

Risk of Dental Caries for Children Aged 4 to 6 in Craiova

LUMINIȚA DĂGUCI¹, MARILENA BĂTĂIOSU², OANA CELLA ANDREI³,
MONICA SCRIECIU¹, IONELA DASCĂLU⁴, MARINA AMĂRĂSCU⁵, C. DĂGUCI⁶

¹Department of Dental Prosthetic, Faculty of Dental Medicine, University of Medicine and Pharmacy of Craiova

²Department of Pedodontics, Faculty of Dental Medicine, University of Medicine and Pharmacy of Craiova

³Department of Removable Prosthodontics, "Carol Davila" University of Medicine and Pharmacy, Bucharest

⁴Department of Orthodontics, Faculty of Dental Medicine, University of Medicine and Pharmacy of Craiova

⁵Department of Dental Morphology, Faculty of Dental Medicine, University of Medicine and Pharmacy of Craiova

⁶Department of Oral Health, Faculty of Dental Medicine, University of Medicine and Pharmacy of Craiova

ABSTRACT: Dental caries represent a chronic disease of high prevalence for the human body and is produced by the interaction of a number of predisposing factors throughout the time. Specialized studies in recent years have made some progress with regard of complex interacting factors in the process of developing dental caries in children, but due to the plurifactorial nature of the disease it seems that there is still much to be studied regarding the start, progress and prevention of tooth decay. The aim of the study was to determine the risk of tooth decay in children aged 4 to 6 years in Craiova and the relationship of the main etiopathogenic cariogenic factors. Material and Methods: The study included a total of 101 children of both sexes, aged 4-6 years, from two kindergartens in Craiova. They filled out questionnaires about food and oral hygiene habits and after that the study protocol included visual clinical examination in according to WHO methodology; determination of dmft index with the analysis of dt, mt and ft component. The results were recorded in personal files and were analyzed statistically. Results: The results of our study were consistent with data from the literature of recent years. So, the highest value of the dmft index (2.52) was at the age group of 6. Conclusions: The most significant contribution to the values of carious experience is the number of teeth affected by caries at the expense of obturated ones.

KEYWORDS: dental caries, food, oral hygiene, dmft index

Introduction

Oral health can affect overall body health with significant impact on the quality of life [1]. Dental caries represent a chronic disease of high prevalence for the human body and is produced by the interaction of a number of predisposing factors throughout the time: acid production by microorganisms and the fermentation of hydrocarbonated food, as well as other factors such as saliva or the quality of dental structure. Furthermore, psychological, biological, environmental and socio-economic factors are also considered as risk factors regarding its emergence and evolution [2].

This disease is a significant health problem for people of all ages, but the extent of the problem is higher among very young children [3]. Dental caries, present in temporary dentition, represent a good indicator of the risk of caries in permanent dentition [4,5]. Thus, studies have been conducted that show the close connection between early childhood caries and the prevalence of proximal caries in permanent

teeth from the side areas for children aged 15 [6]. Also, some studies have shown that the increase of sugar consumption frequency for 3-6 years children is linked to an increased level of dental caries for these children. However, data on dental caries in preschool children are still small in number [7].

Specialized studies in recent years have made some progress with regard of complex interacting factors in the process of developing dental caries in children, but due to the plurifactorial nature of the disease it seems that there is still much to be studied regarding the start, progress and prevention of tooth decay.

The aim of the study was to determine the risk of tooth decay in children aged 4 to 6 years in Craiova and the relationship of the main etiopathogenic cariogenic factors represented by: food (i.e. sugar and drank fizzy exposure) and oral hygiene (frequency of brushing, influence regarding the presence of bacterial plaque) and the incidence of dental caries in temporary dentition.

Material and Methods

The study included a total of 101 children of both sexes, aged 4-6 years, from two kindergartens in Craiova. Children were shown a film and they discussed measures to control dental caries (nutrition and proper brushing techniques) and the importance of visiting the dentist. They filled out questionnaires where questions were asked regarding eating habits and oral hygiene.

The questionnaire included the following questions:

-When do you brush your teeth: in the morning, morning and evening, the evening or never?

-How often do you brush your teeth?

-After brushing in the evening do you eat or drink anything?

-After eating sweets do you brush your teeth?

-What do you like to drink: soda, water or milk?

-What is your favorite dessert: chocolate, candy, toffee or ice cream?

After completing the questionnaires, the study protocol included visual clinical examination in a conventional and meticulous way of pupils according to WHO methodology: the examination registration of dental status according to WHO methodology; determination of dmft index with the analysis of dt, mt and ft component. The results were recorded in personal files and were analyzed statistically.

Results

Our results were consistent with data from the literature of recent years. Out of the 101 children studied, a total of 44, representing a rate of 43.56% were female and 57 (56.43%) were male, there weren't thus major differences between the two sexes. In terms of distribution by age group the highest percentage was recorded in the age group of 5 years (46.53%), followed in descending order by age group of 4 years (28.72%) and 6 years (24.75%).

Caries prevalence by age group showed the highest value of 46.80% at the age of 5, followed by 44% at the age of 6 and 34.48% at 4 (Fig.1).

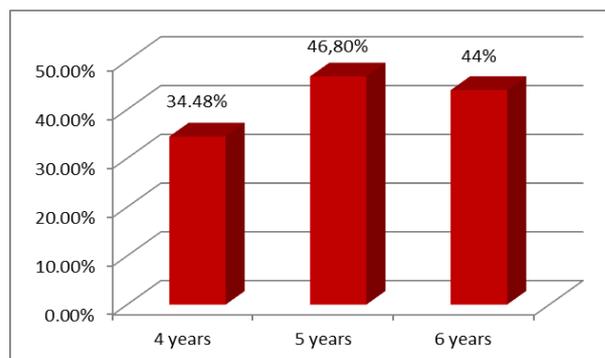


Fig.1. Prevalence of dental caries for age groups at primary teeth

The highest value of the dmft index (2.52) was at the age group of 6, followed by the age of 5 (2.17) and 4 with a value of 0.82 (Fig.2).

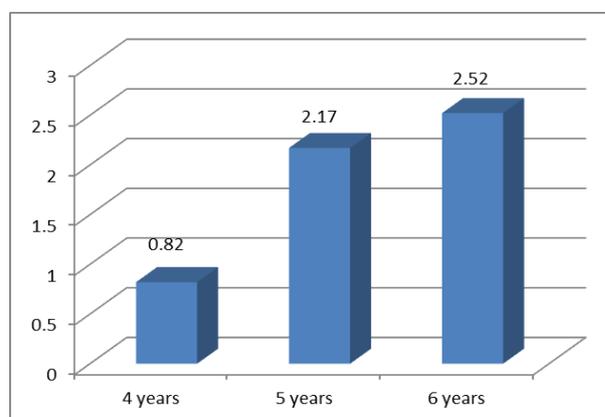


Fig.2. dmft index by age

As for dmft index value compared by gender it was a slight increase in dental caries risk in boys than in girls, but the difference was not statistically significant (Fig.3).

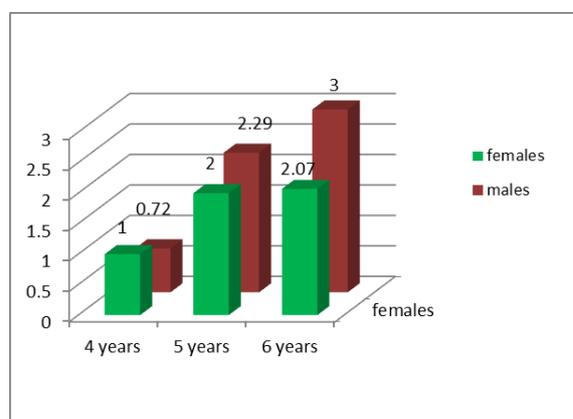


Fig.3. dmft index by sex

We made a comparison between the value of the index component dt and dmft, noting that the increased value of the dmft index component is generally given by dt component, so the teeth affected by caries processes are at the expense of obturated ones, which indicate an increased risk of caries for these children (Fig.4, Fig.5, Fig.6).

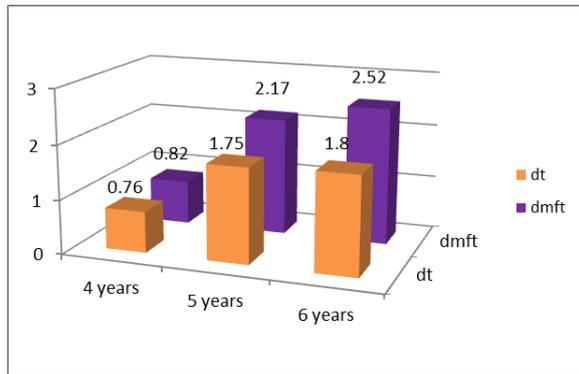


Fig.4. dmft index and dt component for age groups



Fig.6. 4 years old patient. Untreated multiple dental caries.

As for questionnaire replies we found a predilection for increased consumption of sweets and fizzy drinks for the group of children included in the study. 52.5% of children responded that they perform brushing in the morning and evening, although the prevalence and dmft index was increased (Fig.7).



Fig.5. 6 years old patient. Untreated multiple dental caries.

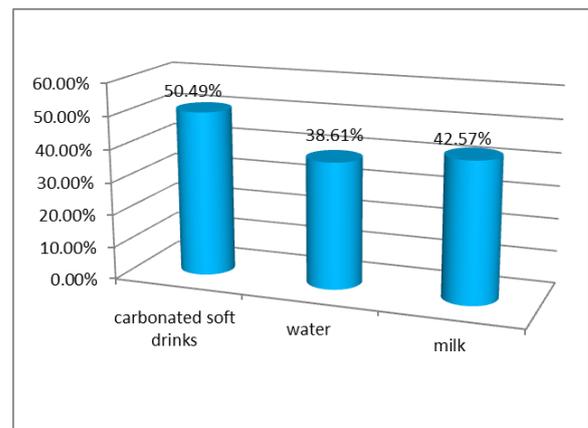


Fig.7. Children's preference regarding soft drinks

Discussions

The aim of the World Health Organization (WHO) for 2000 was that 50% of children of age 5 show no tooth decay.

In more than 40% cases the risk of dental caries by using fluoridated toothpastes and other forms of systemic fluoride such as water fluoridation decreased [8]. However the prevalence and severity of dental caries in some developed countries is still high and at the level of temporary teeth it is estimated

that more than half of children have caries at temporary teeth[9]. In recent years the number of children with caries in temporary dentition increased considerably to around 70% for 5 years old children [10].

Declerck believes that between children's gender and prevalence of dental caries there is a close connection, that girls are much less susceptible to dental caries at age 5 [11]. In our study, dmft index value compared by gender showed a slightly increased risk for dental caries at boys

than at girls.

In other studies it was shown that girls show a slightly increased risk of caries compared to males but the difference was not statistically significant (57.1% in female and 56% at male) [12]. Dental caries present in temporary dentition is a good indicator of risk caries for permanent dentition [4,5].

Greenwell et al have made some notable discoveries, namely that 84% of children who had caries in the primary dentition remained without cavities and on mixed dentition. Children presenting caries in the primary dentition in grooves and fissures were more likely to develop caries on smooth surface teeth than children without caries. A percentage of 57% of children with proximal lesions at temporary molars have developed molar proximal lesions at mixed dentition [13].

In a series of studies conducted in Brazil and in other countries regarding the components of dmft index, it was observed that it is composed mostly of cavity component (dt). In our study we performed a comparison between the value of the index component dt and dmft, noting that the increased value of the dmft index component is generally given by dt component. The analysis of the last national survey in Brazil showed that 65% of children under age of 5 had at least one decayed tooth, and the observed average of dmft index was 3.2, 90% this amount being due to dt component [12].

These data emphasize the need for more attention in terms of child care of oral cavity. One cause for concern is the low percentage of children with dental fillings (2.4%). An explanation for this would be that parents and doctors do not give importance to the treatment of caries in temporary teeth thinking that these teeth will be changed anyway [14,15].

Another study on dmft distribution by age showed that the highest value was observed at the temporary teeth of children aged 6 (3.64), the mean dmft value at age 4 being 2.7, and at age 5 was 3.1 [12].

Tewari and all (2001) studied the risk of caries in children aged 3-7 years from Haryana and noted that the average prevalence was 33.8%. However prevalence was significantly higher in the age group of 6 years compared to 3 years, the gap between female and male sex were also statistically significant, dmft index was 0.73 and 2.37 at women [16]. In other study the prevalence of dental caries in primary dentition of children of 5 years old in the city of Pondicherry was 44.4% with a higher percentage for boys compared to girls [17].

Caries prevalence by age group in our study indicated the highest value of 46.80% at age 5, followed by 44% at age 6 and 34.48% at 4 years. Results of other studies have shown a prevalence of caries at age 2 of 20%, at 3 years 36% and 50% for children aged 5 [3]. The highest prevalence was found at age 4 to 6 years ie 52% and 55% [3], and in Brazil, for preschool children it was 78.7% [10].

Side effects caused by carious processes, namely pain and aesthetic changes affect the quality of life for children. In terms of child psychology, the age of 6 years is the limit in which the child begins to build their self-image [18,19].

Oral hygiene and nutrition are very important for maintaining healthy teeth, temporary teeth caries may immediately affect after their eruption in the oral cavity in case of not taking into consideration these factors. For 3-5 years of age the most affected are the upper incisors [15]. Poor dental hygiene seems to contribute to tooth decay. Good oral hygiene including using fluoridated toothpastes, initiated soon after eruption of temporary teeth, will form the basis of good oral hygiene for teenagers [6].

Duglass and collaborators have determined the prevalence of caries in children of 3-4 years of a fluoridated community in Connecticut that were included in the HeldStart program. They compared the prevalence of caries in 517 children enrolled in 1999 with 311 children enrolled in 1991 and found a 38% prevalence of caries in children enrolled in 1999 and 49% in 1991[20].

Of great importance is the regular tooth brushing. It was noted that reducing the frequency of tooth brushing was associated with an increase in caries for these children [21].

Soft drinks except milk and water cause damage to the teeth for two reasons. First low pH and high degree of titration acidity of the beverages can lead to some erosion of the enamel. On the other hand these beverages contain sugar which is metabolized by plaque microorganisms to produce organic acids that produce demineralization resulting in the occurrence of dental caries.

13% of children who consume soda have a percentage of tooth decay significantly higher compared to children who consume other liquids [22]. Other liquids such as milk, water or natural juices were less criminalized in tooth decay. The findings of this study suggest that an increased consumption of fizzy drinks for children is a risk factor for caries in temporary dentition and should be discouraged [23].

The role of sugar for tooth decay was demonstrated through a series of clinical studies, laboratory and epidemiological ones. Gustafsson et al conducted a study on dental caries control and the conclusion of the study was that the cavity can be increased by sugar consumption if the sugar was in an adhering form to the tooth surface (caramel). Frequently when this form of sugar was consumed between meals it tends to increase dental caries much higher than when sugar was added to the diet as a supplement at meal times [24].

At preschool children, the increased consumption of sugar including sweetened liquid bottles was involved in tooth decay caused by baby bottles. However, epidemiological studies suggest that consumption of sugar is a risk indicator for children who don't regularly use fluoridated products (toothpaste, fluoride tablets). To prevent caries at children with a high risk of caries, excessive sugar consumption should be limited [25].

Conclusion

The prevalence of dental caries for temporary teeth is present in a relatively high value in our county, temporary dental caries being concentrated mostly in the sides of the dental arch.

The most significant contribution to the values of carious experience is the number of teeth affected by caries at the expense of obturated ones.

Lack of awareness and concern of parents for primary dentition status, thinking that these teeth will be changed anyway, lead to a sharp deterioration of permanent dentition with serious

consequences and further development of the maxillary.

It requires a change of attitude regarding the oral-dental health also for the adult population, with their accountability to oral health problems and treatment needs for children, the importance of nutrition and oral hygiene in preventing tooth decay, the importance of periodic checks, and education and training of children to maintain oral health.

Acknowledgment

The data of the present study belong to the project „The education for oro-dental health for the pre-school children”, contract No. 2274 from 06.04.2015.

References

1. BL Edelstein, The Dental Caries Pandemic and Disparities Problem, BMC Oral Health, 2006; 6(1):186-191.
2. Fejerskov O, Changing paradigms in concepts on dental caries: consequence for oral health care, Caries Res., 2004; 38: 182-191.
3. Ieva Henkuzena, Ruta Care, Irena Rogovska, Dental Status Among 2-6 year old children in Riga City, Latvia, Stomatologija, Baltic Dental and Maxillofacial Journal, 2004; 6(1):28-30.
4. Skeie MS, Raadal M, Strand GV, Espelid I, The relationship between caries in the primary at 5 years of age and permanent dentition at 10 years of age- a longitudinal study, Int J Paediatr Dent, 2006; 16:152-60.
5. Y. Li, W.Wang, Predicting Caries in Permanent Teeth from Caries in Primary Teeth: An Eight-year Cohort Study, J Dent Res, 2002; 81:561-566.
6. Anita Alm, Dental Caries and Caries-Related Factors in Children and Teenagers, University of Gothenburg, 2008, ISSN 0348-6672.

7. Bonecker M, Cleaton-Jones P, Trends in dental caries in Latin America and Caribbean 5-6 and 11-13 year-old children: a systematic review, *Community Dent Oral Epidemiol*, 2003; 31:152-7.
8. Narvai PC, Frazão P, Roncalli AG, Antunes JLF. Behavioral and social factors related to dental caries in 3 to 13 year-old children from João Pessoa, Paraíba, Brazil, *Rev Panam Salud Publica*, 2006; 19:385-93.
9. López IY, Bustos BC, Ramos AA, Espinoza RM, Jara MN, Smith LP, Prevalence of dental caries in preschool children in Peñaflo, Santiago, Chile, *Rev. Odonto Ciênc*, 2009; 24: 116-9.
10. Jocianelle Maria Felix de Alencar Fernandes, Suyene de Oliveira Paredes, Daniele Bezerra de Almeida, Fábio Correia Sampaio, Franklin Delano Soares Forte, Prevalence of dental caries and treatment needs in preschool children in a recently fluoridated Brazilian town, *Braz J Oral Sci.*, 2009; 8(4):185-188.
11. Declerck D, Leroy R, Martens L, Lesaffre E, Garcia-Zattera MJ, Broucke VS, Factors associated with prevalence and severity of caries experience in preschool children, *Community Dent Oral Epidemiol*, 2008; 36: 168-78.
12. Deepti Agarwal, Sunitha S, C.V.K. Reddy, Priyanka Machale, Early Childhood Caries Prevalence, Severity and Pattern in 3-6 Year Old Preschool Children of Mysore City, Karnataka, *Pesq Bras Odontoped Clin Integr*, 2012; 12(4):561-65.
13. Greenwell AL, Johnsen D, DiSantis TA, Gerstenmaier J, Limbert N, Longitudinal evaluation of caries patterns from the primary to the mixed dentition, *Pediatr Dent*, 1990; 12:278-282.
14. Feitosa S, Colares V. Prevalência de cárie dentária em pré-escolares da rede pública de Recife, Pernambuco, Brasil, aos quatro anos de idade, *Cad Saúde Pública*, 2004; 20: 604-9.
15. Marcelo Bönecker, Jenny Abanto, Gustavo Tello, Luciana Butini Oliveira, Impact of dental caries on preschool children's quality of life: an update, *Braz Oral Res.*, 2012; 26(1):103-7.
16. Tewari S, Tewari S, Rohtak. A, Caries experience in 3-7 year-old children in Haryana (India), *J Indian Soc Pedo Prev Dent*, 2001; 19(2):52-56.
17. Saravanan S, Anuradha KP, Bhaskar DJ, Prevalence of dental caries and treatment needs among school going children of Pondicherry, India, *J Indian Soc Pedod Prev Dent*, 2003, 21(1):1-12.
18. Rebok G, Riley A, Forrest C, Starfield B, Green B, Robertson J, Elementary school-aged children's reports of their health: a cognitive interviewing study, *Qual Life Res.*, 2001;10(1):59-70.
19. Barbosa TS, Gavião MB, Oral health-related quality of life in children: part III. Is there agreement between parents in rating their children's oral health-related quality of life? A systematic review, *Int J Dent Hyg.*, 2008; 6(2):108-13.
20. Douglass J.M., M.J. Montero, E.A. Thibodeau, G.M. Mathieu, Dental caries experience in a Connecticut Head Start program in 1991 and 1999, *Pediatr Dent*, 2002; 24:309- 314.
21. Rashmi Gupta, Kusum Lata Gaur, Akhil Kumar Sharma, Sumbul Zafer, Suresh Kewalramani, Comparison of Associating factors of Dental Caries in urban and rural children in Jaipur, (Raj) India., *Journal of Dental and Medical Sciences*, 2013; 9(3): 55-60.
22. Sohn W., B.A. Burt, M.R. Sowers, Carbonated Soft Drinks and Dental Caries in the Primary Dentition, *J Dent Res*, 2006; 85:262-266.
23. Ismail A.I., W. Sohn, S. Lim, J.M. Willem, Predictors of Dental Caries Progression in Primary Teeth, *J Dent Res*, 2009; 88: 270-275.
24. Gustafsson BE, Quensel C-E, Swenander Lanke L, Lundqvist C, Grahnen H, Bonow BE, Krasse B, The Vipeholm Dental Caries Study. The effects of different levels of carbohydrate intake in 436 individuals observed for five years, *Acta Odontol Scand*, 1954; 11:232-364.
25. Norman Tinanoff, M.S. Joanna, M. Douglass, Clinical Decision-Making for Caries Management in Primary Teeth *Journal of Dental Education*, 2001; 65(10):1133-1142.

Corresponding Author: Marilena Bătăiosu, University Lecturer, Department of Pediatric Dentistry, Faculty of Dental Medicine, University of Medicine and Pharmacy of Craiova, 2-4, Petru Rareș Street, 200349, Craiova; e-mail:marilena.bataiosu@yahoo.com