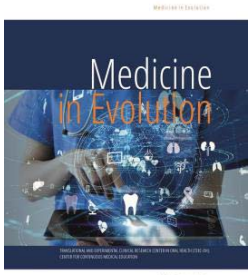
Prevalence of Dental Caries in Relation to Determinants of Oral Health Status among 11-14-Year-Old Schoolchildren in Western Region of Romania



Bolchis V., Dumitrescu R., Jumanca D., Negru D., Bălean O., Oancea R., Găluşcan A., Sava-Rosianu R.

Translational and Experimental Clinical Research Centre in Oral Health, Department of Preventive, Community Dentistry and Oral Health, University of Medicine and Pharmacy "Victor Babes", 300040 Timisoara, Romania

Correspondence to:
Name: Galuscan Atena
Address: Timisoara, Splaiul Tudor Vladimirescu no 14
Phone: +40 756050084
E-mail address: galuscan.atena@umft.ro

Abstract

Aim and objectives: The present study, part of the first national oral health survey for children in Romania, aimed to determine the correlation between the prevalence of dental caries and the impact of dietary factors on oral health status in 11-14-year-old schoolchildren from the western region of Romania. Material and methods: Data was collected from a representative sample of 133 schoolchildren (72 boys and 61 girls), average age of 12.26± 0.6, and then examined by calibrated dentists. The University ethics committee approved the study. ICDAS criteria were used to classify visual caries lesion severity. Statistical analyses of the data were performed by SPSS 23, Spearman's rank correlation and the Pearson correlation was used. Results: The DMFT index determined for the sample was 2.93±2.70. The results showed a significant positive correlation among boys who consume fresh fruits (0.17**), cookies, biscuits, cream, sweet pies, sweet rolls (0.27**), jam/honey (0.14**), sugar-sweetened chewing gum (0.38**). Statistically significant positive relationship was highlighted among girls who consume cookies, cakes, cream, sweet pies, sweet rolls (0.33**), sugar-sweetened chewing gum (0.35**). There is a statistically significant positive relationship between the consumption of sweetened beverages (0.24**), candies/sweets (0.18*), sweetened tea (0.24**), and DMFT. Conclusions: The prevalence and severity of dental caries in 11-14-year-old Romanian children from the western region of the country are strongly influenced by their socio-economic environment, as well as their specific consumption behaviors, such as the consumption of carbonated beverages, milk, sweets, tea, and cocoa.

Keywords: Dental caries prevalence, oral health status, risk factors, dietary habits, schoolchildren

INTRODUCTION

In the opening statement of its constitution, the World Health Organization (WHO) declares that health encompasses not just the absence of illness and weakness, but a holistic state of well-being that includes physical, mental, and social aspects. However, in the field of dentistry, the dental profession has generally focused exclusively on treating oral diseases and not on promoting oral health in the full sense of the term. Thus, it is necessary to address oral health as an essential dimension of quality of life, which is not limited to the absence of oral disease, but also to a person's ability to communicate and socialise appropriately [1,2].

Optimal oral health has a significant impact on a person's quality of life. Poor oral health can lead to digestive and respiratory diseases, as well as subsequent complications to general health [3]. Oral problems are a major global public health problem and have a profound effect on quality of life. Dental caries, for example, is one of the most common chronic diseases worldwide and has a significant impact on general health and quality of life [4]. The prevalence of dental caries varies by country and socio-economic level, and income inequality is an important factor determining the prevalence of childhood dental caries [1,5].

WHO and other international organisations have recognised the importance of oral health and have launched initiatives and programmes to promote oral health globally. However, there are still many challenges in ensuring optimal oral health for all populations. An integrated and holistic approach is needed, including preventive measures, health promotion and health education, and universal access to oral health services [6,7].

Diagnosing dental caries is crucial for early detection and treatment, and various methods are employed in dental practice for this purpose. One such method is self-assessment, where patients answer questions about their oral health, though the accuracy can be influenced by societal and cultural factors [8]. Another common tool is the DMFT (Decayed, Missing, Filled Teeth) index, which measures active carious lesions, missing teeth, and filled teeth, offering insights into caries severity and prevalence [9,10]. The International Caries Detection and Assessment System (ICDAS) is another diagnostic approach, designed to evaluate caries severity, including early lesions missed in routine exams, providing a standardized, evidence-based diagnostic framework [11,12].

In recent years, the concept of health and the measurement of health status have evolved, with little impact on dentistry. However, the dental profession has remained largely focused on the clinical approach to oral health, equating health with the presence of disease [13]. Thus, dentistry has remained immune to the broad concept of health as defined by the WHO [14]. It is important to understand that quality of life (QOL) measures is not a substitute for, but complementary to, the measurement of outcomes associated with disease. In recent years, there has been an evolution in the concept of QOL related to oral health, as more evidence has become available on the impact of oral disease on social roles [15-18]. Thus, oral health is an essential dimension of people's quality of life and optimal oral health enables a person to fulfil their roles in society. Poor oral health can also have a negative impact on general health and quality of life, potentially triggering digestive and respiratory diseases with subsequent complications for the body. Oral health problems, such as tooth decay, affect millions of people worldwide, with a profound impact on general health and quality of life. Although progress has been seen in reducing the prevalence of caries in some industrialised countries, it remains one of the most common chronic diseases worldwide. In developing countries, the prevalence of dental caries and the number of untreated cases remain high [4,6].

Dental caries has been a global problem and has attracted the attention of many specialists. According to the World Health Organisation, between 60% and 90% of children of all ages have at least one tooth affected by caries, and children have a higher prevalence of

caries compared to adults. In less developed countries, oral hygiene may be poor and regular dental visits may be neglected, affecting prophylaxis [4].

Preventive behaviour plays a crucial role in maintaining good oral health for both adult and young patients. This behaviour includes aspects such as oral hygiene, proper care of gums and teeth, dental services, correct use of hygiene objects, toothpaste and mouthwash [4]. Regular visits to the dentist and oral care measures are essential from an early age to prevent early onset of systemic diseases. Poor oral hygiene can lead to the development of tooth decay, which in severe cases can lead to tooth loss. In Romania, studies show that the level of oral health is in many cases limited to simple tooth brushing, which can lead to frequent complications [19].

Aim and objectives

The aim of the scientific is to analyse the prevalence of dental caries and the impact of dietary factors on the oral health of 12-year-old schoolchildren through a cross-sectional study.

The main objective of the research was to assess the oral health status of 12-year-old children in the western part of Romania by determining the prevalence of caries.

The secondary objective of the research was to identify the relationship between the prevalence of dental caries and the determinants of oral health status of 12-year-old schoolchildren in the western part of the country.

MATERIAL AND METHODS

The cross-sectional epidemiological study was designed and conducted during 2019-2020 [20], with the approval of the World Health Organization (WHO), the support of the Ministry of Health and compliance with the General Data Protection Regulation 2018. The study methodology was approved by the local (each school authority), regional (school inspectorate), national (Romanian Ministry of Health - Opinion No. 3411/05.04.2018, Ministry of Education - Opinion No. 1573/12.03.2019) and University of Medicine and Pharmacy "Victor Babeş" Timişoara, Romania (No. 29/28.09.2018) competent authority.

The study aimed to describe the prevalence of caries and severity of carious lesions in schoolchildren aged 11-14 years residing in rural and urban areas of western Romania in relation to oral health determinants. The participants, 133 children, boys and girls, are students from 9 schools distributed in rural and urban areas of Timiş, Arad, Bihor, Hunedoara, Sibiu, Caraş-Severin counties.

The schools selected in the study were: Avram Iancu Unirea Secondary School, Alba County; Arad Secondary School, Arad County; Nicolae Popoviciu Beiuş Secondary School, Bihor County; Pietroasa Secondary School, Bihor County; Sport High School Banatul Timişoara, Timiş County; Theoretical High School Periam, Timiş County; Theoretical High School I. C. Brătianu Haţeg, Hunedoara County; Măureni Secondary School, Caras-Severin County; Brateiu Secondary School, Sibiu County.

In order to ensure randomisation and stratification of the sample, the total number of pupils was determined as a percentage of the total number of children enrolled in the 8th grade National Examination for each school in Romania. Thus, the percentage share for each county was estimated and the final target number of assessments was obtained according to the type of locality (urban versus rural). Using the randomisation function of MS Excel, one urban and one rural school were selected for each county, resulting in a total of 9 schools distributed in rural and urban areas.

School-level predictors included the Development Index (LHDI 2011 given by Dumitru Sandu), which is a sociological index combining county-level variables such as

education stock, life expectancy at birth, average age of adult population, available living space, number of private cars per 1000 inhabitants and average household gas consumption. Factor analysis was used to aggregate these variables, and the scores obtained were relevant to the assessment of the county's workforce potential and economic potential.

Data were collected using the Children's Oral Health Questionnaire developed by the World Health Organization and described in the WHO Oral Health Surveys - Basic Methods, 5th edition, 2013. The questionnaire was translated into Romanian by two independent translators and differences were resolved in a face-to-face meeting. Two experts in educational and developmental psychology were also consulted to ensure the readability of the Romanian version of the questionnaire.

The questionnaires were distributed to schools through the postal services, sent to the children by the teachers one week before the clinical examination, and completed by the children in collaboration with their parents/carers at home. Completion of informed consent by parents/carers was required for participation in the study (Figure 1). Questionnaires were collected by the examiners on the day of the examination.

National Oral Health Project

Hello,

This study aims, for the first time in Romania, to assess the oral health of children on a national sample. The study is carried out by the Ministry of Health and is funded by the World Health Organization.

Thank you in advance for your agreement. participation.

Q1. You 're... a. boy b. girl Q2. How old are you today? .....

Q3. What class are you in? .....

Q4. What level of education has your father completed (or your stepfather, guardian or other male adult living with you)?

1. No school
2. Primary school (4 classes)
3. Secondary school (8 classes)
4. Vocational school (10 classes)
5. High school (12 classes)
6. Post-secondary school
7. University studies
8. Do not live with men in the house
9. I don't know / I don't answer

Q5. What level of education has your mother completed (or your stepmother, guardian or other female adult living with you)?

a) No school
b) Primary school (4 classes)
c) Secondary school (8 classes)
d) Vocational school (10 classes)
e) High school (12 classes)
f) Post-secondary school
g) University studies
h) Do not live with men in the house
i) I don't know / I don't answer

Q6. In the last 12 months, how often have you had toothache or feel discomfort from your teeth?

a. never b. once or twice c. almost every month d. almost every week e. almost every day f. I don't know/ I don't remember

Q7. How often have you been going to the dentist in the last year?

a) Once
b) Twice
c) Three times
d) Four times
e) More than four times
f) I haven't been to the dentist in 12 months.
g) I never received dental care / I visited a dentist
h) I don't know / I don't remember

Q8. What was the reason for your last visit to the dentist?

a) Pain or problems with teeth, gums or mouth b)Treatment or follow-up of treatment c) Routine checking of teeth d) I don't know / I don't remember

Q9. How often do you clean your teeth?

a) never b) 2-3 times a month c) once a week d). 2-6 times a week e) once a day f) 2 or more times a day

Q10. Which of the following do you use when you clean your teeth?

a) toothbrush b) wooden toothpicks c) plastic toothpicks d) dental floss e) Something else. What's that? .....

Q11. Do you use toothpaste to clean your teeth? a) Yes b) No

Q12. How often does your son/daughter consume or drink any of the following foods, even in small quantities?	A few times a day	Once every day	A few times a week	A few times a month	Never
1. Fresh fruit	4	3	2	1	0
2. Biscuits, cakes, cream, sweet pies, buns	4	3	2	1	0
3. Sweetened soft drinks (Coca-Cola, lemonade, fruit juice, etc.)	4	3	2	1	0
4. Sweetness / Honey	4	3	2	1	0
5. Chewing gum containing sugar	4	3	2	1	0
6. Sweets / candy	4	3	2	1	0
7. Milk with sugar / honey	4	3	2	1	0
8. Tea with sugar / honey (sweetened)	4	3	2	1	0
9. Cocoa with sugar / honey	4	3	2	1	0

Figure 1. Oral Health Questionnaire

Clinical examination was performed by calibrated examiners and calibration was performed by examining 21 subjects. The inter-examiner kappa coefficient ranged from 0.74-0.86 and the intra-examiner kappa coefficient ranged from 0.81-0.92. The ICDAS criterion was used to classify the severity of carious lesions, and the ICCMS Guidelines for Practitioners and Educators were used to classify the presence of filling material. Dental plaque or food debris was removed using cotton rollers. The data collected were recorded in a special table attached to the questionnaire and informed consent was obtained from each participant.

Statistical processing of the data was performed in Statistical Package for the Social Sciences (SPSS) version 23 for Windows. Spearman's rank correlation was used to analyse the relationships between variables. The rank correlation coefficient was denoted by rs or rho, and statistically significant values were considered $p<0.05$. intervals.

RESULTS

The study included a total of 133 school children aged 11 to 14, with an average age of 12.26 years. Of these, 54.1% were boys and 45.9% were girls. In terms of age, the majority of the sample was made up of 12-year-olds (70.7%), followed by 13-year-olds (24.1%) and 11-year-olds (3%). There were only a few 14-year-olds (2.3%).

Table 1. Description of the sample according to gender and age

Variable		N (%)
Gender	Boys	72 (54.1)
	Girls	61 (45.9)
Age	11 years	4(3%)
	12 years	94(70.7%)
	13 years	32(24.1%)
	14 years	3(2.3%)

Parental education

The level of education of mothers and fathers was assessed as a determinant of children's oral health. Of the sample, 19 people reported that their mothers had completed secondary school, 38 had completed high school and 29 had completed university. In the case of fathers, 15 people had graduated from middle school, 25 had graduated from high school, and 24 had graduated from college.

Table 2. Description of the sample according to mother's and father's education

Level of education	Mother's education (%)	Father's education (%)
No school	1 (0,73)	1(0.49)
Primary school (grades 0-4)	3 (2.44)	4 (2.93)
Secondary school (classes 0-8)	19 (14.90)	15 (11.11)
Vocational school (grades 0-10)	18(13.80)	20 (15.14)
High school (grades 0-12)	38 (28.57)	25 (32.72)
Post-secondary school	7(5.37)	5 (3.54)
University	29 (22.10)	24 (18.19)
Don't know/ Don't answer	14 (10.62)	17(12.94)
Not living with parents	1 (0.37)	2(1.95)

Visits to the dentist

The frequency of visits to the dentist was analysed according to gender and the children's place of residence. It was found that 11.5% of boys and 8.5% of girls had never been to the dentist. In the last 12 months, 20.3% of boys and 17.4% of girls had never visited the dentist. For those who had visited the dentist, the percentage of visits ranged from 1 to 4 in a year.

The frequency of oral hygiene habits by gender was analysed. It was observed that the percentage of boys who had never been to the dentist was higher than that of girls. In terms of performing oral hygiene habits during a day and week, significant differences were observed between girls and boys.

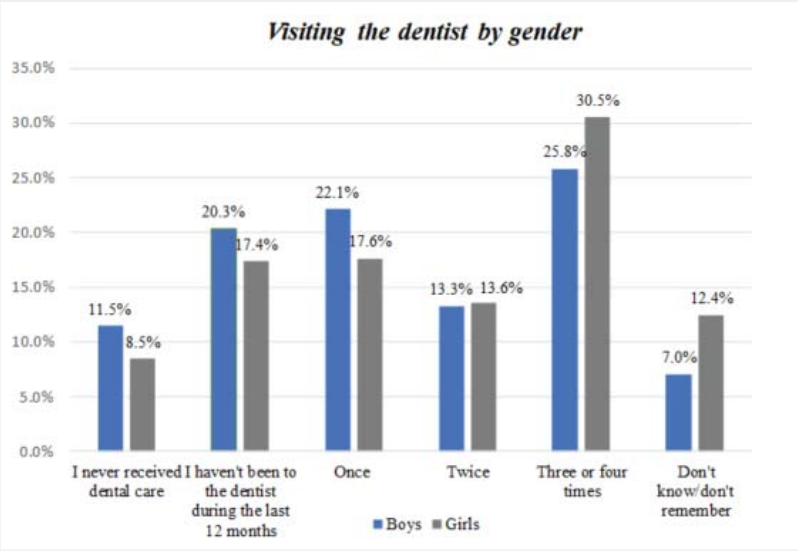


Figure 2. Dental visits by gender

The behaviour and clinical status of children from urban and rural areas were compared. It was found that the percentage of rural children who had never received dental care was higher than that of urban children. The percentage of students included in the study who have never received dental care is 13% for the rural environment, while for students coming from urban areas, it is lower, specifically 7.4%. Within the studied sample, 25.1% of rural students visited the dentist three to four times in the last year, while the percentage was notably higher in urban areas, at 30.8%. Around 13.2% of all rural students and a similar percentage of 13.5% among urban students reported visiting the dentist approximately twice a year. In conclusion, the frequency of annual dental visits within the studied sample is comparable between rural and urban students.

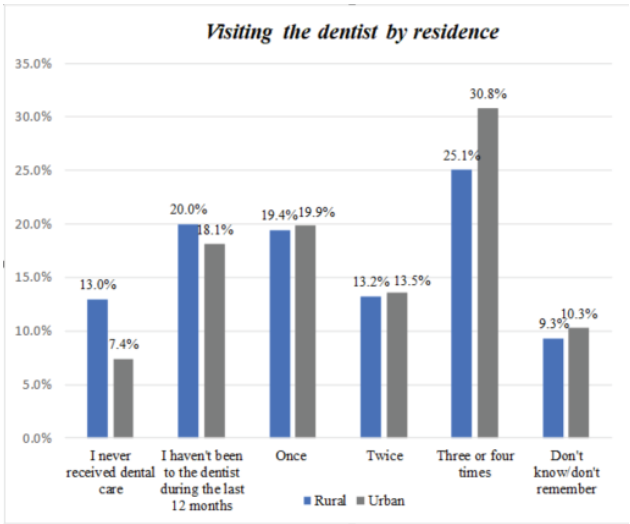


Figure 3. Visiting the dentist by residence

Examining children's eating habits: 34.4% eat fresh fruits multiple times daily, 37.6% enjoy treats like cakes and sweet rolls several times weekly, 33.4% consume sugary drinks several times weekly, 37.2% have jam or honey monthly, 32.2% chew sugary gum weekly. For 6th graders in western Romania: 24.8% eat candies once a day, 23.1% several times daily; 35.9% avoid sweetened milk, 32.8% drink sugary tea monthly. Also, 33.7% enjoy sugar/honey cocoa monthly as shown in Table 3.

Table 3. Description of eating habits

Type of eating habit	Never	A few times a month	A few times a week	Once a day	Several times a day
Fresh fruit	0.60%	4.10%	25.50%	35.30%	34.40%
Biscuits, cakes, creams, sweets, pies, sweets	1.50%	23.5%	37.60%	18.20%	20.80%
Sweetened drinks	4.60%	23%	33.40%	18.20%	20.80%
Jam/ Honey	14%	37.20%	28.70%	14%	6.20%
Chewing gum with sugar	13.90%	26.90%	32.20%	13.40%	13.60%
Sweets/candies	3.70%	13.70%	34.70%	24.80%	23.10%
Milk sweetened with sugar/honey	35.90%	22%	24.20%	12.30%	5.60%
Sweetened tea	15.30%	32.80%	27.80%	14.90%	90.40%
Cocoa sweetened with sugar/honey	31.30%	33.70%	18.90%	9.70%	6.40%

Eating behaviour

Children's eating habits and their correlations with the variables analysed were examined. It was observed that there were significant positive correlations between the consumption of foods with sugar content and the severity index of carious lesions. Parental education also had a significant influence on children's eating behaviour.

Table 4. Correlation between eating behaviour and parental education. *p<0.05, **p<0.001

Type of eating habit	Father's education Rs-rho(p,N)	Mother's education Rs-rho(p,N)
Fresh fruit	-0.01(0.01, 133)	-0.08(0.03, 133)
Biscuits, cakes, creams, sweets, pies, sweets	0.03(0.06, 133)	-0.08(0.03, 133)
Sweetened drinks	-0.02**(0.00, 133)	-0.02**(0.00, 133)
Jam/ Honey	-0.01(0.08, 133)	-0.00(0.09, 133)
Chewing gum with sugar	-0.02(0.07, 133)	-0.01*(0.02, 133)
Sweets/candies	-0.04(0.05, 133)	-0.01(0.00, 133)
Milk sweetened with sugar/honey	-0.01(0.02, 133)	-0.02*(0.00, 133)
Sweetened tea	-0.07(0.03, 133)	-0.02*(0.00, 133)
Cocoa sweetened with sugar/honey	-0.05(0.03, 133)	-0.01*(0.00, 133)

Correlation between eating behaviour and clinical condition

The determined DMFT index value for the sample was 2.93±2.70, within a range of 0 to 20. To better comprehend how the three indices of our study (MT, D3T and RT) are influenced by the dietary behaviour of children in the western region of Romania, a correlation analysis was conducted between these three indices and the variables composing the dimension.

Based on the obtained results, we highlight a statistically significant positive relationship between the consumption of sweetened beverages (0.24**), candies/sweets (0.18*), sweetened tea (0.24**), and D3T among children aged 11 to 14 years.

The relationships between the tested variables are strong and significant due to the significance threshold approaching +1 and the positively significant Spearman rank correlation coefficient. According to the results obtained, statistically negative relationships exist between the consumption of sweetened soft drinks (-0.12**) and the restoration elements in children from the western region of the country, with the significance level nearing -1 and each relationship being significantly negative (Table 5).

Table 5. Correlation between "MT", "D3T" and "RT" index and eating behaviour. *p<0.05, **p<0.001

Type of eating habit	MT rs-sho(p,N)	D3T rs-sho(p,N)	RT rs-sho(p,N)
Fresh fruit	0.07(0.93, 133)	0.08(0.34, 133)	0.01(0.82, 133)
Biscuits, cakes, creams, sweets, pies, sweets	0.08(0.35, 133)	0.14(0.10, 133)	-0.02(0.77, 133)
Sweetened drinks	-0.01(0.24, 133)	0.24**(0.00, 133)	-0.12**(0.11, 133)
Jam/ Honey	-0.07(0.38, 133)	0.06(0.45, 133)	-0.05(0.51, 133)
Chewing gum with sugar	-0.05(0.50, 133)	0.01(0.08, 133)	-0.01(0.19, 133)
Sweets/candies	-0.01(0.90, 133)	0.18*(0.03, 133)	0.05(0.53, 133)
Milk sweetened with sugar/honey	0.08(0.32, 133)	0.15(0.08, 133)	0.06(0.42, 133)
Sweetened tea	-0.02(0.80, 133)	0.24**(00.00, 133)	-0.03(0.68, 133)
Cocoa sweetened with sugar/honey	0.06(0.48, 133)	0.15(0.76, 133)	-0.06(0.43, 133)

DISCUSSIONS

According to a 2014 report from the European Platform for Better Oral Health, Romania lacks an oral health monitoring program involving systematic data collection. Additionally, Romania lacks a comprehensive oral health promotion program and a corresponding strategy. There is also no national scientific research program in the field of oral health in Romania [21].

In Romania, only a few oral epidemiological studies have been conducted in recent years, and systematic data on children's oral health behaviour are limited. This limits the ability to obtain nationally representative data on the prevalence or incidence of caries. Also, differences in diagnostic criteria and the use of non-standardised examiners make it difficult to compare data [21].

The results of two studies on the prevalence of caries in 12-year-old children have been published [22,23], suggesting a national average DMFT of 4.1 for 12-year-old children in 1992 [22] and 2.8 in 2000 [23]. Thus, for this study, the assessment criteria of the "International Caries Detection and Assessment System (ICDAS II)" were used to obtain results comparable to other similar studies worldwide.

Dietary behaviour has been identified as a significant risk factor influencing oral hygiene and caries prevalence among children. Several studies have shown that the consumption of sugar-containing foods and beverages is strongly associated with an increased risk of dental caries (Smith et al., 2017; Jones & Brown, 2019). Our findings are consistent with these studies, as we observed significant positive correlations between the consumption of sweetened drinks and the severity index of carious lesions. Furthermore, the impact of parental education on children's eating behaviour has been documented in previous research (White et al., 2015; Green & Johnson, 2018). Our study also found that parental education level significantly influenced the dietary behaviour of the participants.

It is mentioned that caries is a multifactorial disease, and the results of studies carried out in other European countries have provided valuable information on caries prevalence, reporting significant differences between countries [24]. Numerous comprehensive studies in the field have been conducted in countries such as Italy, Greece, Hungary, Slovenia, and Croatia, providing valuable insights and future considerations, highlighting significant variations between countries (e. g. DMFT of 4 in Croatia, 4.5 in Slovenia, 3.8 in Hungary, 2.05 in Greece, 0.8 in Italy) [25-27]. In contrast, in Romania there is a lack of comprehensive national studies on oral health in children or adults, with the exception of one longitudinal study assessing caries trends in Romanian schoolchildren.

Despite numerous studies conducted in neighbouring countries, comprehensive national studies on oral health in children or adults are lacking in Romania. A previous study

conducted by Petersen and colleagues in the 1990s covered only five major cities, without considering rural areas. Some local studies describe a high prevalence of caries in Romania [24,28,29]. Only one longitudinal study assesses caries trends among Romanian schoolchildren [30].

According to the transnational study HBSC 2001-2002, children's dietary patterns can provide information about their oral health status. A low percentage of daily candy consumption was reported by adolescents in Finland (9%), Denmark (12%), Sweden (13%), Norway and Greece (14%). The highest percentage of 11-13-year-old children reporting consuming sweets once a day or more was in Scotland (46%), Ireland (46%), the Netherlands (45%), Belgium, Flemish-speaking (41%), and Israel (41%). The highest percentages of 11-13-year-old children reporting drinking soft drinks at least once a day were in Israel (52%), Scotland (46%), the USA (42%), and the Netherlands (41%). Soft drink consumption was very uncommon in Finland (7%), Denmark (9%), Lithuania (10%), Sweden (12%), and Latvia (15%) [31].

In a local Romanian study conducted in Cluj-Napoca in 2017, on a sample of 650 schoolchildren with a mean age of 15.3±2.8 years, the research revealed a relatively high caries index associated with sugar consumption. Although 62.2% of the subjects frequently consumed chocolate, the study showed significant gender differences specifically in the consumption of sugar-sweetened beverages ($p < 0.001$). Male adolescents consumed sugar-sweetened beverages more frequently than females (45.2% vs. 32.7%). The results of the DMFT index calculated in this study highlighted a higher prevalence of caries with frequent sweet consumption. Dietary factors and behaviours influence the occurrence of caries. Soda consumption directly influences the DMFT index ($p = 0.028$) [24].

Girls have better knowledge and attitudes regarding dietary habits and sugar consumption. Boys tend to consume more soft drinks than girls, and children with lower parental occupation consume more beverages than those with higher parental occupation [32]. Low parental education is considered one of the predisposing factors leading to poor child health, including oral health. Furthermore, it has been reported that parental educational levels are directly associated with the family's socioeconomic status [33].

One of the limitations of the study lies in interpreting the results, which could be distorted due to the study's design, as cross-sectional studies typically measure both cause and effect simultaneously, introducing temporal ambiguity and an inability to establish causal relationships. Additionally, it is important to consider that the data source from questionnaires may not be sufficiently reliable, especially regarding socioeconomic data.

The validity of the findings is supported by the comprehensive process of sample selection and data analysis, as well as meticulous calibration. This present study addresses caries prevalence and also assesses the roles of key caries risk factors and oral health behaviors, using the STEPS model as recommended by WHO guidelines. This ensures the ability to evaluate national trends and compare them with those of other countries. The STEPS approach advocates for regular and ongoing data collection.

Our study provides information regarding the determinants of oral health status among urban and rural schoolchildren aged between 11 and 14 in the western region of Romania. The data is statistically representative for this area. Considering the significant relevance of oral health issues among schoolchildren, identifying personal parameters that influence caries prevalence is essential for their prevention efforts.

CONCLUSIONS

In Romania, there is a clear lack of an oral health monitoring programme through systematic data collection and a general oral health promotion programme. This lack of

national programmes and strategies has led to few oral epidemiological studies and a lack of systematic data on children's oral health behaviour.

The results of this study indicate a high prevalence of caries in the children evaluated. The risk factors identified were dietary behaviour, especially the consumption of sweetened drinks, sweets and starches, and the level of parental education.

The findings from this study provide a picture of the oral health status of schoolchildren in a specific area of Romania, but comprehensive national studies are needed to obtain representative data and assess trends at national level.

Finally, it is necessary to adopt appropriate strategies and programmes for monitoring and promoting oral health in Romania, taking into account the identified risk factors and involving the education of children and parents in promoting oral hygiene and adopting healthy eating behaviour.

In conclusion, our findings highlight the importance of addressing dietary behaviour, particularly the consumption of sugary foods and beverages, as a key factor in preventing dental caries. To ensure the long-term oral health of Romanian children, educational efforts must be directed towards promoting proper nutrition and oral hygiene practices from an early age.

REFERENCES

1. Dumitrescu R, Sava-Rosianu R, Jumanca D, Balean O, Damian LR, Fratila AD, et al. The Impact of Parental Education on Schoolchildren's Oral Health—A Multicenter Cross-Sectional Study in Romania. Int J Environ Res Public Health. 2022 Sep 5;19(17):11102.
2. Elamin A, Garemo M, Gardner A. Dental caries and their association with socioeconomic characteristics, oral hygiene practices and eating habits among preschool children in Abu Dhabi, United Arab Emirates — the NOPLAS project. BMC Oral Health. 2018 Dec;18(1):104.
3. Sănătatea orală în România.:19.
4. Petersen PE, Bourgeois D, Ogawa H, Estupinan-Day S, Ndiaye C. The global burden of oral diseases and risks to oral health. Bull World Health Organ. 2005 Sep;83(9):661–9.
5. Kagihara LE, Niederhauser VP, Stark M. Assessment, management, and prevention of early childhood caries. J Am Acad Nurse Pract. 2009 Jan;21(1):1–10.
6. Petersen PE, Bourgeois D, Ogawa H, Estupinan-Day S, Ndiaye C. The global burden of oral diseases and risks to oral health. Bull World Health Organ. 2005 Sep;83(9):661–9.
7. Watt RG, Sheiham A. Integrating the common risk factor approach into a social determinants framework. Community Dent Oral Epidemiol. 2012 Aug;40(4):289–96.
8. Ramos RQ, Bastos JL, Peres MA. Diagnostic validity of self-reported oral health outcomes in population surveys: literature review. Rev Bras Epidemiol. 2013 Sep;16(3):716–28.
9. Radić M, Benjak T, Dečković Vukres V, Rotim Ž, Filipović Zore I. Presentation of DMF Index in Croatia and Europe. Acta Stomatol Croat. 2015 Dec 15;49(4):275–84.
10. Moradi G, Mohamadi Bolbanabad A, Moinafshar A, Adabi H, Sharafi M, Zareie B. Evaluation of Oral Health Status Based on the Decayed, Missing and Filled Teeth (DMFT) Index. Iran J Public Health. 2019 Nov;48(11):2050–7.
11. Dikmen B. Icdas II criteria (international caries detection and assessment system). J Istanb Univ Fac Dent. 2015;49(3):63–72.
12. Gugnani N, Pandit IK, Srivastava N, Gupta M, Sharma M. International Caries Detection and Assessment System (ICDAS): A New Concept. Int J Clin Pediatr Dent. 2011;4(2):93–100.
13. Fontana M, Zero DT. Assessing patients' caries risk. J Am Dent Assoc 1939. 2006 Sep;137(9):1231–9.
14. Park Textbook of Preventive and Social Medicine 23rd edition.
15. Higginson IJ. Measuring quality of life: Using quality of life measures in the clinical setting. BMJ. 2001 May 26;322(7297):1297–300.

16. Cohen LK, Jago JD. Toward the Formulation of Sociodental Indicators. Int J Health Serv. 1976 Oct;6(4):681–98.
17. Cushing AM, Sheiham A, Maizels J. Developing socio-dental indicators--the social impact of dental disease. Community Dent Health. 1986 Mar;3(1):3–17.
18. Ettinger RL. Oral disease and its effect on the quality of life. Gerodontics. 1987 Jun;3(3):103–6.
19. Special Eurobarometer 330: Oral health.
20. Sava-Rosianu R, Campus G, Matichescu A, Balean O, Dumitrache MA, Lucaciu PO, et al. Caries Prevalence Associated with Oral Health-Related Behaviors among Romanian Schoolchildren. Int J Environ Res Public Health. 2021 Jun 17;18(12):6515.
21. Dumitrescu R, Sava-Rosianu R, Jumanca D, Balean O, Damian LR, Campus GG, et al. Dental Caries, Oral Health Behavior, and Living Conditions in 6–8-Year-Old Romanian School Children. Children. 2022 Jun 16;9(6):903.
22. Alhabdan YA, Albeshr AG, Yenugadhati N, Jradi H. Prevalence of dental caries and associated factors among primary school children: a population-based cross-sectional study in Riyadh, Saudi Arabia. Environ Health Prev Med. 2018 Nov 30;23(1):60.
23. Szöke J, Petersen PE. Evidence for dental caries decline among children in an East European country (Hungary). Community Dent Oral Epidemiol. 2000 Apr;28(2):155–60.
24. Tudoroniu C, Popa M, Iacob SM, Pop AL, Năsui BA. Correlation of Caries Prevalence, Oral Health Behavior and Sweets Nutritional Habits among 10 to 19-Year-Old Cluj-Napoca Romanian Adolescents. Int J Environ Res Public Health. 2020 Sep 22;17(18):6923.
25. Lešić S, Dukić W, Šapro Kriste Z, Tomičić V, Kadić S. Caries prevalence among schoolchildren in urban and rural Croatia. Cent Eur J Public Health. 2019 Sep;27(3):256–62.
26. Vrbič V, Vrbič M. Epidemiology of Caries in 12-Year-Olds in Slovenia 1987-2013. Oral Health
27. Boka V, Arapostathis K, Karagiannis V, Kotsanos N, van Loveren C, Veerkamp J. Dental fear and caries in 6–12-year-old children in Greece. Determination of dental fear cut-off points. Eur J Paediatr Dent. 2017 Mar;18(1):45–50.
28. Funieru C, Klinger A, Băicuș C, Funieru E, Dumitriu HT, Dumitriu A. Epidemiology of gingivitis in schoolchildren in Bucharest, Romania: a cross-sectional study. J Periodontal Res. 2017 Apr;52(2):225–32.
29. Dumitrescu, R.; Sava-Rosianu, R.; Jumanca, D.; Negru, D.; Bălean, O.; Pasca, I.G.; Oancea, R.; Găluscan, A. Investigating the Connection between Parental Education and Children's Oral Health: An Extensive Examination in Western Romania for 11–14-Year-Olds. Timisoara Med. 2023, 2023(1), 3; doi:10.35995/tmj20230103. Baciu D, Danila I, Balcos C, Gallagher JE, Bernabé E. Caries experience among Romanian schoolchildren: prevalence and trends 1992-2011. Community Dent Health. 2015 Jun;32(2):93–7.
30. Zaborskis A, Milciuviene S, Narbutaite J, Bendoraitiene E, Kavaliauskiene A. Caries experience and oral health behaviour among 11 -13-year-olds: an ecological study of data from 27 European countries, Israel, Canada and USA. Community Dent Health. 2010 Jun;27(2):102–8.
31. Verzeletti C, Maes L, Santinello M, Vereecken CA. Soft drink consumption in adolescence: associations with food-related lifestyles and family rules in Belgium Flanders and the Veneto Region of Italy. Eur J Public Health. 2010 Jun 1;20(3):312–7.
32. Pizzo G, Piscopo MR, Matranga D, Luparello M, Pizzo I, Giuliana G. Prevalence and socio-behavioral determinants of dental caries in Sicilian schoolchildren. Med Sci Monit Int Med J Exp Clin Res. 2010 Oct;16(10):PH83-89.