeding.

Discussion

The results showed that 47.19% of the examined schoolchildren, 1235 subjects, presented decayed permanent teeth, while 391 (17.56%) subjects presented missing

	Males	Females	Total
DMFT	2.253	2.396	2.327
Decayed			
subjects (n)	588	647	1235
subjects (%)	46.77	47.57	47.19
Missing			
subjects (n)	195	196	391
subjects (%)	18.36	14.41	17.56
Filled			
subjects (n)	396	467	863
subjects (%)	31.50	34.33	32.97

Table 3. DMFT (permanent teeth).

Age	dmft	DMFT
7	5.052	0.844
8	5.178	1.220
9	3.924	1.413
10	3.217	2.033
11	1.683	2.425
12	0.853	2.614
13	0.209	2.990
14	0.110	3.168
15	0.009	3.609

Table 4. dmft and DMFT by age.

Total DMFT	7-9 years			10-12 years			13-15 years		
	Inf CI	Sup CI	Median	Inf CI	Sup CI	Median	Inf CI	Sup CI	Median
Males	5.36	6.32	5.84	4.00	4.96	4.48	2.94	3.38	3.16
Females	5.44	6.24	5.84	3.66	4.41	4.04	3.27	3.83	3.55
M + F	5.53	6.15	5.84	3.95	4.55	4.25	3.18	3.54	3.36

dmft	7-9 years			10-12 years			13-15 years		
	Inf CI	Sup CI	Median	Inf CI	Sup CI	Median	Inf CI	Sup CI	Median
Males	4.37	5.05	4.71	1.86	2.45	2.16	0.03	0.13	.08
Females	4.34	4.96	4.65	1.40	1.87	1.63	0.03	0.22	.13
M + F	4.45	4.91	4.68	1.70	2.07	1.88	0.05	0.16	.10

DMFT	7-9 years			10-12 years			13-15 years		
	Inf CI	Sup CI	Median	Inf CI	Sup CI	Median	Inf CI	Sup CI	Median
Males	0.85	1.40	1.12	2.03	2.60	2.32	2.86	3.29	3.07
Females	0.99	1.39	1.19	2.16	2.64	2.40	3.16	3.68	3.42
M + F	0.99	1.33	1.16	2.17	2.55	2.36	3.08	3.42	3.25

Table 5. dmft and DMFT by gender and age.

teeth and 863 (32.97%) subjects presented filled teeth. DMFT index was 2.327 and this is according to other studies of same population for age (WHO, 2004); this DMFT index can be classified as high dental caries experience.

The overall DMFT results of the studied sample was lower than results of another study on a smaller (n=372) population, completed in Tirana in 2010 that shows DMFT 3.8 in a 12 years old schoolchildren group(9). These DMFT data are lower than the last epidemiological study, conducted in 2000, that indicated DMFT 3.02 in a 12 years-old group and DMFT 4.7 on a 18 years-old group (3). Other national studies of dental caries experience for 12-year-olds indicated that in 2005 the national mean Decayed, Missing, or Filled Teeth (DMFT) index was 3.1 (8).

These results are similar to other examined groups, as Norwest Russian (6), Romanian (10) and Greek population (14).

DMFT in Albanian sample is lower than Hungarian adult population (5), Iranian (2) and Indian population (15).

In Western European countries the situation is completely different: DMFT in Albanian schoolchildren was higher than other European population as Spain (1), Netherlands, United Kingdom, Germany and Italy (18).

Decayed teeth was the principal component of both the dmft index and the DMFT index and this is another important indicator of lacking dental prevention.

First dental visit		No	Yes	Total
7-9 years	Frequencies	112	502	614
	Percentage	18.2%	81.8%	100.0%
10-12 years	Frequencies	82	528	610
	Percentage	13.4%	86.6%	100.0%
13-15 years	Frequencies	68	627	695
	Percentage	9.8%	90.2%	100.0%
Total	Frequencies	262	1657	1919
	Percentage	13.7%	86.3%	100.0%

Table 6. First dental visit and age.

Oral Hygiene	Frequencies	Percentage
Absent	297	11.3
Not sufficient	1203	45.9
Good	1117	42.6
Total	2617	100

Table 7. Oral hygiene in the total sample.

Oral hygiene level		Absent	Not sufficient	Good	Total
7-9 years	Frequencies	80	369	349	798
	Percentage	10.0%	46.2%	43.7%	100.0%
10-12 years	Frequencies	100	407	342	849
	Percentage	11.8%	47.9%	40.3%	100.0%
13-15 years	Frequencies	116	426	424	966
	Percentage	12.0%	44.1%	43.9%	100.0%
Total	Frequencies	296	1202	1115	2613
	Percentage	11.3%	46.0%	42.7%	100.0%

Table 8. Oral hygiene by age.

Oral hygiene level		Absent	Not sufficient	Good	Total
Females	Frequencies	123	557	678	1358
	Percentage	9.1%	41.0%	49.9%	100.0%
Males	Frequencies	173	645	437	1255
	Percentage	13.8%	51.4%	34.8%	100.0%
Total	Frequencies	296	1202	1115	2613
	Percentage	11.3%	46.0%	42.7%	100.0%

Table 9. Oral hygiene by gender.

It is possible to observe a low improvement of oral hygiene status in older subjects (good hygiene 7-9 years = 349, 13-15 years = 424), and females appear generally better than males. A significant correlation is evident between grade of oral hygiene and DMFT, as shown in other studies (9, 12, 20).

The results of the study show that just 1919 subjects (73.3% of the total sample) were visited by a dentist: it is possible to note that the number of visited subjects is higher in the 13-15 age group. These data demonstrate that oral prevention is not frequent and the age of first dental visit has to be earlier in order to plan preventive programmes. The current dental situation in Albania is not valid to reach WHO global goals for oral health 2020: - to minimise the impact of diseases of oral and craniofacial origin on health and psychosocial development, giving emphasis to promoting oral health and reducing oral disease amongst populations with the greatest burden of such conditions and diseases;

- to minimise the impact of oral and craniofacial manifestations of systemic diseases on individuals and society, and to use these manifestations for early diagnosis, prevention and effective management of systemic diseases. The process of formulating a regional, national or local oral health strategy necessitates many stages. A preventive strategy must be programmed for the Albanese families including dental knowledge, routine care visits, the infectious nature of dental caries, awareness of dental benefits and access through Medicaid and awareness of dentists and dental clinics in the community. Furthermore, appropriate interventions could be developed to view and manage caries as a chronic disease (13, 16).

Conclusions

The oral health status of children living in Tirana can be classified as quite poor: this situation indicates the need for preventive and restorative strategies. Adequate

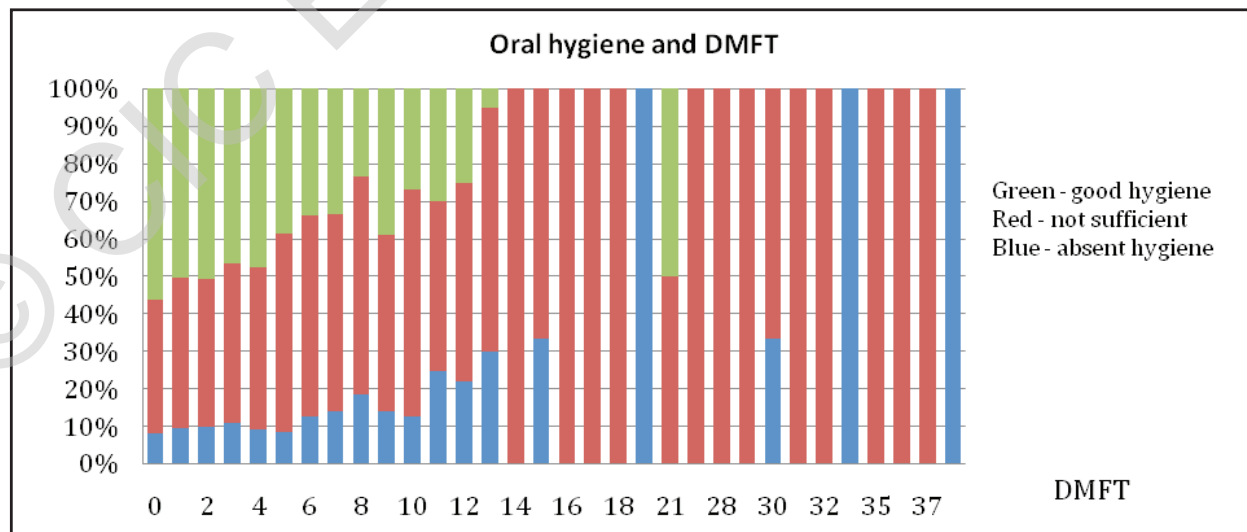


Figure 1. Correlation between oral hygiene and DMFT.

public dental health programmes including school-based oral health education and primary oral care, increasing the number of dentists and oral hygienists, and decreasing the patient: dentist ratio can be recommended to the Albanian authorities.

In Albania there is a need for dental education to improve behaviour toward oral health and the current dental situation is not valid to reach WHO global goals for oral health 2020:

- to minimise the impact of diseases of oral and craniofacial origin on health and psychosocial development, giving emphasis to promoting oral health and reducing oral disease amongst populations with the greatest burden of such conditions and diseases;

- to minimise the impact of oral and craniofacial manifestations of systemic diseases on individuals and society, and to use these manifestations for early diagnosis, prevention and effective management of systemic diseases. Considering the economic development of the country, special oral health education programmes are necessary in order to reach the WHO oral health goals for 2020. It remains an important challenge for the Dental Public Health Service to improve access to dental care and start preventive programmes.

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