

THESIS SUMMARY

ASSESSING CHILDREN'S ORAL HEALTH

IN RELATION TO DIET AND LIFESTYLE

According to the World Health Organization (WHO), health is a state of complete physical, mental, and social well-being. Oral health is a state characterized by the absence of chronic pain sensation of the oral and facial region, the absence of oral lesions, congenital defects, periodontal disease, carious lesions, loss of dental units, and other disorders that may affect the oral cavity. The WHO reports a widespread prevalence of dental caries among children, with estimates suggesting that between 60% and 90% of the pediatric population may be affected globally, making dental caries a major public health crisis.

Tooth decay has a multifactorial etiology, and cariogenic microbial flora, nutrient substrate, and hard tissue quality contribute to its development. The local factors that favor dental caries are: accidental dental morphology that favors food retention, dental malposition, poor oral hygiene, mastication, and the presence or absence of fluoride in water. Other factors contributing to a high prevalence of dental caries are eating habits (especially excessive consumption of sugary snacks and drinks), oral hygiene practices, socioeconomic status, and access to dental care.

The PhD thesis aims to assess the correlation between lifestyle, nutritional habits, prevalence of dental caries, and oral health among primary school children in two Romanian counties (Mureş - County in the North-West macro-region of Romania and Bistriţa-Năsăud County in the Central macro-region of Romania), respectively, and how socio-economic factors influence the oral health status of schoolchildren. The PhD thesis aims to investigate the eating habits of schoolchildren and their influence, including socio-economic and nutritional factors, on oral diseases. It also seeks to highlight the differences between urban and rural children, as well as the prevalence of dental caries, by analyzing the answers provided by their legal guardians. Specifically, the PhD thesis aimed to estimate and interpret the incidence of dental caries and other dental health markers in children from the two counties. The motivation for choosing the research topic was based on the fact that oral hygiene and nutrition play a crucial role in the overall health of the individual, especially during childhood.

To achieve the overall aim of the thesis, we used a cross-sectional convenience study in which we applied questionnaires to assess knowledge about nutrition and oral hygiene, including children's lifestyle. Three anonymous questionnaire models were applied, addressed to children, parents, and teachers in schools, regarding knowledge and attitudes towards oral health, namely lifestyle and social at-risk components. Parents were asked to fill the questions covering not only demographic information (age, gender, residence, social status, parents' level of education) but also information on eating habits (frequency and type of milk-based foods, fruits, vegetables consumed, respectively frequency and type of sugar-based foods/beverages consumed) and oral hygiene of children (frequency and timing of tooth brushing, use of fluoride toothpaste, mouthwash, dental floss), lifestyle, including socio-economic status of the family. Moreover, the children were also given a clinical screening to assess their oral health status (caries of temporary and permanent teeth, missing teeth due to caries, filled teeth, gum inflammation, presence of dento-alveolar anomalies, dento-alveolar fractures, etc.). Data collection was carried out in a controlled setting in schools under the supervision of the research team and teachers. The collected data were analyzed using IBM® SPSS® Statistics software (from IBM, Armonk, NY, USA). The analysis included descriptive and inferential statistical methods to assess frequency distributions, means, and standard deviations. Correlation and regression tests were also performed to identify significant relationships between variables. The results identified the key factors influencing oral health knowledge and behaviors among children.

The first research study involved 700 children aged between 7 and 10, recruited from nine urban and rural schools in two Romanian counties, Mureş and Bistriţa-Năsăud, respectively, divided into 3 age groups (7-8 years, 8-9 years, and 9-10 years). A qualified specialist performed an oral examination to assess the condition of the children's teeth, documenting the number of decayed, missing, and filled teeth. The presence of bacterial plaque was assessed using a

plaque index, and the status of dental caries was quantified using the decayed, missing, and filled teeth (DMFT) index. The study results showed that the mean plaque score was marginally higher in boys (mean = 0.69 ± 0.36) compared to girls (mean = 0.65 ± 0.40). In addition, urban children demonstrated a mean plaque score of 0.61 ± 0.32 , while their rural counterparts showed a higher score of 0.73 ± 0.38 . In multivariable models, irregular brushing, higher daily sugar intake, and intake of ≥ 3 snacks/day were independently associated with both caries prevalence (DMFT>0) and higher DMFT ($p<0.05$).

The second research study included a sample of 1124 children, aged 6-8 (n=524) and 9-11 (n=600), from nine schools in Mures County (4 schools in urban areas and 5 schools in rural areas). The results showed that among children aged 6-8 years, the prevalence of untreated caries was 76.5% and the prevalence of caries experience was 77.7% (mean dmft = 3.9). Among children aged 9-11 years, the prevalence of untreated caries was 43.5% and the prevalence of caries experience was 48.2% (mean dmft = 1.9). Among the most significant factors associated with caries prevalence were school location ($p = 0.04$ for children aged 6-8 years and $p < 0.001$ for children aged 9-11 years); mothers' occupational status ($p = 0.04$ for children aged 9-11 years) consumption of sweets ≥ 4 times/day ($p = 0.04$ for children aged 6-8 years); brushing time ≥ 3 min ($p = 0.03$ for children aged 9-11 years); and previous or emergency restorative dental treatment ($p < 0.001$ for all children examined).

The third research study included 1100 children aged 6-10 years from both counties of Romania and aimed to investigate the prevalence of dental caries in school-age children in Bistrița Năsăud and Mureș counties, focusing on how their food intake and body composition influence the development of caries. The results showed that children who consumed cheese daily had a lower DMFT value than children who did not ($p<0.05$). In addition, those who consumed sugary foods had higher DMFT values than those who did not ($p<0.05$). Body weight, BMI, and waist circumference are positively correlated with DMFT, but negatively with dmft ($p<0.05$). The overall prevalence of caries was 79.8% in the primary dentition and 63.6% in the permanent dentition, with slightly higher rates observed in Bistrița-Năsăud county compared to Mureș. Predictors of caries in children have been found to include maternal education, frequency of sugar consumption, and body fat ratio.

The research carried out is highly significant as it highlights the high prevalence of dental caries among children in Romania. Despite the increase in the number of dental services, there are still disparities in oral health care resulting from socio-economic challenges and limited funding of the health system. The research studies focus on urban and rural populations in Mureș and Bistrița Năsăud counties, exploring a wide range of factors that contribute to caries prevalence (socioeconomic status, oral hygiene and nutritional practices, habits, and access to dental care), which highlights the novelty of the PhD thesis. Research highlights the cyclical nature of tooth decay and its wider impact on quality of life, school performance, child growth, and development.

Despite the increase in the number of dentists, the Romanian healthcare system faces financial limitations and health policies that lead to unequal access to treatment and prevention. Based on the results obtained, we emphasize the need to implement preventive measures at the community and school level, such as oral health activities, education campaigns for parents, promotion of dietary health, and accessibility of dental services in rural areas. In order to reduce the incidence of caries, we recommend strategies such as regular reassessments of caries risk, the introduction of dental sealants, limiting the sale of sugary products in schools, and actively involving the family in health education. Last but not least, an essential aspect highlighted in the thesis is the need for policies tailored to the specific Romanian socio-economic and cultural context to combat oral health inequalities. In conclusion, the research provides a solid basis for planning effective interventions with sustainable impact in reducing the prevalence of dental caries and improving the oral health of children in the region.

PhD Student

Seni Ana-Gabriela