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MEDICAL-GEOGRAPHICAL CHARACTERISTIC OF THE NORTH AND MODERN ASPECTS OF IMPROVEMENT OF THE DENTAL HELP

ABSTRACT

Severe accommodation conditions of the population have a negative influence on the functional condition of all organism, including organs and tissues of the oral cavity in the North. The diseases of organs of the respiratory system in the form of chronic tonsillitis, quinsy, bronchitis, etc. are most often met in the structure of somatic diseases. At the same time the chronic obstructive pulmonary disease is characterized by the system symptoms including cardiovascular pathology, osteoporosis, metabolic disorders and endothelial dysfunction. But, at the same time, patients of the Yakut nationality have been observed heavier symptoms of the combined course of chronic bronchitis, chronic obstructive pulmonary disease and metabolic syndrome in comparison with the group without metabolic syndrome.

In the conditions of the North lipid exchange becomes more active when the power exchange changes from "carbohydrate" to "fatty" type which can lead to the cholesterol reservation in vessels intima with the subsequent development of atherosclerosis that in turn can lead to the development of pathological processes of parodontium tissues of exchange and dystrophic character and define need for the dental help. Thus people of the senior age group show the high level of prevalence of pathological processes of maxillodental system and respectively high level of need for the specialized dental help.

One of the links of improvement of the dental help to the population is the school dentistry. school dentistry in the country during the last period has been developing but not with the necessary rates. In this regard, the school age is the most optimum period of preventive methods from physiological and pathogenic points of view.

Dental personnel supply influences on the rational organization of the treatment-and-prophylactic help to the population. Nowadays in rural areas there is great insufficiency of medical staff. Such situation exerts negative impact on the organization of medical and preventive actions among the population. So, the improvement of the dental help to the population requires systematic strengthening of material and technical resources and personnel supply of treatment-and-prophylactic institution in the region.

In general, it is necessary to develop and introduce the scientifically based recommendations considering specific regional features for optimization of health care to inhabitants of the North

Keywords: northern territories, climatic conditions, sanitary culture, somatic diseases, medical care.

Severe accommodation conditions of the population have a negative influence on the functional condition of all organism, including organs and tissues of the oral cavity in the North [4, 42]. In these conditions the organism functions on its physiological opportunities limit, at almost full mobilization of functional reserves [35]. In this regard, studying of adaptation and disadaptation problems of the organism in the conditions of high latitudes is an actual medical-social task.

The Republic of Sakha (Yakutia) is the largest subject of the Russian Federation. The region occupies the territory with a total area of 3104 thousand square kilometers and has a difficult and diverse relief – from ridge mountains to the boggy tundra lowlands which are poorly raised above the sea level [50]. The mountain landscape occupies two thirds, lowlands – one third of the territory [44]. Almost all territory of the republic except for extreme southwest areas, is in the zone of continuous permafrost which power can reach 300-1500 meters. A half of the territory of the republic is located behind the Polar circle. Yakutia is the only region in the world with sharply continental climate.

The Republic of Sakha (Yakutia) has no analogs on absolute value of the minimum temperature and its total duration in a year in the northern hemisphere where amplitude of fluctuations of air temperature exceeds 100 °C [1, 14].

The high duration of light day "a light excess" during the summer period, long winter polar night "light starvation", existence of the long periods of the increased atmospheric pressure with critically reduced partial pressure of oxygen should be noted among climatic features of the North [50].

It should be noted that the balanced diet is important in severe climatic conditions of the North [24]. It is known that consumption of proteins and fats much more important for normal functioning of organism and health maintenance in inhabitants of high latitudes than in inhabitants with temperate climate [43, 56]. At the same time lipid exchange becomes more active when the power exchange switches with "carbohydrate" to "fatty" type [51, 69] which can lead to cholesterol deposit in vessels intima of with the subsequent development of atherosclerosis [21, 68] that in turn can lead to the development of pathological processes of parodontium tissues of exchange and dystrophic character.

According to the conducted researches inhabitants of the North showed increase of frequency of diseases of the digestive tract with the age where their comorbide course with arterial hypertension, respiratory and urinogenital systems are defined. At the same time, united pathogenic mechanisms of development of the diseases making this combination demands carrying out a number of researches [5]. Meanwhile, in the conditions of high latitudes there is a problem the gastrointestinal disorders in population. So, the high frequency of symptoms of gastrointestinal reflux and syndrome of the irritable bowel in women and indigenous people was defined [31]. At the people living in conditions of high latitudes changes of glucose-insulin indicators at the verified coronary atherosclerosis were noted. At the same time increase of S-peptide level, insulin and HOMA-IR index in comparison with persons without coronary heart diseases where coronary atherosclerosis closely correlates with the increased level of glucose, insulin were revealed. These facts correspond the starting moments of development of atherosclerosis which are connected with hyperinsulinemia and an insulin resistance [65, 74]. At the same time climatic, physiographic and ethnic factors exert impact on expressiveness of coronary arteries calcinosis in the conditions of the North. So, there are more patients with ischemic heart disease in combination with arterial hypertension among indigenous males and females than non-indigenous people [3].

Severe climatic conditions cause the development of diseases of respiratory organs. At the same time the chronic obstructive pulmonary disease is characterized by systemic manifestations including cardiovascular pathology, osteoporosis, metabolic disorders and endothelial dysfunction [76]. So, the combined course of chronic bronchitis, chronic obstructive pulmonary disease and metabolic syndrome in people of the Yakut nationality has observed heavier clinical course in comparison with the group without metabolic syndrome [6]. Meanwhile the frequency of metabolic syndrome among indigenous people 1.5-2.0 times is less, than among non-indigenous, males less than females [18]. The high level of frequency of such social important disease as tuberculosis where the males of working-age who are often suffering from nicotine and alcoholic addiction are ill more often in the North. They have multiple medical resistance of tuberculosis mycobacteria to antituberculosis preparations [12]. Among children and teenagers the complicated course of primary tuberculosis in the form of bronchopulmonary affection and generalization of process with the affection of other organs and systems is met more often [57].

In the conditions of cold impact on the human body there is a generation stimulation of the active forms of oxygen exerting impact on processes of lipids peroxidation which are necessary for power providing in the conditions of the increased heat production [13]. It has been experimentally proved that long cold influences on the reliable increase of diethenoid conjugates and accumulation of lipids hydroperoxides, and also content of malonic dialdehyde in blood. In this regard the preparation "Cytoflavin" is recommended for cold stress for regulation of adaptation reactions of organism [13].

It is important to emphasize that recently there were data of features of adaptation of children in severe climatic conditions [53]. So, values of hormones levels of hypophysis, thyroid gland, sex hormones ethnic features among

Sakha children and minorities of the North of Yakutia living in identical climate-geographical conditions haven't been revealed [7].

Optimum adaptation of organism to environment conditions mostly depends on the condition of immune system when the population has the width dependence of immunological indicators. At the same time, the high frequency of cases of the increased synthesis of immunoglobulins connected with a heavy immunity work in the native population was established [16, 75]. The light regime connected with desynchronization of internal clocks of organism is the leading factor influences on the development of these changes where melatonin hormone which synthesis is directly connected with polar day and night plays immunomodulatory role [66, 67, 71].

North living conditions influences on oral cavity homeostasis which are connected with long and severe winter, short cold summer, low humidity, cyclic processes disorders in organism, sharp differences of atmospheric pressure, photofrequency disruption, close permafrost layer, etc. [4, 39, 49].

The inhabitants of high latitudes adaptable mechanisms of organism cause the specific types of metabolism connected with changes of homeostasis of electrolytes, proteins and lipids [29]. So, ultra-violet insufficiency promotes disorder of mineral exchange which makes impact on structural uniformity of solid tissues of teeth, expressed multiple defeat by teeth caries [9, 15, 49]. In this regard 6-7-year-old children are defeated by caries at once after eruption of the first molars [50, 70]. Such situation causes an adverse clinical situation on dental diseases of the population of the North [4, 33].

Nowadays the conducted researches have established that macro - and microelement structure of food and water exert important impact on resistance of solid tissues of teeth [9, 30, 36, 73]. The inhabitants of the North have specific food connected with protein-lipid type which is consumed much more, than residents of the Central Siberia and European part of Russia [24, 38]. But, at the same time, the inhabitants of the North have more hypervitaminosis when the level of vitamins B in organism is followed by seasonal dynamic fluctuations, the acute shortage of vitamin C, group B, E, A and D, and also the low level of mineralization of the main sources of drinking water which have certain values in caries pathogenesis [50, 60].

Conditions of accommodation of the population exert negative influence on the increase of indicators of prevalence and intensity of dental diseases among inhabitants in the north [27]. Besides, specific regional risk factor are settlements remoteness from each other, difficult transport scheme, organization of medical care, including prevention of dental diseases [49, 63, 78].

The researches demonstrate that severe climatic conditions influence on biophysical properties of oral liquid [4, 9, 50]. So, the inhabitants have the increased level of saliva mucoviscosity with the reduction in its rate of secretion and remineralizing potential, with the prevalence of 2 and 3 types of microcrystallization, and also decrease of the activity of alkaline phosphatase with decreased concentration of calcium, phosphorus, etc. which form the main local risk factors of the development of dental diseases [4, 27].

It should be noted that functional activity disorder of salivary glands creates negative background to permeability violation of enamel and promotes dental plaque. At the same time abundance of microorganisms in a plaque, especially str. mutans exert impact on the level of prevalence and intensity of pathological processes of solid tissues of teeth of demineralizing character, and also tissues of parodontium of inflammatory and destructive character [45]. Besides, the low level of sanitary culture in population which also creates prerequisites of development of the main stomatological diseases [16].

It is necessary to emphasize that social and economic changes happening during the present period definitely can affect the disease level of the population, especially among socially unprotected layers (disabled people, pensioners, children, teenagers, students, etc.) [4, 62]. Besides, such situation extremely complicates financing and activity of the special comprehensive programs directed to preservation and promotion of health of the population [32].

The inhabitants of the North showed the expressed hypervitaminosis, despite the range expansion of the food range of social and economic system of society, preserved foods and easy carbohydrate food are prevailed among

natives. At the same time insufficient ultra-violet radiation promotes the development of vitamin D insufficiency that leads to mineral exchange disorder in organs and tissues of oral cavity which somewhat can influence the frequency of caries of teeth [60].

Some authors claim that the level of dental diseases directly depends on duration of the period of accommodation of the biological individual in severe climatic conditions of the North [4]. In their opinion, there is a progressing course of pathological processes of organs and tissues of oral cavity with the age.

In the conditions of the Republic of Sakha (Yakutia) year-round water supply is absent in rural settlements where the ice is prepared for drink in winter which is characterized by extremely low content of fluoride and level of mineralization [39]. This situation can be considered as environmental risk factor of pathological processes of solid tissues of teeth of demineralizing character which often leads to complications of caries [49,50]. Besides insufficient staff and material and technical resources of the treatment-and-prophylactic establishments in rural settlements greatly influences on it [19]. This situation creates certain difficulties in availability of health care to the population that on the other hand defines lack of any complex preventive actions [4].

It should be noted that adaptable mechanisms of the human body in the conditions of the North is widely studied where existence of some of their features was revealed. So, physical development of children of the Yakut nationality from 0 to 7 years is estimated as average, "growth jump" in boys is observed at 3 years and 7 years old, in girls – at 4 and 7 years old where disharmonious development was defined among 1/3 of them [54]. At that time, physical development of children of similar age group of the European North corresponds to the general anatomical-physiological regularities of biological development of children's organism [25]. At the same time children of 6-7 years old are prevailed of caries of second teeth, it reaches high levels with affection of parodontium tissues with 1 sextant intensity [52].

At the present stage of the development of society one of the most important national objectives is further improvement of health care and prevention of dental diseases [26]. Despite broad studying of these problems, it remains to be unsolved. In this regard clinical stomatology searches for effective methods and warning facilities of the development of pathological processes of organs and tissues of oral cavity among the population [20, 72].

It is necessary to emphasize that in connection with the developed social and economic situation occurring for the last period I have considerably changed approach to planning and the organization of the dental help to the population [4, 64]. Extremely limited information devoted to questions of improvement of the organization of the dental help to the population in new conditions is provided in available literature [61]. In the international context prevention of diseases is considered to be the central element of health care improvement [41]. Modern prevention includes system of the state, social, hygienic, medical and personal measures aimed at providing high level of health and the prevention of diseases [37]. At the same time medical-social aspects in research of dental diseases of the population, its dependence from environment, material household, labor living conditions of the person and other factors are of great importance for strengthening of health of the population [10].

The researches have established that the low level of sanitary culture was defined among various age groups of the population [9, 23, 50]. At the same time the direct interrelation of unsatisfactory condition of dental health with rare visit to the dentist was noted [77]. This situation was confirmed by V. N. Sorokin (2006) and V. N. Grinin's data with others (2008) where the share of the population not asking for the dental help made 56% and more that made it impossible carrying out secondary prevention. The above causes emerge negative risk factors which exert impact on diseases indicators. On this background the most effective preventive action is rational hygiene of oral cavity with motivation of the patient about its efficiency in the prevention of various pathological processes of organs and tissues of the oral cavity [22, 55].

One of the improvements of the dental help to the population is the school stomatology where complex prevention and treatment is possible within 9-11 years at the group level [58]. During the last period development of

school stomatology in the country, but without necessary rates was noted. In this regard, the school age is the most optimum period of carrying out preventive actions from physiological and pathogenic points of view [22, 28].

It should be noted that medical staff exerts supply impacts on the organization of the treatment-and-prophylactic help to the population. So, according to L.F. Timofeev and et al., 2012 in the Republic of Sakha (Yakutia) completeness of dentists of industrial regions (Anabar, Oymyakon, Tompon and Nyurba) averages 55%. At the same time the indicator of hospital beds supply is in limits of digital values of 115 beds on 10000 population. Such situation exerts negative impact on the organization of medical and preventive actions among the population. In this regard improvement of the dental help to the population requires systematic strengthening of material and technical resources and personnel capacity of treatment-and-prophylactic institution in the region.

Accommodation conditions of the population in the North influences on the dental help need. So, according to A.S. Sadulayeva and et al., 2011, patients of senior age group have the high level of prevalence of pathological processes of maxillofacial system and respectively high level of need for the specialized stomatologic help was defined. At the same time it is necessary to develop and introduce the scientifically based recommendations considering specific regional features for optimization of health care.

It is known that caries complications and parodontium illnesses are the main reasons for loss of teeth. At the same time extended defects in the oral cavity cause considerable inconveniences in patients and constantly feel psychological and communicative discomfort [8]. Restoration of tooth defects in patients with orthopedic designs considerably improves quality of life in the next and remote terms [17].

Last researches in the Republic of Sakha (Yakutia) have revealed a high level of caries and parodontium diseases [50, 59]. This situation dictates further researches to reveal and neutralize specific regional biological and environment risk factors of the development of maxilo-mandibular diseases that allows making positive influence on the improvement of dental help to the population.

At the present stage the prevention gains the leading value in health care. It is necessary to improve the prevention of pathological processes of organs and tissues of the oral cavity in the North. Especially this aspect approaches those preventive events which are held with application of fluorinated preparations where it is necessary to regulate together with municipal, regional local governments and their application since preschool and school age [48, 50]. So, according to N. A. Alekseeva (2010), the primary prevention in the conditions of the North with the use of fluoride sodium has allowed decrease in reduction of teeth caries by 43% which is characterized as the priority direction of the prevention of pathological processes of solid tissues of teeth of demineralizing character. But, at the same time, T.E. Yavorskaya (2013) carried out prevention of teeth caries among children of school age with the use of suspension, 2 and 3% of Epsorin solution on the basis of reindeer horns. The suspension was applied in the form of applications within 20 minutes, and solutions in the form of rinsings which have given caries reductions in 51,42, 47,14 and 50,01 respectively that characterized its expressed clinical efficiency in the conditions of deficiency of fluorine in the main sources of drinking water.

It is known that the structure and properties of solid tissues of teeth depending on biogeochemical conditions of accommodation undergoes considerable changes [36]. So, in the Republic of Sakha (Yakutia) year-round water supply is absent in rural settlements when river and lake ice is taken for drinking water in winter which have only fluorides, and extremely low level of mineralization. Such situation definitely creates prerequisites to the development of deficit states and change of mineral exchange in organs and tissues of the oral cavity [4, 50].

Today the main dental help is given in the North by the public treatment-and-prophylactic institutions. At the same time according to A.S. Opravina and others (2015) the main problem of patients is obtaining free dental coupons where chances not to be satisfied by free medical aid are 6,8 times higher in comparison with the commercial clinic. Taking it into account, a network of private clinics should be developed for improvement of the dental help in the North along with the state policlinics.

CONCLUSION

Thus, many local and general factors exert impact on incidence and improvement of the dental help to the population. It, in turn, dictates need of carrying out the researches directed to improvement of quality of the provided medical care taking into account specific regional factors.

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