

PREVENTION OF CARIES AND ITS COMPLICATIONS IN THE POPULATION OF A SPECIAL ECONOMIC ZONE: EFFECTIVENESS OF MANAGEMENT AND PRACTICAL ACTIONS

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Abstract. *The article highlights the problem of caries prevention in the adult population. It is emphasized that individual prevention of dental diseases contributes to the improvement of the public health, it is carried out through awareness of the role and importance of hygiene procedures and is aimed at eliminating the causes and conditions for the occurrence and development of diseases, and increasing the body's resistance to adverse environmental factors. The authors conducted a study that, in addition to carrying out preventive measures, took into account systemic diseases that directly affect the level of acidity of the oral fluid, as well as the patients' residential occupancies. A complex of measures that registers the main cariogenic factors and predicts the occurrence of a carious process has been developed. The developed options of clinical examination allow tracing the patterns that occur in the surface layers of the enamel after therapeutic and preventive treatment and comparing the effectiveness of individual preventive measures in permanent dentition.*

Keywords: *caries, prevention, prevalence, management.*

Introduction. Caries prevention does not evoke an adequate response in adults in practical healthcare, the fact evidencing low level of oral hygiene compliance in the Russian population as a whole. With age, there is a significant increase in caries extension: in various regions of Russia the prevalence of dental caries in permanent teeth ranges from 61 to 96% among 12-year-old schoolchildren, and it reaches 100% in adults.

The main goal of individual dental disease prevention is to improve the health of the country's population through the disease awareness and importance of hygiene procedures. Knowledge of oral hygiene products and their proper use allows converting individual oral hygiene procedures into effective preventive and therapeutic ones, but for this, it is necessary to correctly select the appropriate personal hygiene products for each specific patient in accordance with his dental status. This algorithm will allow specialists to better navigate in the development of the "Individual hygienic program for the caries prevention", since on this basis, they will be able to explain indications for the use of specific drugs and the direction of their action, so that patients can use them reasonably and for their intended purpose. The main objectives of

prevention are to eliminate the causes and conditions for the occurrence and development of diseases, as well as to increase the body's resistance to the effects of adverse environmental factors.

Studies related to individual caries and periodontal disease prevention are carried out in many countries; however, there is insufficient literature data to cover the results of these studies.

Significant dental well-being is to be achieved only by providing individual preventive measures. Introduction of a complex of effective measures for caries prevention in temporary and permanent occlusion will significantly improve the dental health level in the country's population. Carrying out preventive measures requires an individual approach considering common diseases, for example, gastrointestinal pathologies, which directly affect the level of acidity of the oral fluid, as well as the conditions of the patients' living environment. Previously, these factors were not analysed as part of caries preventive measures. Insufficient research results, a variety of controversial issues and the need to resolve them prompted us to take up this problem.

Materials and methods. The study included 300 people, 152 (50.7%) women and 148 (49.3%) men, aged 18-44 years (that is, with completed mineralization of hard dental tissues), having at least 20 natural teeth with a preserved crown, not exposed to industrial hazards, without severe concomitant pathology. The studies involved patients without a systemic pathology or patients who had initial manifestations of certain diseases (gastritis, colitis, mild dyskinesia, the initial stage of coronary heart disease detected by ECG, the initial stages of hypertension, etc.), but at the time of the examination, there were either no pronounced changes, or the identified changes were within the age norm, i.e. the disease was recorded in the remission stage. Including in research patients with existing health problems allowed creating research conditions as close as possible to those taking place at a dental appointment, and objectively assessing the impact of the patient's individual parameters on his dental status and effectiveness of mass and individual prevention. All patients were divided into two groups: the control group and the experimental group. In the control group, after educating patients on the oral health issues and conducting professional oral hygiene, the patients carried out mass prevention techniques based on the information taken from the media; they were further examined to compare the results. In the experimental group, we developed individual preventive measures for caries prevention. We developed a complex of investigations registering major cariogenic factors and predicting occurrence of a tooth decay process. This included: medical history data; visual inspection of hard tooth tissues; detection of the pH of the oral fluid; detection of the cariogenic effects of dental plaque; detection of the KPU index (KPU - the Russian abbreviation meaning caries-fillings-loss teeth); detection of the CPITN index; detection of oral hygiene status index (OHI-s) according to the Green-Vermillion; detection of KOSRE-test (clinical definition of tooth enamel remineralization rate); clinical macro-histochemistry of gum tissues according to A.A. Kunin; bacterioscopy of the plaque from the tongue and cheeks, the contents of the periodontal sulcus; touch imprint cytology of the oral mucosa; electrometric studies of the

tooth hard tissues; detection of unsatisfactory filling by staining the enamel at the border with the filling material with a 2% solution of methylene blue; clinical assessment of the quality of the filling according to D.M. Karalnik. The data were processed statistically using Statistika 6.0, SPSS-11. For all types of analysis, the representativity of the results obtained was assessed. When testing statistical hypotheses, differences were considered significant at $p \leq 0.05$.

Results and conclusion. The conducted clinical examination allowed tracing the patterns occurring in the surface layers of the enamel after therapeutic and preventive measures and conducting a comparative assessment of the effectiveness of individual preventive measures in the permanent dentition. A preliminary examination of patients and the search for ways to implement the intended goals and objectives of the study revealed the need for a new integrated system for the detection, management and follow-up treatment of caries-susceptible individuals. The solution to this problem, in our opinion, is introducing into modern dentistry a targeted modified method of clinical examination of caries-susceptible patients consisting of 3 stages: stage 1 - clinical selection - detection of caries-susceptible patients for their succeeding registration; stage 2 - clinical registration - registration of caries-susceptible patients for succeeding observation; stage 3 - clinical observation - conducting individual therapeutic and preventive measures and dynamic monitoring of their effectiveness. Detection of a caries-susceptible cohort at the stage of clinical selection supported results of previous studies and literature data on the significant prevalence of caries. Of 2673 patients, 11.1% (297 people) needed primary caries prevention, 88.9% (2376 people) needed secondary caries prevention. Thus, in all examined patients, there was a need for measures to prevent caries.

It should be noted that 2054 people (76.8%) refused to be involved in the caries prevention program for various reasons, and only 619 patients (23.2%) felt like participating in the proposed program. Moreover, of these 619 patients, 419 people (67.7%), i.e. 2/3 of the total, gave their consent to conduct preventive measures only after a conversation

with a specialist at the Center for Individual Caries Prevention. This fact evidencing urgency of health education interventions that can be effective only when purposefully introduced into the work of specialized structures and carried out by a specially trained, highly professional employee who deals directly with the problem of caries prevention. Thus, the effectiveness of the first stage of medical examination of caries-susceptible patients, equal to the percentage of the number of patients selected during the examination (619 people) to the total number of those examined (2673 patients), was 23.2%. However, the coverage caries-susceptible patients identified during the clinical registration stage (the ratio of caries-susceptible patients detected during clinical registration (300 patients) to the total number of patients with identified cariogenic factors (619 patients)) was 48.5%.

It is noteworthy that of the identified caries-susceptible patients, we were not able to include in the study 307 people (11.5%) who had serious somatic diseases and were administered constant maintenance drug therapy. The general status of these patients being a limitation for participation in this study, is not a contraindication for the participation in an individual caries prevention program in specialized dental institutions. Five patients (0.8%) changed their place of residence, 4 (0.06%) refused medical examination for family reasons, 3 (0.05%) did not attend a specialized examination appointment at the clinical registration stage.

The patients selected and sent for clinical registration were as follows:

- patients with medium, high and very high intensity of caries;
- patients identified during their appointment for periodontal pathology (edema, hyperemia of the gingival mucosa, its bleeding during probing);
- patients with visually determined poor oral hygiene;
- patients who do not have clinical indications, but were eager to participate in an individual caries prevention program.

Then the selected patients were admitted to the second stage of medical examination - clinical registration. During the clinical registration, a comprehensive examination of the patient was carried out using diagnostic

methods for predicting caries and identifying cariogenic factors previously determined by the a priori ranking method.

The results of the targeted examination of patients allowed concluding about the effectiveness of clinical registration and determining the diagnostic error of clinical selection. At the 3rd stage of medical examination - clinical observation - patients were prescribed, in accordance with the indications, active or passive caries prevention interventions aimed at eliminating general and local cariogenic factors, control examinations. When an organ pathology was detected (according to the medical history and / or examination), especially that of the digestive system, the patients were referred to specialists of the relevant profile, a proper diet was prescribed; when dental diseases were detected, patients were referred for individual consultations to health professionals in related specialties (orthodontists, surgeons, orthopedists). Patients with decompensated form of caries ($KPU \geq 10$) were individually prescribed calcium-rich foods, bottled drinking water (with mineralization no more than 0.2 g/l, HCO_3 mg/l, Ca^{2+} mg/l, Mg^{2+} mg/l, K + mg/l, fluorides no less than 0.2 mg/l and no more than 1.0 mg/l, hardness of water no more than 2.0 mg-equ/L). With the improper pH value of the oral fluid, the acid-base balance of the oral cavity was individually corrected using hygiene products with different pH values.

Individual preventive measures compliance was monitored during the control check-ups, if necessary, the prescriptions were corrected. As reported, the developed program of individual caries prevention through clinical examination of caries-susceptible patients helped achieve high efficient clinical outcomes. Individual preventive measures resulted in changes in the increased or decreased pH value of the oral fluid to a neutral level ($6.9 \leq pH \leq 7.1$), cariogenic activity of the plaque decreased by 59%, and the level of oral hygienic status improved by 1.4 times, the fact allowing reducing activity of the cariogenic process by 0.22, according to the increase in KPU. According to the KOSRE-test, an individual caries prevention program caused an 8.2-time increase in tooth caries resistance.

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ПРОФИЛАКТИКА КАРИЕСА И ЕГО ОСЛОЖНЕНИЙ У НАСЕЛЕНИЯ ОСОБОЙ ЭКОНОМИЧЕСКОЙ ЗОНЫ: ЭФФЕКТИВНОСТЬ УПРАВЛЕНИЯ И ПРАКТИЧЕСКИЕ ДЕЙСТВИЯ

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***Аннотация.** Статья посвящена проблеме профилактики кариеса у взрослого населения. Подчеркивается, что индивидуальная профилактика стоматологических заболеваний способствует оздоровлению населения страны, она проводится через осознание роли и значимости гигиенических процедур и нацелена на устранение причин и условий возникновения и развития заболеваний, а также повышение устойчивости организма к воздействию неблагоприятных факторов окружающей среды. Авторы провели исследование, в котором, помимо проведения профилактических мероприятий, учитывались общие заболевания, непосредственно влияющие на уровень кислотности ротовой жидкости, а также условия зоны проживания пациентов. В процессе работы был сформирован комплекс методов, регистрирующих основные кариесогенные факторы и прогнозирующих возникновение кариозного процесса. Проведенное клиническое обследование позволило проследить закономерности, происходящие в поверхностных слоях эмали после проведения лечебно-профилактических мероприятий и провести сравнительную оценку эффективности индивидуальных мер профилактики в постоянном прикусе.*

***Ключевые слова:** кариес, профилактика, распространенность, лечение.*