

THE TWOFOLD PERSPECTIVE OF SCHOOLCHILDREN'S ORAL HEALTH

Anca-Cristina Perpelea^{1,*}, Ruxandra Sfeatcu^{2,*}, Mihaela Tănase^{3,#}, Mihail Tușaliu⁴,
Bogdan Dimitriu^{5,#}, Ana Cernega¹, Silviu-Mirel Pițuru¹

¹“Carol Davila” University of Medicine and Pharmacy - Bucharest, Romania, Faculty of Dentistry, Department of Organization, Professional Legislation and Management of the Dental Office;

²“Carol Davila” University of Medicine and Pharmacy - Bucharest, Romania, Faculty of Dentistry, Department of Oral Health and Community Dentistry;

³“Carol Davila” University of Medicine and Pharmacy - Bucharest, Romania, Faculty of Dentistry, Department of Pedodontics;

⁴“Carol Davila” University of Medicine and Pharmacy - Bucharest, Romania, Faculty of Medicine, Department of Ophthalmology, ENT;

⁵“Carol Davila” University of Medicine and Pharmacy - Bucharest, Romania, Faculty of Dentistry, Department of Endodontics;

*Corresponding authors: anca-cristina.perpelea@drd.umfcd.ro; ruxandra.sfeatcu@umfcd.ro

#Authors had an equal contribution

ABSTRACT

Aim of the study: This study identifies the optimal condition for the efficient integration of prevention in schools, as well as the actors who contribute to achieving this. Drawing from results-based management theory, a dual perspective is applied, encompassing both the parent's and the dental practitioner's viewpoints to analyse the oral health status of schoolchildren in Romania. **Materials and methods:** Data were collected using Step 1 and Step 2 approach, and information correlation was done digitally, with the assistance of a web application. Statistical analysis included the utilization of Kruskal-Wallis H Test and Post-hoc Dunn-Bonferroni Test. **Results:** The results presented indicate a disparity between the adults' perception and the clinical evaluation. The level of education background of parents becomes a factor capable of exerting influence on the oral health of the children, thus children whose mothers have university education have a better oral health compared to those whose female parents have primary or secondary education. **Conclusions:** Prioritizing electronic data collection should be emphasized, aiming to facilitate information, monitoring, evaluation and support for public health sector and community level. In this context, a nationwide program for promoting oral health in schools in Romania should be regulated.

Key words: dentistry, oral health; schoolchildren; dental care; education; prevention

INTRODUCTION

The diseases of the oral cavity are frequently encountered and affect millions of people globally [1], [2]. Carious lesions are still considered the most common child-hood disease that is not self-limiting [3]. Over 80% of children in some countries have carious lesions or gum disease [4]. Children who have diseases of the oral cavity are 12 times more susceptible to have days when their activities are restricted, compared to those who present a good oral health [5]. Dental caries in children is increasing globally and represents one of the great challenges at the level of community

health [6]. The management of carious lesions in schoolchildren involves assessing the risk of developing carious lesions and studying multiple approaches [7] to determine the most effective way to contribute to maintaining good oral health [8]. Childhood dental problems are shown to be indicators for adult dental problems [9].

The perception of the state of oral health differs depending on the individual and reflects their behaviours and experiences [10]. The increased prevalence of carious lesions is not determined only biological aspects that interface with cariogenic microorganisms; the

problems related to oral health being also in accordance with the educational level [11].

The impact of social determinants on health and disease represents a complex problem with multiple aspects [12]. The socio-economic position has a possible influence on the occurrence of the disease, being a relevant etiological factor for oral health [13]. There is a close connection between socio-economic conditions and the occurrence of dental caries [14], which indicates that those whose level is lower are exposed to a greater extent to risk factors that could affect the incidence of dental caries [15].

There are two sets of indices considered by the World Health Organization to be the most appropriate for evaluating dental caries in public health surveys [16]. DMFT index (abbreviation for D-decay, M-missing, F-filled, T-tooth) and DMFS (abbreviation for D-decay, M-missing, F-filled, S-surface) [17,18] for permanent dentition, and for the temporary one, the dmft and dmfs index [16]. The incidence of dental caries remains high in Romania [19]. The dental care system in Romania includes both the public and private sectors [20,21]. Children can benefit from dental services within the educational units in which they are enrolled, but not all educational units in Romania have a school dentist [22]. Thus, in order to ensure the oral health prevention of all school children, a more complex approach is required.

This analysis is a component of a research carried out at national level regarding the oral health of children enrolled in public education units, where there is a dental office and a dentist, elaborated according to the methodology implemented by the National Institute of Public Health (NIPH) [23], in year 2022, in Romania. It is based on the results-based management (RBM), a managerial theory, an approach through which all the actors involved, directly or indirectly ensure that everything they do effectively contributes

to the achievement of the desired results [24]. It identifies the optimal conditions for the effective integration of oral health in schools, as well as the actors who support and promote these efforts. It analyses both the parents' and the dentist's perception and identifies if the adults' opinions regarding the health status of their children's teeth and gums correspond to the clinical assessment made by the medical staff and if the parents' level of education influences the children's oral health status.

MATERIALS AND METHODS

This research aimed at highlighting the double perspective related to the state of oral health of children in Romania. It was based on the methodology defined in 2022, "supervision and monitoring of the oral health status of children in schools" [23]. Thus, Step 1 approach [25], self-administered, was used, parents being able to complete this questionnaire also online. It was divided into two divisions. The first contained identification information (name, surname, age, school, city), and the second questions related to the parents' level of education, their perception of the oral health of the child's teeth and gums.

In the framework of this research, conducted between 2022-2023, the target group was represented by children enrolled in public education units, from grades 0-8, aged between 5 and 15 years, where there is an authorized school dental office and a dentist. A number of 4180 adults with whom the children live, signed the agreement to participate in the study and completed this questionnaire. Later, the clinical examination was carried out by the school dentist, in the dental office adjacent to the school. The examination form used was Steps 2 [25] - 2013 implemented by the World Health Organization, in which both general data (name, surname, age, school, city) and data related to the type of dentition (temporary,

permanent, mixed), dental status, as well as the existence or non-existence of gingival bleeding was collected. The data was entered into a web application. With its help, it was possible to correlate the information from the STEP 1 questionnaire [25] with the data from the STEP 2 file [25]. From the registered questionnaires, a number of 337 Step 1 questionnaires were eliminated, because there was no connection with the clinical examination form. A number of 3843 cases [20] were taken into consideration for the analysis. The mean age of participants was 10.56 ± 2.61 years [20]. The data entered by the dentist in the application was later processed, which allowed the creation of consultation sheets and general reports. The information for permanent teeth and temporary teeth was recorded separately.

2.1. Data analysis

Statistical analysis was performed using IBM SPSS Statistics 25. It was visually represented using Microsoft Office Excel/Word 2021. Discrete attributes were

presented in absolute form or as percentages. Testing was conducted across different groups using Fisher's Exact Test. Z-tests with Bonferroni correction were performed to elaborate the details obtained in the contingency tables. Independent quantitative variables with non-parametric distribution were tested between groups using the Mann-Whitney U/Kruskal Wallis H test. Dunn-Bonferroni post-hoc tests were used to detail the results obtained from testing quantitative variables.

2.2. Ethical consideration

The ethical principles established by the Helsinki Declaration of the World Medical Association were respected in this study, thus, all the parents of the children participating in the study provided written informed consent. Approval for the study was obtained from the Ethics Committee of the "Carol Davila" University of Medicine and Pharmacy in Bucharest, Romania, protocol number: 36987/29.11.2022.

RESULTS AND DISCUSSIONS

For each individual, a calculation was made of the caries index at the teeth level (DMFT/dmft) and at the surface level (DMFS/dmfs) [26]. For the analysed group, the mean dmfs was 6.07 ± 7.4 , and the mean dmft was 3.11 ± 2.91 . Analysing the permanent dentition where the mean DMFS was 2.48 ± 4.76 , and the mean DMFT 1.77 ± 2.86 .

3.1. Correlation between the adult perspective regarding the child's dental health status and the clinical evaluation

Regarding the health status of the child's teeth, 4.1% of the adults residing with the children could not estimate this aspect. The majority of respondents, 43.5%, described it as

"good", 26.9% considered it "very good", and 7.7% characterized it as "excellent". Those who considered it "precarious" were 5%, and those who mentioned that it was "satisfactory" were 12.8%. Thus, 325 answers are missing, while a total of 3518 answers are considered valid [20]. After performing Shapiro-Wilk tests ($p < 0.001$), the distribution of caries indices was non-parametric in all groups. Differences between groups assigned, according to tooth health status were significant for all caries indices according to Kruskal-Wallis H tests. The comparison of caries indices connected to perceived health condition of the teeth is represented in Table 1.

Table 1. Comparison of caries indices connected to the perceived health condition of the teeth

<i>Health condition – teeth</i>		dmfs	dmft	DMFS	DMFT
Poor	Mean ± SD	11.9 ± 11.47	5.37 ± 3.8	4.29 ± 7.52	2.85 ± 3.9
	Median (IQR)	9 (3-17.5)	5 (2-8)	2 (0-5)	2 (0-4)
Satisfactory	Mean ± SD	8.45 ± 8.7	3.96 ± 2.95	3 ± 4.89	2.12 ± 3.14
	Median (IQR)	6 (2-11)	4 (2-6)	1 (0-4)	1 (0-3)
Good	Mean ± SD	6.02 ± 6.69	3.14 ± 2.74	2.53 ± 4.28	1.83 ± 2.76
	Median (IQR)	4 (1-9)	3 (1-5)	1 (0-4)	1 (0-3)
Very good	Mean ± SD	3.83 ± 5.15	2.28 ± 2.5	1.91 ± 4.3	1.44 ± 2.61
	Median (IQR)	2 (0-6)	1.5 (0-4)	0 (0-2)	0 (0-2)
Excellent	Mean ± SD	2.86 ± 4.05	1.66 ± 2.01	1.55 ± 3.98	1.24 ± 2.54
	Median (IQR)	1 (0-4)	1 (0-2.75)	0 (0-2)	0 (0-2)
p*		<0.001	<0.001	<0.001	<0.001

*Kruskal-Wallis H Test.

The caries index values were much higher among the parents who perceived the health condition of their children's teeth as "poor" compared to those who perceived it as "good"/"very good"/"excellent" for all caries indices. The caries index values were much higher in children whose parents perceived the state of health of their children's teeth as "satisfactory" / "good" compared to those who mentioned that it was "very good" / "excellent". There were no significant differences between the description of the state of health of the teeth as "very good" and "excellent" and the caries index values. The differences in caries indices between the perception of the state of health of the teeth as "precarious" vs. "satisfactory" were not significant except for the comparison of the dmft index (where there were higher values in children with "precarious" vs. "satisfactory" status). Differences in caries indices between patients with satisfactory condition vs. good were not significant except when comparing the dmfs or dmft index (where there were higher values in patients with satisfactory vs.

good condition).

3.2. Distribution of children related to the presence of gingival bleeding and adults' perception of child gum health

Analysing the perception regarding the state of health for their children's gums, 15.4% of respondents considered it "excellent", a percentage of 33.9% estimated the state of gums health as "very good", 35.7% mentioning that this is "good". At the opposite pole, 6.2% described the gums' health as "satisfactory", 1.5% "precarious", while 7.3% of the respondents could not estimate this. Thus, 593 answers are missing, while a total of 3250 answers are considered valid [20]. The data in table 2 highlight the comparison between the perception of the adult residing with the child and the clinical examination performed by the school dentist. The disparities among the groups were significant according to the Fisher test ($p < 0.001$) (Table 2).

Table 2. The distribution of children related to the adult's perception of the child's health gums and the clinical examination performed by the dentist regarding the existence of gingival bleeding

Gum health / Gingival bleeding	Absence of condition		Presence of condition		p*
	Nr.	%	Nr.	%	
Poor	35	1.3%	19	3.3%	<0.001
Satisfactory	166	6.2%	50	8.6%	
Good	974	36.5%	276	47.2%	
Very good	1019	38.3%	170	29.1%	
Excellent	472	17.7%	69	11.8%	

*Fisher's Exact Test

According to the Z test with Bonferroni correction performed between groups, it was observed that parents who perceived the health status of their children's gums as "poor" (3.3% vs. 1.3%), "satisfactory" (8.6% vs. 6.2%) and "good" (47.2% vs. 36.5%) was significantly more frequently associated with gingival bleeding clinically evaluated by the dentist, while the children of parents whose perception related to the state of gum health was "very good" (38.3% vs. 29.1%) and "excellent" (17.7% vs. 11.8%) were associated significantly less often with gingival bleeding clinically evaluated by the dentist (Table 2).

3.3. Correlation between the education level of adults residing with the children and caries indices

Among the children who live with female adults, a percentage of 2.4% have primary

education, 4.9% have secondary education, 29.9% have high school education and 62.8% have university education. A number of 232 answers are missing (don't know/don't answer/don't live with), thus a total of 3611 answers are considered valid. Regarding the children who live with male adults with a declared level of education, 2.6% of them have primary education, 4.8% of adults have secondary education, 38% have high school education and 54.6% have university education. Thus, a number of 438 answers are missing (don't know/don't answer/don't live with), while a total of 3405 answers are considered valid [20]. The distribution of caries indices was non-parametric in all groups according to Shapiro-Wilk tests ($p < 0.001$) (Table 3).

Table 3. Comparison of caries indices of children related to the educational level of the adults

Level of education – M / Indices		dmfs	dmft	DMFS	DMFT
Primary	Mean ± SD	9.76 ± 9.71	4.27 ± 3.34	4.37 ± 7.39	2.61 ± 3.82
	Median (IQR)	8 (2-16)	4 (1-7)	1 (0-6)	1 (0-4)
Gymnasium	Mean ± SD	7.73 ± 8.64	3.68 ± 3.09	3.47 ± 6.03	2.33 ± 3.41
	Median (IQR)	5 (2-12)	3 (1-5)	1 (0-5)	1 (0-4)
High school	Mean ± SD	6.33 ± 7.66	3.21 ± 2.9	2.82 ± 4.65	2.02 ± 2.98
	Median (IQR)	4 (1-9)	3 (1-5)	1 (0-4)	1 (0-3)
Academic	Mean ± SD	5.46 ± 6.64	2.94 ± 2.84	1.9 ± 4.04	1.43 ± 3.51
	Median (IQR)	3 (0-8)	2 (0-5)	0 (0-2)	0 (0-2)
p*		<0.001	0.001	<0.001	<0.001
Level of education – F / Indices		dmfs	dmft	DMFS	DMFT
Primary	Mean ± SD	10.61 ± 11.74	4.56 ± 3.71	4.18 ± 7	2.67 ± 3.78
	Median (IQR)	6 (2-16)	4 (1-7)	2 (0-6)	2 (0-4)
Gymnasium	Mean ± SD	7.79 ± 8.44	3.54 ± 2.84	3.42 ± 6.01	2.2 ± 3.1
	Median (IQR)	6 (1.25-12)	3.5 (1-5)	1 (0-4)	1 (0-4)
High school	Mean ± SD	7.23 ± 8.53	3.54 ± 3.09	3.22 ± 5.54	2.22 ± 3.15
	Median (IQR)	5 (1-10)	3 (1-5)	1 (0-4)	1 (0-4)
Academic	Mean ± SD	5.29 ± 6.41	2.87 ± 2.77	1.98 ± 4	1.5 ± 2.62

	Median (IQR)	3 (0-8)	2 (0-5)	0 (0-2)	0 (0-2)
p*		<0.001	<0.001	<0.001	<0.001

*Kruskal-Wallis H Test.

Analysing the educational attainment of the male adults and the value of the caries indices of the children they live with, it was found that the dmfs index values were significantly lower in children whose parents had high school or university education vs. primary studies, or university studies vs. secondary education, and the dmft index values were significantly lower in children whose adults had an academic education vs. primary studies. DMFS, DMFT

DISCUSSIONS

This article is based on the structure of the World Health Organization for Health promoting schools (HPS), combining the 2 perspectives - of the adult with whom the children live and of the school dentist. In accordance with the purpose of the research, the link between the parents' perception of the health status of their children's teeth and gums and the clinical assessment made by the dentist was highlighted. The correspondence between the educational level of the adult with whom the children live and the clinical evaluation was also emphasized. Based on the results presented previously, a significant difference between the adult's perception and the clinical evaluation was highlighted. In multiple studies, a discrepancy between the normative treatment need and the patient's perception of oral health is highlighted [27-29]. Similar to a study conducted in 2017, our study also shows that personal perception does not always correspond to the normative need for dental treatment [30].

Prevention and education programs for oral health, intended for both family members, represent one of the basic methods to prevent dental cavities [31]. A strategic and coordinated approach is necessary for the provision of health promotion activities at the community level, including the monitoring of

values were significantly lower in children whose adults had an academic education vs. primary/secondary/high school education. Compared to the education level of the female adult with whom the child lives, the value of all caries indices were significantly lower in children whose adults had an academic education vs. primary /secondary /high school education (Table 3).

oral health status, the assessment of curative and preventive treatment needs, as well as the need for oral health education [32]. Another research indicates a potential connection between the educational attainment of the adult residing with the child and the perceived health and oral hygiene practices of the children [20,33]. Similar to another study, it was highlighted that the level of education has a possible influence on the prevalence of carious lesions [34]. Another research that highlighted the inequalities in oral health in early childhood, identified a close connection between caries experience, age and the low educational level of people who take care of children [35]. Thus, it is necessary to implement a program focused on oral health in children whose parents have a lower level of education [36, 37]. In some countries in Europe (Finland, Sweden, Denmark, etc.), publicly subsidized oral care services have been extended to cover larger segments of the entire population [38]. In Finland, the oral care system is largely managed by the municipalities; the emphasis is on the digital infrastructure of medical services, including teledentistry [39].

The use of school for the purpose of health education has been confirmed to be effective in promoting oral health among students [40]. In schoolchildren, oral health promotion

programs are considered the best strategy for solving problems in this area [31]. Schools are an effective environment for promoting oral health [41]. A school that promotes health (Health promoting school) is the one that constantly strengthens its capacity to be a healthy environment for life, education and the development of the activity [42]. Certainly, in the context of health promotion, the effectiveness of these programs has been examined in several studies [43, 44], but there is still a gap in dentistry in terms of oral health education programs that correspond to the needs identified in the clinical setting. The periodic insurance coverage for dental care combines individual behavioural aspects with the contextual factors represented by public policies [14]. The problem of existing inequities in children's health continues to be a

priority for policymakers [45]. The absence of prevention is associated with poor oral health in adult life [46, 47]. As in the case of early detection and intervention programs, it is necessary to carry out periodic screenings at the level of schoolchildren in order to assess the needs of the community in terms of education and prevention [48].

It is necessary to continue documenting and evaluating the results in order to make appropriate use of the available resources and to support the evidence-based approach. That is why it is necessary to have an electronic database, centralized at the national level, which allows the monitoring of the evolution over time, the re-evaluation and the conducting of longitudinal studies.

CONCLUSIONS

1. This national study shows that parents' perception of their children's oral health does not always correspond to the state of health assessed by the dentist.
2. The level of education background of parents is a factor that can influence the oral health of the children, thus children whose mothers have university education have a better oral health compared to those whose female parents have primary or secondary education. In this way, through information and with the help of digitalization, the message should be constructed bidirectionally; for children through gamification and for adults tailored to the extent of their knowledge.
3. The results highlight that in order to start programs in schools, a double perspective (of parents and of dentists) must be used, using result-based management and

- integrating the process of adopting digital technology. In this sense, the campaigns carried out in schools must focus on the electronic collection of data with the objective of monitoring the evolution over time, comparing and re-evaluating the state of oral health, as well as carrying out longitudinal studies to effectively manage schoolchildren's oral health from Romania.
4. The role of prevention through information and digitalization is emphasized to increase the efficiency of the allocated time.
5. There should be regulated a nationwide oral health promotion program in schools in Romania that involves students, but also parents, as well as teachers and dentists, with the aim of informing, motivating and supporting healthy behaviours with significant long-term benefits.

Acknowledgements

The authors wish to extend their thanks to the local authorities for their ongoing support and crucial collaboration throughout the research process. This research was carried out with the

support of the University of Medicine and Pharmacy “Carol Davila”, via The Interdisciplinary Research and Development Centre in Dentistry.

REFERENCES

- 1 Shay B., Ben Ami O., Levy Ianculovici D., Zini A., Ianculovici C., Almoznino G. Oral health-related quality of life in patients with disorders of nutrition. *J Oral Rehabil.* 2019;46(4):355–68. doi: 10.1111/joor.12754.
- 2 Bekes K., Solanke C., Waldhart T., Priller J., Stamm T. Effect of method of administration on the oral health-related quality of life assessment using the Early Childhood Oral Health Impact Scale (ECOHIS-G). *Clin Oral Investig.* 2021; 25(8):5061–6. doi: 10.1007/s00784-021-03818-7.
- 3 Gussy M.G., Waters E.G., Walsh O., Kilpatrick N.M. Early childhood caries: current evidence for aetiology and prevention. *J Paediatr Child Health.* 2006;42(1-2):37-43. doi: 10.1111/j.1440-1754.2006.00777.x. PMID: 16487388.
- 4 Kwan S.Y., Petersen P.E., Pine C.M., Borutta A. Health-promoting schools: an opportunity for oral health promotion. *Bull World Health Organ.* 2005;83(9):677-85
- 5 U.S. Government Accountability Office, Oral Health: Dental Disease Is a Chronic Problem Among Low-Income Populations. Available online: <https://www.gao.gov/products/hehs-00-72>. Accessed on 17 January 2024.
- 6 Kumar J., Crall J.J., Holt K. Oral Health of Women and Children: Progress, Challenges, and Priorities. *Matern Child Health J.* 2023;27(11):1930-1942. doi: 10.1007/s10995-023-03757-7.
- 7 Wright J.T. The Burden and Management of Dental Caries in Older Children. *Pediatric Clinics of North America.* 2018; 65, no. 5, Pages 955-963, <https://doi.org/10.1016/j.pcl.2018.05.005>.
- 8 Watt R.G. Strategies and approaches in oral disease prevention and health promotion. *Bull World Health Organ.* 2005;83(9):711-8.
- 9 Welbury R. Summary of: Influence of dental care on children's oral health and wellbeing. *Br Dent J.* 2013;214:568–569. <https://doi.org/10.1038/sj.bdj.2013.558>.
- 10 da Silva J.V., da Costa Oliveira A.G.R. Individual and contextual factors associated to the self-perception of oral health in Brazilian adults. *Revista de Saúde Pública.* 2018. <https://doi.org/10.11606/S1518-8787.2018052000361>.
- 11 Chen L. Hong J., Xiong D., Zhang, L., Li Y., Huang S., Hua F. Are parents' education levels associated with either their oral health knowledge or their children's oral health behaviors? A survey of 8446 families in Wuhan. *BMC Oral Health.* 2020; 11;20(1):203. doi: 10.1186/s12903-020-01186-4.
- 12 Cockerham W.C., Hamby B.W., Oates G.R. The Social Determinants of Chronic Disease. *Am J Prev Med.* 2017;52(1S1):S5-S12. doi: 10.1016/j.amepre.2016.09.010.
- 13 Buchwald S., Kocher T., Biffar R., Harb A., Holtfreter B., Meisel P. Tooth loss and periodontitis by socio-economic status and inflammation in a longitudinal population-based study. *J Clin Periodontol.* 2013;40(3):203-11. doi: 10.1111/jcpe.12056. PMID: 23379538.
- 14 Martignon S., Roncalli A.G., Alvares E., Aranguiz V., Feldens C.A., Buzalaf M.A.R. Risk factors for dental caries in Latin American and Caribbean countries. *Braz Oral Res.* 2021. <https://doi.org/10.1590/1807-3107bor-2021.vol35.0053>.
- 15 Schwendicke F., Dörfer C.E., Schlattmann P., Foster Page L., Thomson W.M., Paris S. Socioeconomic inequality and caries: a systematic review and meta-analysis. *J Dent Res.* 2015;94(1):10-8. doi: 10.1177/0022034514557546.
- 16 Al-Blawi G.S. Epidemiology of dental caries in children in the United Arab Emirates. *Int Dent J.* 2014;64(4):219-28. doi: 10.1111/idj.12114.
- 17 Tahririan D., Arman S., Maddah F., Jafarzadeh M. Investigating the relationship between DMFT and mothers' knowledge and attitude about oral health and dmft of 6-12-year-old children with attention-deficit/hyperactivity disorder. *Dent Res J (Isfahan).* 2023;26;20:64.
- 18 Becker T., Levin L., Shochat T., Einy S. How much does the DMFT index underestimate the need

- for restorative care? *J Dent Educ.* 2007;71(5):677-81.
- 19 Dumitrescu R., Sava-Rosianu R., Jumanca D., Balean O., Damian L.-R., Campus G., Maricutoiu L.; Alexa V., Sfeatcu R., Daguci C. Dental Caries, Oral Health Behavior, and Living Conditions in 6–8-Year-Old Romanian School Children. *Children.* 2022. <https://doi.org/10.3390/children9060903>.
- 20 Perpelea A.-C., Sfeatcu R., Tănase M., Meleşcanu Imre M., Ripszky Totan A., Cernega A., Funieru C., Pițuru S.-M. A STEPwise Approach for Oral Hygiene Behavior of Schoolchildren in Romania. *Healthcare.* 2024;12, 198. <https://doi.org/10.3390/healthcare12020198>.
- 21 The Government of Romania Legislative Portal. (Romanian only) Available online: <https://legislatie.just.ro/Public/DetaliiDocumentAfis/270780>. Accessed on 18 January 2024.
- 22 National Institute of Public Health Situation analysis. (Romanian only) Available online: https://insp.gov.ro/download/cnepss/stare-de-sanatate/boli_nettransmisibile/sanatate_orala/Analiza-de-situatie-sanatatea-orala-2023.pdf. Accessed on 18 January 2024.
- 23 National Institute of Public Health. (Romanian only) Available online: https://insp.gov.ro/download/cnepss/metodologii_ghiduri_recomandari_si_evidente_stintifice/metodologii/metodologii_evaluare_santate_copii/Metodologie-sanatate-orala-revizuita-19-aprilie-2022.pdf.) Accessed on 18 January 2024.
- 24 Bhattarai R. Basic Concepts and Approaches of Results Based Management. *Journal of Population and Development.* 2020. <https://doi.org/10.3126/jpd.v1i1.33113>.
- 25 World Health Organization WHO STEPwise approach to surveillance. Available online: [https://www.who.int/europe/tools-and-toolkits/who-stepwise-approach-to-surveillance#:~:text=The%20WHO%20STEPwise%20approach%20to,on%20noncommunicable%20diseases%20\(NCDs\)](https://www.who.int/europe/tools-and-toolkits/who-stepwise-approach-to-surveillance#:~:text=The%20WHO%20STEPwise%20approach%20to,on%20noncommunicable%20diseases%20(NCDs)). Accessed on 18 January 2024.
- 26 World Health Organization. The Global Health Observatory. Available online: <https://www.who.int/data/gho/indicator-metadata-registry/imr-details/3812>. Accessed on 17 January 2024.
- 27 Smith M., Sheiham A. Dental treatment needs and demands of an elderly population in England. *Community Dent Oral Epidemiol.* 1980. doi: 10.1111/j.1600-0528.1980.tb01308.x.
- 28 Deep A., Singh M., Sharma R., Singh M., Mattoo K.A. Perceived oral health status and treatment needs of dental students. *Natl J Maxillofac Surg.* 2020;11(1):76-80. doi: 10.4103/njms.NJMS_14_19.
- 29 Lim M.A.W.T., Crocombe L.A., Do L.G. Perceptions of dental treatment need in Australian-born and migrant populations. *Eur J Oral Sci.* 2017;125(6):479-486. doi: 10.1111/eos.12373
- 30 Farmer J., Ramraj C., Azarpazhooh A., Dempster L., Ravaghi V., Quiñonez C. Comparing self-reported and clinically diagnosed unmet dental treatment needs using a nationally representative survey. *J Public Health Dent.* 2017;Sep;77(4):295-301. doi: 10.1111/jphd.12205
- 31 Fraihat N., Madae'en S., Bencze Z., Herczeg A., Varga O. Clinical Effectiveness and Cost-Effectiveness of Oral-Health Promotion in Dental Caries Prevention among Children: Systematic Review and Meta-Analysis. *Int. J. Environ. Res. Public Health* 2019;16,2668. <https://doi.org/10.3390/ijerph16152668>.
- 32 Widström E., Tillberg A., Byrkjeflot L.I., Stein L., Skudutyte-Rysstad R. Community-based preventive activities in the Public Dental Service in Norway. *International Journal of Dental Hygiene.* 2018. <https://doi.org/10.1111/idh.12326>.
- 33 Moin M., Maqsood A., Haider M.M., Asghar H., Rizvi KF., Shqaidef A., A Sharif R., Suleman G., Das G., Alam M.K., Ahmed N. The Association of Socioeconomic and Lifestyle Factors with the Oral Health Status in School-Age Children from Pakistan: A Cross-Sectional Study. *Healthcare (Basel).* 2023;4;11(5):756. doi: 10.3390/healthcare11050756.
- 34 Kato H., Tanaka K., Shimizu K. et al. Parental occupations, educational levels, and income and prevalence of dental caries in 3-year-old Japanese children. *Environ Health Prev Med.* 2017. <https://doi.org/10.1186/s12199-017-0688-6>.
- 35 Martignon S., Usuga-Vacca M., Cortés F., Cortes A., Gamboa L.F., Jacome-Lievano S., Ruiz-

- Carrizosa J.A., González-Carrera M.C., Restrepo-Perez L.F., Ramos N. Risk factors for early childhood caries experience expressed by ICDAS criteria in Anapoima, Colombia: a cross-sectional study. *Acta Odontol Latinoam*. 2018;31(1):58-66.
- 36 Lam PPY., Chua H., Ekambaram M., Lo ECM., Yiu C.K.Y. Risk predictors of early childhood caries increment-a systematic review and meta-analysis. *J Evid Based Dent Pract*. 2022;22(3):101732. doi: 10.1016/j.jebdp.2022.101732.
- 37 Khalid G., Metzner F., Pawils S. Prevalence of dental neglect and associated risk factors in children and adolescents-A systematic review. *Int J Paediatr Dent*. 2022;32(3):436-446. doi: 10.1111/ipd.12923.
- 38 Widström E., Ekman A., Aandahl L.S., Pedersen M., Agústsóttir H., Eaton K.A. Developments in oral health policy in the Nordic countries since 1990. *Oral Health Prev Dent*. 2005;3(4):225-35.
- 39 Palander A., Holopainen A., Rantamo T. e-Oral Health and Teledentistry in Finland - an Overview. *Journal of the International Society for Telemedicine and eHealth*. 2019. DOI:10.29086/JISfTeH.7.e11.
- 40 Nery N.G., Jordão L.M.R., Freire M.D.C.M. School environment and oral health promotion: the National Survey of School Health (PeNSE). *Rev Saude Publica*. 2019;21;53:93. doi: 10.11606/s1518-8787.2019053001376.
- 41 World Health Organization Promoting health through schools report of a WHO Expert Committee on Comprehensive School Health Education and Promotion: WHO Technical Report Series N°870. Available online: <https://www.who.int/publications/i/item/WHO-TRS-870>. Accessed 17 January 2024.
- 42 World Health Organization Health Promoting Schools. Available online: https://www.who.int/health-topics/health-promoting-schools#tab=tab_1. Accessed on 17 January 2024.
- 43 Hachey S., Clovis J., Lamarche K. Children's Oral Health and Barriers to Seeking Care: Perspectives of Caregivers Seeking Pediatric Hospital Dental Treatment. *Health Policy*. 2019;15(1):29-39. doi: 10.12927/hcpol.2019.25940.
- 44 Sanaeinasab H., Saffari M., Taghavi H. et al. An educational intervention using the health belief model for improvement of oral health behavior in grade-schoolers: a randomized controlled trial. *BMC Oral Health*. 2022;22, 94. <https://doi.org/10.1186/s12903-022-02132-2>.
- 45 Oberg C., Colianni S., King-Schultz L. Child Health Disparities in the 21st Century. *Curr Probl Pediatr Adolesc Health Care*. 2016;46(9):291-312. doi: 10.1016/j.cppeds.2016.07.001.
- 46 Peres K.G., Thomson W.M. et al. Oral Health Birth Cohort Studies: Achievements, Challenges, and Potential. *Journal of Dental Research*. 2020. <https://doi.org/10.1177/0022034520942208>.
- 47 Aleksejūnienė J., Pūrienė A., Rimkervicius A., Amariei C., Oancea R., Porosencova T., Porosencov E., Nikolovska J., Mirnaya E., Serova-Papakul A., Eaton K.A. Knowledge, dentist confidence and management of periodontal patients among general dentists from Belarus, Lithuania, Macedonia, Moldova and Romania. *BMC Oral Health*. 2020;10;20(1):47. doi: 10.1186/s12903-020-1033-9.
- 48 Sfeatcu R., Cărămidă M., Sava-Rosianu R. et al. Carious status and socio-behavioral risk factors among 12 year-old children in South-Central region in Romania. *BMC Oral Health* 2023;23, 644. <https://doi.org/10.1186/s12903-023-03360-w>.