

Dental Caries Experience and Oral Health Behaviour Among 12-Year-Olds in the City of Tirana, Albania

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Abstract

Aim: The aim of this study was to investigate the prevalence of dental caries experience among 12-year-old children in Tirana, Albania, and its relationship with toothbrushing, flossing, sweet consumption, and dental visits. **Methods:** In this cross-sectional study, 12-year-old children (N=372) were selected from three schools in three different areas of Tirana using cluster sampling. Participants' dental status was evaluated using the 1997 World Health Organization caries diagnostic criteria for Decayed, Missing, or Filled Teeth/Surfaces (DMFT, DMFS) by four calibrated examiners. A questionnaire on oral health behaviours was completed by each participant. Ethical approval was obtained from the Albanian Ministry of Health. Informed consent was obtained from the parents by the principals of the schools concerned. **Results:** The total number of children in the sample was 372, comprising 195 (52.4%) females and 177 (47.6%) males. The mean DMFT was 3.8, DMFS=7.98, Significant Caries (SiC) index =7.06, and the prevalence of caries-free children was 14.5%. The percentage of untreated caries or the ratio of D/DMFT was 0.542 (54.2%). Three hundred and twenty-five (87%) participants reported consuming sweets every day and only 250 (67.%) reported brushing their teeth at least once a day. The children reported making frequent visits to a dentist, often for relief of pain. **Conclusions:** Dental caries experience was seen to be high among 12-year-old children in Tirana, Albania. This is a challenge for the Dental Public Health Service to improve access to dental care and start preventive programmes.

Key Words: Caries, Oral Health Behaviour, 12-Year-Old Children, Albania

Introduction

Dental caries is a public health problem responsible for tooth loss in childhood and subsequently in adulthood. It remains a global problem. A decline in caries experience has been reported in many developed countries whereas a slow increase seems to be evident in developing countries [1]. Albania is a developing country undergoing many political and economic changes in an effort to become a member of the European Union. In Albania, there is no national caries preventive programme and oral health services are provided mainly by private dental practitioners. Previous 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, the Significant Caries (SiC) index was 5.8, and the

prevalence of caries-free children of this age was 15% [2]. At present, Albanian dentists are principally concerned with the treatment of oral diseases rather their prevention or the promotion of oral health. The public's information about and behaviour towards oral diseases and prevention are limited.

Schools have become important places for selling sodas (soft drinks), chips, sweets, and so on. Dietary patterns have changed and the trend is negative. Several studies have focused on the relationship between dietary habits and oral health behaviour of young adults with caries experience. They have found a significant association between sweet consumption and dental caries [3-5].

Oral hygiene is essential for oral health. Some studies suggest that toothbrushing and flossing play

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an important role in reducing dental caries and periodontal disease [6-8]. Nowadays, fluoride toothpaste is recognised as a major contributor in caries prevalence reduction. Critical review of the literature indicates that the anti-caries effect increases with its concentration [6]. Almost all the toothpaste sold in the Albanian market contains fluoride. The fluoride concentration is between 1000-1450 ppm or lower (500 ppm in children's toothpaste).

There is a general perception that regular dental attendance contributes to a population's oral health but the evidence is controversial. On the one hand, it has been reported that regular attendance is associated with better oral health and less caries but on the other hand, regular attendance does not help to prevent the disease [9,10].

Aim

The aim of this study was to assess the dental caries experience of 12-year-olds in Tirana, Albania, and its relationship with oral health behaviour such as toothbrushing, flossing, sweet consumption, and regular dental attendance.

Methods

Tirana is the main city and capital of Albania. Approximately a quarter of the country's population lives there. More and more people tend to live in Tirana because it is the most important cultural, social and economic centre of the country. The sample for the present cross-sectional study was 372 12-year-old children attending schools in Tirana. Based on information from the Albanian Institute of Statistics, there are approximately 84,532 children in the age group 0-14 living in the city of Tirana. It was not possible to elucidate the total number of 12-year-olds [11]. However, if it were one fourteenth of all children in the city, it would be about 6,000. The sample was selected from three schools based in three different areas of the city. These areas have different socio-economic status (SES). In contrast with some European countries, the central area was selected as representative of the wealthier part of the city because people with high SES tend to live there. The middle area represented middle SES. The suburban area was more representative of low SES because most of people who have migrated from rural areas live there and living costs are lower compared with the other two areas. The three schools were selected on the bases of easy access to the children, the support of the teaching staff, and their location in the three

different areas. This information was provided by the Regional Health Authority of Tirana, Dental Public Health Service. It was decided to use cluster sampling because it was more economical and achievable within the constraints of resources and finance. All classes (sixth grade) of 12-year-olds in these schools were included in the study. Ethical approval was obtained from the Ministry of Health. Permission for the study was obtained from the school authorities, who sought and obtained consent from the parents of the children concerned.

A questionnaire was developed. It consisted of two parts, a structured questionnaire and clinical part (*Figure 1*). Information about clinical examination, patient's details, age, gender, examiner initials, and school name were included in the first part. The second part consisted of questions on oral health behaviour. In this part, sweet consumption was assessed by a question asking for the frequency of daily intake as *not every day, once a day, twice a day, more than twice a day*. Consumption of soft drinks was ascertained by a question asking whether they were consumed: *not every day, once twice a day, twice a day*. Oral hygiene behaviour was assessed in terms of toothbrushing frequency: *no brushing, several times a week, once a day, twice a day*. A question about dental floss knowledge was included. Regular dental attendance was assessed by frequency of visiting dental surgeries/offices in two years: *no visit, once, twice, more*. The last question was about the reason for the dental visit: *check-up and prophylaxis, treatment, or relief of pain*. A question about fluoride supplement use was included in the questionnaire but because the children's knowledge of fluoridation was scant, it was decided not to analyse the answers to this question. The questionnaire was completed by the children at school before a clinical dental examination was performed.

The clinical examination took place in each school's health office or in a separate room. Two portable examination lights, dental chairs and single-use instruments (disposable mouth mirrors and probes [Flightek Co. Ltd., Taipei, Taiwan]) were used. Two calibrated dental examiners conducted the dental examination and the clinical part of the form was filled in by two other trained dentists (kappa values for inter-examiner reliability was 0.85). World Health Organization 1997 caries diagnostic criteria were followed. The DMFT, Decayed, Missed, or Filled Surfaces (DMFS) and SiC indices were used to evaluate children dental caries experience.

Date _____ Examiner Initials _____ Children name _____ Age _____ Gender M / F
 School name _____

How often do you use sweets in a day (chocolate etc)? not every day ___; once ___; twice ___; more ___

Do you use soda drinks everyday (coca cola, sprite pepsi etc) ? not every day ___; once ___; twice ___

Do you get fluoride supplements (tablets) ? Yes / No ;

How many time do you brush your teeth ? never ___; several time in a week ___; once a day ___; twice a day ___

Do you have information about dental floss? yes / no

Have you been to the dentist during two years? No ___; Once ___; Twice ___; More ___

If yes, why have you been to the dentist? Check ups ___; Pain _____

Clinical exam form
To be filled by the dentist

	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
Decayed surface																
Filled surface																
Decayed surface																
Filled surface																
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38

Figure 1. The questionnaire

Statistical analysis

Statistical software (SPSS version 18, SPSS Inc, Chicago, USA) was used for all the statistical procedures. For continuous variables, measures of central tendency and dispersion were calculated. For categorical variables, the frequencies and percentages for each category were obtained. Correlation analysis was performed to measure any relationship between the categorical variables (brushing, consumption of sweets, soft drinks, visits to the dentist), D (untreated caries) and mean DMFT.

Results

It should be noted that only results for the total sample are presented in this paper. A subsequent paper will present, compare and discuss the results for each of the three schools.

The total number of children in the sample was

372. The mean age of the children was 12.17 years (± 0.8). The questionnaire and dental examination was completed for all children, giving a participation rate of 100%. The sample comprised of 195 (52.4%) females and 177 (47.6%) males. The mean DMFT, DMFS, SiC and the prevalence of caries-free children, both for the sample and gender, are presented in Table 1.

Overall, the mean number of untreated decayed teeth (D) was 2.06 (± 2.085) and decayed surfaces (DS) was 3.76 (± 4.628). The ratio of D/DMFT was 0.542 (54.2%) and DS/DMFS was 0.471 (47.1%). Data on filled teeth or surfaces and missing teeth or surfaces display (F) 1.29 (± 1.612), (FS) 2.15 (± 2.884) and (M) 0.46 (± 0.818), (MS) 2.07 (± 3.973).

Responses to the questions on sweets (chocolates, cookies etc.) and soft-drink consumption

Table 1. Caries Experience in the Examined Sample

	DMFT mean (\pm sd)	DMFS mean (\pm sd)	SiC index	% Caries-free
Sample	3.8 (± 2.801)	7.98 (± 7.088)	7.06 (± 1.768)	14.5%
Males	3.78 (± 2.801)	8.19 (± 7.063)		13.6%
Females	3.82 (± 2.808)	7.79 (± 7.124)		15.4%

Table 2. Frequencies and Percentages of Daily Sweets and Soft-Drink (Soda) Consumption

Frequency	Sweets n (%)	Soft drinks (soda) n (%)
Not every day	45 (12.1)	69 (18.5)
Once a day	157 (42.2)	204 (54.8)
Twice a day	75 (20.2)	96 (25.8)
More than twice a day	93 (25.0)	3 (0.8)
Missing value	2 (0.5)	-
Total	372 (100.0)	372 (100.0)

indicated that only 45 (12.1%) (for sweets) and 69 (18.5%) (for soft drinks) participants did not use products on a daily basis whereas 325 (87.9%) (sweets) and 300 (81.5%) (soft drinks) consumed them regularly (Table 2).

The frequencies and percentages of tooth-brushing habits of the participants are at Table 3. Responses to the question on dental floss indicated that 294 (79%) participants did not have any knowledge of dental floss compared to only 78 (21%) who responded "Yes".

Table 3. Frequencies and Percentages of Toothbrushing

Frequency	n (%)
No brushing	25 (6.7)
Several times a week	97 (26.1)
Once a day	92 (24.7)
Twice a day	158 (42.5)
Total	372 (100.0)

Data on dental attendance are presented in Table 4. The participants who responded that they had visited a dental office in the previous two-year period were divided in two groups: 287 (84.7%) of them visited because of pain and only 52 (15.3%) for check-ups. Correlation analysis presented an association between mean decayed teeth (D) and DMFT with categorical variables of the study (Table 5). This association was statistically significant except for DMFT and soft-drink consumption.

Table 4. Frequencies and Percentages of Dental Visits in the Previous Two-Year Period

Frequency	n (%)
No visit	33 (8.9)
Once	90 (24.2)
Twice	96 (25.8)
More than twice	153 (41.1)
Total	372 (100.0)

Discussion

Dental caries is a widespread disease. Although there is a plethora of published studies of dental caries experience among different age groups in different regions of the world, there is a lack of data on dental caries experience in the literature with regard to Albania. There have been some pilot studies published in the local dental journal but their methodology was questionable.

The study aimed to assess the dental caries experience of 12-year-olds in Tirana and to investigate the frequency of some influencing factors as toothbrushing, flossing, the consumption of sweets, and regular dental attendance. The purpose of the study was to help planning preventive programmes and to serve as a baseline for future evaluation of this preventive treatment for this age group.

The overall mean DMFT was 3.8 and this can be classified as high dental caries experience. This view can be strongly supported by the finding that the caries-free prevalence was 14.5% and the caries prevalence was 85.5%. Moreover, the DMFS index

Table 5. Correlation Between D, DMFT with Categorical Variables

			Sweet	Soft drink	Brushing	Visit
Kendall's Tau-b	D	Correlation Coefficient	.216**	.144**	-.203**	-.080
		Sig. (2-tailed)	.000	.001	.000	.059
		N	370	372	372	372
	DMFT	Correlation Coefficient	.144**	-.003	-.107*	.095*
		Sig. (2-tailed)	.001	.940	.010	.022
		N	370	372	372	372

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

was 7.98 and the SiC 7.06, indicating that one-third of the sample had a caries experience twice the mean DMFT. Comparing the findings with data from other European countries appears to suggest that the mean DMFT for 12-year-olds in Tirana may be similar to that in other Central and Eastern European countries such as Poland (3.8), Slovakia (4.3), Hungary (3.8), Latvia (3.5), and Lithuania (3.6). However, these some of these data related to studies in earlier years, so a true comparison is impossible. The same apparent picture is found when comparing caries prevalence in Poland (87%), Slovakia (88%), and Lithuania (84%) with that found in the current study [12,13]. However, in Western European countries the situation is completely different; for example, most recent data for mean DMFT and caries prevalence in 12-year-olds was 0.8 and 32% in the Netherlands, 0.9 and 38% in the UK, and 2.1 and 64% in Italy. respectively [12].

There was no gender difference in the mean DMFT but the prevalence of caries-free 12-year-olds in Tirana was slightly higher in females (15.4%) than males (13.6%). The ratio of D/DMFT gives an indication of treatment need. In the current study, this ratio indicated that untreated caries was responsible for 0.542 (54.2%) of the DMFT index. It was clear that almost half of the caries experience was untreated, indicating that there was a problem with access to the dental care service by this age group.

High frequency of sweet consumption is known to be related to increased risk of dental caries [14]. Data from the study suggested that 157 (42.2%) respondents consumed sweets once and 168 (45.2%) twice per day, so a total of 325 (87.2%) of the participants reported consuming sweets every day. Comparing this finding with data from other countries, (Hungary 35%, Poland 37.5%, Ukraine 36%, Italy 37%) suggests that sweet consumption is very high in this age group in Tirana [3].

There is evidence that soft drinks (soda) are risk factor for tooth demineralisation due to sucrose composition and low pH [15]. In the current study, the intake percentages of such drinks per day was reported by 204 (54.8%) respondents to be once a day and by 96 (25.8%) to be twice a day. This trend of a high percentage reporting sugary product consumption might be related to the new market changes, the increasing number of small shops close to schools, and the lack of policy in reducing sugary product consumption.

The results for toothbrushing indicated that 67.2% of the participants brushed once or twice a day. This finding is comparable with some Eastern European countries such as Poland (61.5%), Russia (60.25%), Macedonia (59%), and the Czech Republic (65.45%) but it is lower than most Western European countries [3].

The responses on regular dental attendance showed that 91.1% (n=339) visited a dentist at least once in a two-year period. However, the reason for a visit for 287 (84.7%) 12-year-olds was pain, leading to conclusion that their dental attendance was associated with relief of dental pain only.

The use of correlation analysis comparing D (untreated caries) and DMFT with sweets, soft-drink consumption, toothbrushing and dental visits demonstrated that regular toothbrushing was inversely associated with D and DMFT, and that this finding was statistically significant. Sweets and soft-drink consumption showed a positive association with D but the relation of soft drinks and DMFT was not statistically significant. Also, there was no statistical significance between visits to a dentist and D, DMFT.

It is appropriate to discuss the weaknesses of the study. The sample was not randomly selected. The method used may indicate selection bias so the sample might have not been a representative of all 12-year-old children in Tirana. The questionnaire used was not previously piloted because it was thought that the questions were simple and there should be no problem with understanding. This proved to be the case. Unfortunately, in the current study the researchers were unable to differentiate between different kinds of sweets and drinks. It is possible that some may have been sugar-free. Although the study introduced some data about dental caries experience and frequencies of toothbrushing, regular dental visits, and sweets and soft-drink consumption, there is a need for better-designed national studies in the future.

Conclusions

The present study demonstrated that dental caries experience is high among 12-year-old children in Tirana, Albania. Also, there is a need for dental counselling and education to improve behaviour toward oral health and reduce consumption of sugar products, which might also become a problem for obesity and diabetic disease in the future. It remains a major challenge for the Dental Public Health Service to improve access to dental care and start preventive programmes.

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