

Basic Parameters of Dental Status in School-Age Children in Normal Conditions and in Diseases

Afakova Ma'mura Shukhratovna

Bukhara State Medical Institute, Uzbekistan

Abstract Many countries are interested in monitoring various public programs for the prevention of oral diseases, as well as assessing the quality of dental care for school-age children. Dental health indicators developed for European countries provide internationally comparable practices that can facilitate faster implementation of positive practices in national child dental care systems. Constant monitoring of the level of dental health of children is the most important component of the public health system.

Keywords Oral cavity, Young child, Caries, Prevention

1. Introduction

Oral health is a key indicator of overall health, well-being and quality of life. Some dental diseases are considered public health problems because they can lead to nutritional deficiencies as well as aesthetic, speech, chewing, and swallowing problems. In addition, psychological disorders, especially those associated with low self-esteem, may be a consequence of oral health problems.

Efforts to prevent and promote oral health have become a reality around the world. Despite significant improvements in oral health in children and adolescents, the prevalence of dental problems at this stage of life remains high, mainly in economically disadvantaged groups. Children and adolescents with dental problems may lag behind in social, physiological and mental development compared to people without oral disease. There is strong evidence that individuals with oral health conditions are more likely to be absent from class due to dental visits and will also have greater difficulty concentrating, which will negatively impact school learning.

The results of this analysis are consistent with recent studies (Blumenshine SL, Vann Jr. WF, 2020; Jackson SL, Vann Jr. WF, Kotch JB, 2020), which indicate the negative impact of poor oral health not only on absenteeism, but also on children's performance at school.

Wei CT, Lo KY, Lin YC. (2021) Taiwanese researchers present a semi-experimental design of the impact of a school health promotion strategy on plaque control and preventive behavior among schoolchildren with high caries rates in rural Taiwan. Dental caries in children is a serious public health problem in Taiwan. Children affected by tooth decay may

experience pain and sleep disturbances, which can affect school attendance and performance, eating habits, weight and height. In 2012, the decayed, missing, and filled teeth (DMF) index for 12-year-old children in Taiwan was 2.5; this is higher than the global average for DMF, as reported in a World Health Organization survey.

Studies conducted in the USA and Australia have noted the influence of geographic location on the prevalence of dental caries. Urban-rural differences in health care resources are noticeable in Taiwan, especially in dental care, which is largely concentrated in urban areas. Taitung County is located primarily on the southeast coast of the island, which is somewhat rural and has the highest percentage of Taiwan's indigenous population (35.5%). DMF rates of 12-year-old children in eastern Taiwan are 1.52 times higher than those in western counties.

In 2017, the prevalence of tooth decay among schoolchildren in Taiwan was 61.1%. The prevalence in Taitung was 68.8%. Therefore, a quasi-experimental design was adopted; six intervention schools (intervention group [IG]) and six comparison schools (comparison group [CG]) were selected from primary schools with above-average caries rates (>68%). IG was selected using cluster sampling and CG was selected according to IG. In total, the groups IG and CG included 166 and 174 children each. The selected schools implemented the HPS framework over a 3-month period during the 2019 school year. An oral plaque examination was performed and a self-administered questionnaire regarding knowledge, attitude, self-efficacy and behavior was distributed at baseline and 2-week follow-up.

A linear and logistic regression model using generalized estimating equations (GEE) was used to analyze differences between baseline and follow-up data. Compared with CG, the IG group experienced greater reductions in plaque index among second graders ($\beta = -0.36$) and plaque control scores

among second, fourth, and sixth graders ($\beta = -27.48, -26.04$, and -18.38 respectively). IG also showed greater increases at follow-up in oral health-related knowledge among second and fourth graders ($\beta = 1.46$ and $\beta = 0.92$, respectively), and attitudes toward oral health among sixth graders ($\beta = 1.78$). fluoride (aOR = 5.88) than CG students.

2. Materials and Methods

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The researchers concluded: The HPS strategy was effective in reducing dental plaque, improving oral hygiene knowledge and self-efficacy for flossing, and promoting preventive behavior among rural schoolchildren with a high prevalence of dental caries.

Karveetil V, Kumar SV, Janakiram C (2020) Indian scientists concluded that the high incidence of dental diseases among Indian children may be due to low awareness about maintaining oral health. The school oral health curriculum in India lacks an oral health component and there are currently no organized oral health programs for school children. Therefore, the present study was conducted to

evaluate the effectiveness of an oral hygiene curriculum in improving oral health behaviors and caries management experiences in schoolchildren.

The school preventive dental program in rural communities of the Republic of Armenia is evaluated by the authors (Gasoyan H, Safaryan A, Sahakyan L. 2019) The authors provide an analysis of the school preventive dental program implemented in 14 rural schools in nine villages of Armenia. As part of the program, tooth brushing stations (called Brushadromes) were installed in participating schools. The intervention included supervised brushing with fluoride toothpaste at school and oral hygiene education.

The study assessed the prevalence and levels of dental caries among rural schoolchildren in 2013 (before the implementation of a prevention program, called the pre-intervention group) and 2017 (4 years after the start of the program, called the intervention group). group) in two randomly selected villages where the program was implemented. A repeated crossover study design was used. The prevalence of caries and the number of carious, missing and filled teeth in the permanent dentition (PPD) and primary dentition (PDD) were registered in schoolchildren aged 6-7 and 10-11 years in 2013 ($n = 166$) and 2017 ($n = 148$).

The pre-intervention and intervention groups include different children of the same age, from the same villages, examined at different times. In both cases, they represented more than 95% of the 6-7 year old and 10-11 year old student population of the villages studied. Pearson chi-square, Fisher's exact test, independent t -test, and Poisson quasi-likelihood regression were used to analyze the data. It was found that among schoolchildren who participated in the intervention, the level of caries was significantly lower than in groups of the same age before the intervention. In schoolchildren aged 10-11 years who participated in the program, the average number of permanent teeth with caries was 0.689 times lower (by 31.1%), $p = 0.008$, 95% CI, 0.523; 0.902 compared with the 10-11 year old group before the intervention, after taking into account the age, gender, socio-economic vulnerability of the child, locality of residence and the number of permanent teeth with fillings.

Thus, the study indicates a significantly lower incidence of caries among schoolchildren in the two study villages where the intervention was carried out. The intervention described is particularly suitable for rural areas where water fluoridation is not available and homes have limited access to piped water.

Dental status of children in the Bukhara region of Uzbekistan. A number of scientific studies have been devoted to the study of the dental status of children in the Bukhara region (Kamilova M. 2021; Tailakova D. I. 2017; Saidova M. A. 2020, etc.). A questionnaire survey of the oral cavity of high school students living in various environmental conditions was carried out in order to determine the effectiveness of this method in identifying the nature of the influence of unfavorable environmental factors on the dental system of children in rural areas. To conduct a survey in rural areas, 3 districts of the Bukhara region of the Republic of Uzbekistan

were selected (Karaulbazar, Gijduvan and the Madaniyat village of the Bukhara region), which are relatively easily comparable in their natural, climatic and social conditions, but differ in the nature and degree of environmental pollution, which contributes to the methodological approaches adopted in studying the influence of the environment on children's health.

The Karaulbazar cotton-growing region (experimental) is characterized by combined environmental pollution with pesticides, mineral fertilizers and harmful emissions from the Bukhara Oil Refinery (BOR), especially aromatic hydrocarbons. The Gijduvan cotton-growing area (conditional control) is characterized by environmental pollution only by pesticides and mineral fertilizers.

The village of Madaniyat in the Bukhara livestock raising region (control) is a relatively environmentally friendly residential area. When surveying children in rural areas, showed that in the experimental area the largest number of children (66.8%) complained of periodic (especially in summer) unpleasant odors from the oil refinery, while in the control areas there were almost no such complaints. The feeling of unpleasant odors during the treatment of fields with pesticides and mineral fertilizers was indicated by 48.3% of children in Karaul-Bazarsky district, 51.7% in Gizhduvansky district, 9.5% in Bukhara district, of which 42.4% of children in Karaulbazarsky, 23, 6% in Gijduvan and 1.27% in Bukhara districts limited the ventilation of rooms due to an unpleasant odor.

3. Result and Discussion

The authors of the studies state: a screening examination of the oral cavity of children, taking into account the nature of regional unfavorable environmental factors, helps to identify high-risk groups and sick children; increasing the efficiency of early prenatal diagnosis of dental diseases and treatment and preventive care.

Kamalova M.K. (2020) in his work provides the results of the implementation of programs for the prevention of dental caries in preschool children in Bukhara and the Bukhara region. A total of 959 children participated in the study, of which 320 children lived in the city of Bukhara (pupils of 4 kindergartens), 319 children living in the Alat district of the Bukhara region (pupils of 4 kindergartens) and 320 children living in the Karakul district of the Bukhara region (pupils of 4 kindergartens). 4 programs for the prevention of dental caries among kindergarten students were carried out. Program No. 1 included a screening dental examination of children. Other programs, in addition to screening children, additionally included various activities.

Program No. 2 was aimed at involving parents in the prevention and timely treatment of dental caries in children. Program No. 3 involved the formation of health-saving behavior in children. In Program No. 4, dentists carried out comprehensive primary (use of fluoride varnish and fissure sealing) and secondary prevention of caries (non-invasive

and minimally invasive methods of treating caries). The author summarizes. Thus, the screening program and its combination with the involvement of parents in caring for the dental health of children gave less results than the additional involvement of kindergarten teachers in the formation of health-saving behavior in children. On the other hand, a comprehensive program with additional preventive procedures, non-invasive and minimally invasive treatment of dental caries by dentists directly in kindergartens made it possible to improve the dental status of children much more effectively than all other programs.

In the work of Tailakova D.I. and Murtazaeva S.S. (2022) presented an anamnestic analysis of hard tissue diseases 360v in school-age children in the Bukhara region of Uzbekistan. The authors found that the leading causes of dental disorders in schoolchildren are a number of features: environmental various toxic and chemical substances, in particular, pesticides, mineral fertilizers and other industrial wastes (sulfur dioxide, nitrogen dioxide, aromatic hydrocarbons) pollute environmental objects and through the body of pregnant and nursing mothers, along with changes in the general condition of the body, have an adverse effect on the dental system of children, expressed in an increase in dental hypoplasia.

Another, no less important reason is transmitted diseases, the level of hygienic knowledge of oral care and diet in children in the rural areas studied was in the Karaulbazar district, out of 100 children surveyed, 49% adhere to the diet, in Gijduvan, out of 96 children, 62%, in the Bukhara district, Madaniyat village, out of 100 children, 80%. 31% pay attention to hygienic oral care in the Karaulbazar district, 46% in the Gijduvan district, and 65% in the Bukhara district, Madaniyat village. It has been proven that due to poor hygienic care and non-compliance with the diet in the Karaulbazar district, children significantly more often than control information complain about discoloration in the teeth - white spots $46.8\% \pm 4.98$ children, yellow spots $16.8\% \pm 3.67$ and brown spots in the teeth of $26.4\% \pm 4.39$ children.

In the Gijduvan region, children complain about discoloration of their teeth - white spots in the teeth of $35\% \pm 4.91$ children, yellow spots in the teeth of $17.5\% \pm 3.9$ children and brown spots in the teeth of $15.6\% \pm 3.71$ children, in the Bukhara district, the village of Madaniyat, complain of discoloration in the teeth - white spots in the teeth of $15.2\% \pm 3.57$ children, yellow spots in the teeth of $9.1\% \pm 2.86$ children and brown spots in the teeth of $6.1\% \pm 2.37$ children. [106; p.499-515]

Thus, further study of the dental status of children in environmentally disadvantaged regions of Bukhara and industrialized regions of the region requires further study, development of therapeutic and preventive measures.

Teeth eruption is a physiological process defined as the movement of a tooth from its position in the bone during its development to its functional position in the oral cavity. This is a complex and dynamic process that involves changes in the tissues surrounding the tooth and in the tooth itself. The process of teething consists of three phases: pre-eruptive,

pre-functional and functional. In the pre-eruptive phase, the crown is formed and mineralized, and root formation is initiated. Bone resorption occurs in the area of the tooth eruption path. In the pre-functional phase, the tooth changes its position from intraperiosteal to extraperiosteal, and after appearing in the oral cavity, it moves towards contact with the opposing tooth.

During this phase, the root is also formed, changes occur in the bone structure of the alveolar process and other periodontal tissues. The functional phase is the period during which the root continues to grow, the periapical foramen is formed, and the periapical tissues develop. During this phase, the epithelial attachment of the gingival crevice is formed and moves towards the root apex. The depth of the gingival sulcus decreases. The process of teething is not continuous, but occurs in stages. There are time intervals between active tooth movements. The average rate of tooth eruption is 0.7 mm per month, which means that the time from the moment the tooth is palpated with gum tissue to the complete eruption of the crown is 2 months (range 0.9–4.9 months).

At the intraosseous stage, the tooth moves at a speed of 1–10 μ m per day [Olczak-Kowalczyk, D. Et al. 2011]. As soon as the erupting tooth reaches the crest of the alveolar process and penetrates the soft tissue, the speed of movement changes and reaches 75 microns per day. This stage of dental development depends on local, genetic and epigenetic factors. Scientific protocols confirm that teething is genetically programmed and genes are responsible for 70% of it, while environmental factors play a minor role. Studies in rodents have shown that tooth development, number, size, shape and eruption are under strong genetic control.

The mechanism of teething is not fully understood. As a result of the analysis of physiological processes, it was established that the dental follicle, periodontium and the membrane covering the periapical tissues, and the terminal root follicle play an important role in the process of teething. These structures interact with each other and control the process of teething.

One of the important factors influencing the development of a child is teething. From the moment the primary teeth erupt, the vital physiological process of eating is formed, the sucking reflex decreases, the swallowing mechanism and chewing function develop. These changes contribute to the growth of the jaws and changes in the proportions of the brain and facial skull. With the eruption of primary teeth, speech development is activated - it becomes possible to achieve correct articulation and sound production and the formation of social adaptation and stimulation of the child's mental development. The physiological norm for the eruption of teeth in the temporary occlusion can be established based on a number of criteria, such as certain timing, pairing and sequence of eruption.

Shilova N. et al. (2017) studying the data of various authors on the timing of the formation of primary occlusion in children in different countries show that they differ. If the age of eruption of primary teeth in a child differs significantly from the average eruption time accepted for a

given population, it is late or premature eruption. Late eruption is more common. It can be caused by premature birth, shorter body length and weight, malnutrition, genetic disorders, systemic diseases and local factors. Premature eruption of primary teeth may also be associated with maternal smoking during pregnancy, low physical activity of the mother before pregnancy, socio-economic status of the mother and certain genetic disorders in the development of the child.

Late eruption of primary teeth, according to domestic and foreign literature, may be due to miscarriage and the negative influence of the pathology of the neonatal and postnatal periods of child development. A number of authors note the negative impact of rickets on the physiological course of the eruption of primary teeth. These disorders manifest themselves as deposition of osteoid tissue along the periphery of the bone beams, and in some areas as more extensive accumulations of osteoid, which is slowly resorbed. The author believed that the violation of the eruption sequence was due to delayed growth of the lower jaw. As a result, temporary teeth first erupt on the upper jaw, and only then on the lower jaw.

4. Conclusions

Rickets suffered during the first year of a child's life has a pronounced effect on the timing of the eruption of primary teeth and leads to their delay by 4-5 months. compared to healthy children. In the group of children with rickets, all signs of physiological eruption of primary teeth were disrupted: timing, pairing and sequence. In addition, the timing of the eruption of primary teeth is directly influenced by the type of feeding in infancy and the characteristics of the introduction of subsequent complementary foods, which shape the nature of the chewing load in the future. Early eruption of primary teeth was noted in breastfed children in comparison with the group of children on artificial and mixed feeding.

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