



Optimization of Comprehensive Prevention of Dental Caries in Primary School Children

Isahodjaeva HK¹, Matkulieva SR¹, Malikov ST¹, Nazirova SH² and Kangilbaeva GE^{2*}

¹Tashkent State Dental Institute, Uzbekistan

²Department of Ophthalmology, Tashkent Medical Academy, Uzbekistan

Abstract

An analysis reflecting the etiology of dental caries in children of primary school age was carried out. We have analyzed various causes of cariogenic factors: Carbohydrate, hygienic, microbial, economic, behavioral, and psychosocial. The features of caries in children and its connection with the medical culture of parents are considered. The need to improve a comprehensive program for the prevention of dental caries in children, taking into account age, was expressed.

Keywords: Children; Etiology of caries; Primary prevention; Dental caries; Risk factors; Primary prevention; Medical culture

Introduction

Based on the results of epidemiological studies, conducted in different countries of the world, dental caries is widespread among preschool children in both economically developed and developing countries. The prevalence of this disease in the world ranges from 35% to 83%. Over the past 15 to 20 years, interest in this problem has increased significantly around the world. In 2007, the World Health Assembly 60.17 meeting was held, during which recommendations were formulated for the development of a plan to improve the dental health of the population, including measures for the comprehensive prevention of dental diseases epidemiological studies are necessary for planning programs for the prevention of mass dental diseases - dental caries and periodontal diseases, assessing the adequacy of dental care to the population in need. Primary prevention programs for dental caries are highly effective, which is a promising direction, especially among the child population. Dental caries is an urgent problem of dentistry in both industrialized and developing countries [1,2]. In Eastern European countries, the indicator reaches 56% [3], in the Middle East, children aged 3 years from 22% to 61% [4], and in Africa from 38% to 45% [4]. In the Asian region, the rates among 3-year-olds are even higher, ranging from 36% to 85% [1]. The prevalence of caries in children of primary school age, according to various authors, ranges from 91% to 100%, and the intensity is 3.9 to 6.3 [5,6]. Kuzmina EM found that the prevalence of caries of permanent teeth in children 6 years old, on average, in various regions of Russia is 13%, at 12 years it sharply increases to 73%, and up to 15 years - up to 82%. According to [7], the greatest increase in the prevalence and intensity of caries is observed at the age of 2 to 5 years, confirming studies [8], where the indicator increased from 24% in 1994 to 28% in 2004. However, according to [9], a sharp jump in the prevalence of caries occurs earlier: from 3.2% in the first year of life to 67.0% in the third year, with an increase in the intensity of caries from 0.69 to 3.92. In Russia, despite the early prevention and treatment of RDC, the prevalence of caries reaches 80% [3,2,10,11], at an intensity of 3.32-3.94, which is 1.6-2.1 times higher than in economically developed countries [1]. In the Khabarovsk Territory, the average CPI index in 3-year-olds is 3.34 ± 0.29 with the predominance of the "k" component up to 3.01 ± 0.3 [6]. The incomplete process of enamel mineralization, being a factor of increased risk of caries, leads to a sharp increase in this disease in permanent teeth in children 6 to 8 years old. Permanent molars of 82% are affected by caries in the first 6 to 12 months after the onset of the eruption. The lack of oral sanitation and the initiation of inflammatory processes affect the quality of life of the child and the family, leading to decompensation, aggravating the psychosomatic status of children with developmental disabilities [3,12], exacerbating chronic infections [11] and socioeconomic consequences [3,13]. Early tooth loss leads to impaired occlusion, speech development, and decreased self-esteem [14,15]. Casamassimo et al. established a link between RDC and improper performance of duties by parents [4], including it in the list of diseases equated to child abuse [16,17]. Dental caries is a multifactorial poly-etiological disease caused by the

OPEN ACCESS

*Correspondence:

Kangilbaeva Guzal, Department of Ophthalmology, Tashkent Medical Academy, Tashkent, Uzbekistan, E-mail: doctorguzal70@gmail.com

Received Date: 16 Dec 2022

Accepted Date: 02 Jan 2023

Published Date: 06 Jan 2023

Citation:

Isahodjaeva HK, Matkulieva SR, Malikov ST, Nazirova SH, Kangilbaeva GE. Optimization of Comprehensive Prevention of Dental Caries in Primary School Children. *J Clin Ophthalmol Eye Disord.* 2023; 7(1): 1049.

Copyright © 2023 Kangilbaeva GE. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

interaction of the cariogenic microflora with each other and the macro-organism [1,7,8], significantly dependent on the type of feeding, the course of pregnancy, the timing of teething [18]. The main goal of prevention is to eliminate the causes of the occurrence and development of diseases, as well as to create conditions for increasing the body's resistance to exposure [15]. Hygienic education in dentistry plays a very important role, since the etiology and pathogenesis of dental caries, periodontal diseases are largely due to the negative habits of adolescents: The use of large amounts of carbohydrate foods, and sugars, unwillingness to brush their teeth. In modern dentistry, the problem of treatment and prevention of caries and its complications in children and adolescents is one of the most difficult and attracts the attention of many researchers [5,6,14,19]. The high prevalence of focal demineralization after the eruption is due to immature tooth enamel and aggressive exposure to caries factors, especially with poor hygiene [2,8,20], consumption of large amounts of carbohydrates [2,8] and insufficient intake of fluoride [2,6]. Other authors [1] identify economic, behavioral, and psychosocial factors: Caries of children in primary school children occurs more often in children living in poverty, in poor economic conditions [3], from among ethnic and racial minorities [14]. There is an opinion that passive smoking is a more dangerous risk factor for the development of caries than the low socioeconomic level of the family [15,21]. The conducted studies indicate the presence of a synergy between nicotine intoxication and the incidence of caries in young children [15]. A direct connection has been proved between the high cpi index in young children, with the low level of education of parents, especially with the illiteracy of mothers [1,15]. Children in single-parent families have a higher CPU since their diet is significantly more often dominated by high-carbohydrate foods [8]. The role of the carbohydrate factor in the risk of caries development is recognized by many authors [6,8]. According to Gomenyuk [22], the prevalence and intensity of dental caries in young children increase sharply with uncontrolled sugar consumption: For example, in children aged 7 to 10 months, the indicators are $50.0 \pm 5.8\%$ and 1.96 ± 0.34 , respectively. In countries where the average amount of sugar consumed by a person per day is less than 40 g to 55 g, a low prevalence of caries is recorded [1], at the same time, people with high sugar consumption have a caries level higher than average [1]. The early introduction of starch, and carbohydrate products into the child's diet negatively affects the formation of the dental system and provokes a malfunction of the physiological work of the hormonal and digestive systems. The relationship between dental caries in young children and the habit of frequent snacking, especially with sweet contents, has been proven [12,14], while the risk of developing caries in a child increases 6.5 times [5]. Children who prefer to drink sweetened drinks and juices at night are characterized by a direct strong correlation with a high cpi index ($R_{xy}=0.82$, $p<0.01$) [6]. Breast feeding is an ideal nutrition for a baby in the first year of life, recent studies demonstrate the extremely important role of breast milk in the formation of healthy microflora, the development of innate and acquired immunity [1], reducing the risk of gastrointestinal and respiratory infections [2,17]. Breast milk contains several factors with protective properties: "useful" lactobacilli and bifidobacteria, immunoglobulins, lactoferrin, and lysozyme [11]. This is due to a decrease in salivation at night, and an increase in the level of lactose concentration in saliva and plaque. At the same time, in her research, Yakubova II [13] proved that not only the timing of breastfeeding creates conditions for the development of caries of temporary teeth, but also contamination of breast milk with bacteria, which was

registered in 36.5% of women and the presence of oral dysbiosis in 73.9% of infants. Regardless of the type of feeding, the risk of developing dental caries in young children increases by 3.5 times in the absence of hygienic dental care for children [5], which should begin after the eruption of the very first tooth. The dependence of dental status on the level of oral hygiene has been established [11-13,23]: In children aged 7 to 10 years, with good oral hygiene, the intensity of caries is 2.3 ± 0.17 , with satisfactory - 2.7 ± 0.23 , with poor oral hygiene - 3.4 ± 0.28 [14]. High rates of caries intensity in children aged 7 years confirm the relationship between dental caries of young children and poor hygiene ($R_{xy}= -0.72$, $p<0.05$) with pronounced cariogenic plaque (ZN) ($R_{xy}=0.41$, carbohydrate metabolism, *S. mutans* produce lactic acid faster than other microorganisms and are the first to populate the biotopes of the oral cavity [8]. There are contradictory data on streptococcal contamination of individual biotopes [11,18,19]: Previously it was believed that infection of a child with *S. mutans* occurs between 19 and 31 months – in a discrete window of infection [17], or after teething [11]. But other studies [8] have shown that infection with cariogenic *S. mutans* and their colonization in the grooves of the tongue are possible even before teething. At the same time, Tanzer writes that *S. mutans* requires hard surfaces, as evidenced by the appearance of *S. mutans* in infants with congenital pathology of the maxillofacial region before teething when using obturators. Studies [2,11,17] have confirmed the horizontal transmission pathway of cariogenic streptococci: Children from the same school have identical bacterial serotypes in saliva [8], and children in home education have the same serotypes and titer of *S. mutans* as their parents [24]. There is also a clear link between the high titer of *S. mutans* streptococci in mothers with the risk of massive contamination of the oral cavity in their children and, subsequently, with a high prevalence of caries by the age of 7, while children with minor infection with *S. mutans* have a low risk of developing caries [25,26].

References

1. Knaist S, Maslak E, Tsare R, Berzina S, Skrivele S, Terekhova T, et al. Social factors influencing the development of early children's caries: research results in five countries. *Sociology of Medicine*. 2012;1(20):41-5.
2. Leontiev VK, Kiselnikova LP. Pediatric therapeutic dentistry: National guidelines. 2017.
3. Kuzmina EM, Kuzmina IN, Petrina ES. Dental morbidity of the population of the Russian Federation. 2009;236.
4. Casamassimo PS, Thikkurissy S, Edelstein BL, Maiorini E. Beyond the dmft: The human and economic cost of early childhood caries. *J Am Dent Assoc*. 2009;140(650):7.
5. Kuyumjidi NV. Medico-sociological analysis of the influence of parental compliance on the effectiveness of prevention of dental diseases in young children. autoref. diss. ... candidate of medical Sciences. 2010:26.
6. Kharitonova TL, Lebedeva SN, Kazakova LN. Early prevention of dental caries in children. *Saratov Sci Med J*. 2011;7(1):260-2.
7. Livny A, Assali R, Sgan-Cohen H. Early childhood caries among a bedouin community residing in the eastern outskirts of Jerusalem. *BMC Public Health*. 2007;7:167.
8. Ercan E, Dulgergil CT, Yildirim I, Dalli M. Prevention of maternal bacterial transmission on children's dental-caries-development: 4-year results of a pilot study in a rural-child population. *Arch Oral Biol*. 2007;52(8):748-52.
9. Starovoitova EL, Antonova AA, Strelnikova NV. Informative value of the determination of cariogenic bacteria of the species *Streptococcus mutans* and *Lactobacillus* spp. in young children. *Pediatr Dent Prev*. 2017;16(3):4-

- 8.
10. Maslak EE, Kamenнова EN, Kamenнова TN, Afonina IV. Bulletin of the volgograd scientific center of the Russian Academy of Medical Sciences. 2010;1:48-51.
11. Skripkina GI, Smirnov SI. A model of the development of the carious process in children. *Pediatr Dent Prev*. 2012;3:3-7.
12. Berkowitz RJ. Causes, treatment and prevention of early childhood caries: A microbiologic perspective. *J Canad Dent Assoc*. 2003;69(5):304-7.
13. Yakubova II. Substantiation and development of a scheme for the prevention of caries of temporary teeth in children under two years of age. *Russian Bull Perinatol Pediatr*. 2012;5:118-24.
14. Kuzmina EM. Criteria for assessing the condition of the oral cavity and the effectiveness of various means of preventing dental diseases. *Method Recommendations*. 1996:36.
15. Semenkova OV, Pylkov AI. Evaluation of the effectiveness of the caries prevention program in young children. *Medicine and Education in Siberia*. 2014;6:27.
16. Medeiros PBV, Otero SAM, Frencken JE, Bronkhorst EM, Leal SC. Effectiveness of an oral health program for mothers and their infants. *Int J Pediatr Dent*. 2015;25(1):29-34.
17. Misra S, Tahmassebi JF, Brosnan M. Early childhood caries: A review. *Dent Update*. 2007;34(9):556-8.
18. Starovoitova EL, Strel'nikova N, Antonov AA. Microbiome language as a predictive model to determine the contamination of cariogenic bacteria *Streptococcus mutans* hard tissues of teeth in children of early age. patent Application of the Russian Federation No. 2017126914/15 (046388), 26.07.2017. Notification: A positive result of the formal examination of the application for an invention, 31.08.2017.
19. Starovoitova EL, Antonova AA, Strelnikova NV, Lemeshchenko OV. Sanological culture of parents as the basis of dental health of children. *Health and education in the XXI century*. 2017;19(10):157-62.
20. Shevchenko OL, Antonova AA. Composition of mixed saliva and indicators of caries of temporary teeth and its complications in children. *Endodontics Today*. 2015;4:8-12.
21. Shevtsova Yu V, Danilova MA, Machulina NA. Clinical and morphological aspects of caries of milk teeth. *Dentistry of Childhood and prevention*. 2015;1(48):62-4.
22. Gomenyuk TN, Sechen IT. Intensity of dental caries indicators in children under 3 years old depending on the amount of sugar consumed. *Dentistry*. 1997;4:58-9.
23. American Academy of Pediatric Dentistry. Policy Early Childhood Caries (ECC): Classifications, consequences, and preventive strategies. *Pediatr Dent*. 2008;30:40-3.
24. Petersen PE, Estupinan-Day S, Ndiaye C. WHO's action for continuous improvement in oral health. *Bull World Health Organ*. 2005;83(9):642.
25. Schroth RJ, Brothwell DJ, Moffatt ME. Caregiver knowledge and attitudes of preschool oral health and Early Childhood Caries (ECC). *Int J Circumpolar Health*. 2007;66(2):153-67.
26. Dulgergil CT, Colak H. Rural dentistry: Is it an imagination or obligation in Community Dental Health Education. *Niger Med J*. 2012;53(1):1-8.