

PRACA POGLĄDOWA
REVIEW ARTICLE

MODERN APPROACHES TO PREVENTION OF PERIODONTAL DISEASES IN PREGNANCY: A REVIEW

NOWOCZESNE STRATEGIE ZAPOBIEGANIA CHOROBYM PRZYZEBIA W CIAŻY: PRZEGLĄD LITERATURY

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ABSTRACT

Introduction: In the modern literature, a variety of treatment regimens for periodontal diseases in pregnant women have been suggested and recommended for use in practical public health. And yet the concept of "dental diseases prevention in pregnancy" does not fully reflect the essence of the necessary measures to maintain the dental health of women during this period.

The aim: The aim of the present paper is to study the scientific literature on the issue of preventing periodontal diseases in pregnancy.

Materials and methods: The subject under discussion was considered on the basis of 59 sources on this issue, using the method of content analysis, comparative and contrastive, analytical and biblio-semantic methods.

Review and conclusions: The analysis of scientific literature justifies the need for an integrated approach to treatment and prophylactic measures during the entire pregnancy period. Furthermore, the review of literature sources allows us to advocate the need to improve the existing approaches and to develop new individual programs for primary and secondary prevention of periodontal diseases in pregnant women, taking into account pathogenesis and the peculiarity of their course. Diagnosis of dental status in pregnant women with assessment of early and long-term clinical observations provides a prognostic model of the course and outcome of dental diseases. Meanwhile, the introduction of the follow-up observation for the maternity leave group enhances the dental health of pregnant women and prevents multiple pathological conditions of the unborn child.

KEY WORDS: pregnant women, periodontal diseases, prevention, treatment.

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INTRODUCTION

Currently, dental diseases in pregnancy form a separate link in cariology and periodontology [1]. Hence, in the modern literature, a variety of treatment regimens for periodontal diseases in pregnant women have been suggested and recommended for use in practical public health. And yet the concept of "dental diseases prevention in pregnancy" does not fully reflect the essence of the necessary measures to maintain the dental health of women at a high level due to the features of clinical presentation and the influence of general status of the body during this period.

When analyzing the scientific literature data, it should be noted that modern dentistry possesses a potent arsenal of various methods and means for the prevention and treatment of periodontal disease in pregnant women. The variety of therapeutic and prophylactic measures is conditioned by diverse and unequal approaches of the researchers to the analysis of causes, mechanisms of origin and development of gingivitis in pregnant women [2, 3, 4].

THE AIM

The research is to study the scientific literature on the issue of preventing periodontal diseases in pregnancy.

It is known that a woman's pregnancy is an important period in the formation of the child's dental health and preservation of a woman's health. Therefore, the problem of prevention and treatment of periodontal tissue and dental caries in this category of patients remains relevant, despite the numerous findings of domestic and foreign scientists, devoted to the prevention of dental diseases in pregnant women [1, 2, 5, 6].

MATERIALS AND METHODS

The subject under discussion was considered on the basis of 59 sources on this issue, using the method of content analysis, comparative and contrastive, analytical and biblio-semantic methods.

Measures for the prevention of dental diseases during pregnancy should be conducted from the time of the first visit to the maternity welfare center and pregnancy registration; although the optimal time to start their implementation is a period of 3-6 months of pregnancy planning. At present, the scientific literature suggests a new view upon this issue: prevention should be carried out not only during pregnancy and after the child's birth,

but also during the period of pregnancy planning – progenesis, or the preparatory stage for pregnancy [7, 8]. Numerous scientific studies, justifying the preventive and therapeutic schemes, recommend taking into account the activity of the carious process [1, 2, 3, 5, 6, 10, 18, 23, 24, 27], the condition of periodontal tissues, general and local risk factors for the development of dental diseases, the state of oral hygiene [9, 10], the somatic pathology and diversity of nutrition in pregnant women [2, 5].

RESULTS AND DISCUSSION

In Ukraine, it is considered relevant and necessary to achieve the maximum effect in the prevention of dental diseases through the implementation of women's medical examination during pregnancy and coordinated work of gynecologist, psychologist, geneticist and dentist, to whom the woman should be referred after the first visit to the maternity welfare center [11]. At the dentist's office, it is necessary to organize the individual oral hygiene training for pregnant women, help them in selecting basic and accessory items and hygiene products, sanitation of the oral cavity, and professional hygiene. It is considered that the emphasis on prevention in pregnant women should be exerted by the integrated efforts of obstetricians, gynecologists, pediatricians, parents and with the support of healthcare facilities [12, 13]. Thus, domestic studies have introduced a scheme for dental prophylactic medical examination of pregnant women, which includes preventive measures during pregnancy and after the infants' birth until they reach the age of two years [13]. This scheme contains individually selected programs for the prevention of dental diseases in accordance with the trimesters of pregnancy. The prophylactic regimens use products manufactured by R.O.C.S. enterprise.

It is known that the purpose of preventive measures is the improvement of the woman's health, enhancing her dental status and carrying out antenatal prevention of caries in milk and permanent teeth, the anlage of which occurs during pregnancy [14]. Therefore, it has been proven that under modern conditions, the optimal way to organize dental care is to conduct prophylactic medical examination of pregnant women [13].

Pregnancy is a complex physiological process, during which the periodontal tissues undergo pronounced changes. A number of major causes that affect the periodontal tissues of pregnant women have been revealed: they include the change in the concentration of hormones, actively produced for optimal fetal development; the increase of oral flora pathogenicity; the change in calcium phosphorus homeostasis, which leads to decreased resistance of periodontal tissues in a pregnant woman [15, 16, 17].

It is important to note that in deterioration of the general condition of the body during pregnancy, reduced quality of individual oral hygiene or complete disregard of this set of actions is quite possible [2, 3, 5, 10].

The latter affects not only the course of pregnancy, but also the frequency and nature of dental pathology in this period.

From the scientific literature it is known that dental status of pregnant women is characterized by high prevalence of caries and periodontitis (more than 90%), the severity of which depends on the severity of extragenital pathology [18], and pregnancy in its turn aggravates the course of inflammatory and dystrophic processes in the periodontium. As a result, oral cavity sanitation is required in 92.06% [19].

Most researchers advocate the opinion about high preventive efficiency of rational individual oral hygiene in combination with professional hygiene during the gestation period and fostering motivation to implement the recommendations of specialists [12, 14, 20].

To date, there are numerous items and means for personal oral hygiene; general schemes of treatment and prevention for inflammatory gum diseases have been developed.

Therapeutic and prophylactic regimens, used to improve the oral condition of pregnant women are known [2, 5, 6, 21, 22] to be aimed at reducing plaque formation, inhibition of oral microflora, increase of hard dental tissues resistance [23]. However, taking into account the specificity of the group on maternity leave, the choice of effective therapeutic and prophylactic schemes remains a rather difficult task. Meanwhile, the development of effective methods for prevention and treatment of local gingivitis in women during pregnancy is relevant and at the same time remains insufficiently effective.

It is known that pregnancy is a physiological process that requires the body to reorganize many types of metabolism and subsequently leads to changes in the body's environment, in particular blood and saliva [15, 21, 24].

According to the scientific literature, the greatest manifestation of inflammatory phenomena in the periodontal tissues is observed in the second trimester of pregnancy, whereas the critical growth of cariogenic situation in the oral cavity occurs in the third trimester, which allows us to determine the optimal periods of dental examinations and develop a differential approach to preventive measures [1, 2, 25, 26]. Yu.G. Chumakova [27] further suggests the use of measures aimed at normalizing the function of the salivary glands and maintaining homeostasis of the oral cavity, correction of mineral metabolism and local remineralizing therapy.

In order to prevent dental caries and periodontal diseases, it is recommended to prescribe, as topical agents, solutions of sodium fluoride, calcium gluconate or glycerophosphate, Remodent, combining them with the action of helium-neon laser, the use of antihypoxant and mexidol antioxidant in toothpastes (Mexidol dent) [23], coating varnishes, gels, sealants for teeth, hemostimulants [8]. It is also considered expedient to use non-medicinal products – auto- and hydromassage, chewing dense food.

Yu.G. Romanova [21] developed a course for prevention of diseases of hard dental tissues and periodontium during pregnancy with the use of toothpaste and dental elixir "Fitodent" topically and the use of purple echinacea extract per os.

For secondary pathogenetic prevention of dental diseases in pregnant women, the effectiveness of oral intake of calcium [26], fluoride, mono- and multivitamins, extracts

of eleutherococcus, echinacea, biologically active additives "Bioca lutevit" and sea kale has been proven [5, 24]. O.V. Kravchenko [25] recommends the introduction of a set of preventive measures, including individual oral hygiene with coating of hard dental tissues with fluorine-containing varnish, prescription of "Calcium-D3 Nycomed" preparation during pregnancy to prevent major dental diseases, improve the functional properties of the fetoplacental system, prevent fetal hypotrophy and promote the correct development of the dentoalveolar system. The use of "Calcium-D3 Nycomed" chewing tablets leads to saturation of oral fluid with basic mineral components and contributes to the decrease of dental enamel permeability in women.

N. Gadzhula [5] showed the effectiveness of individual approach to the prevention of dental caries in women in gestational and lactational periods using local and systemic ("Biocalcovite") influencing factors.

At the same time, the mechanisms of the formation and development of the carious process, as well as the pathology of periodontal tissues have individual characteristics with respect to the reactivity and resistance of each individual, and in particular pregnant women [28, 29].

The result of scientific and practical research is the development of primary and secondary prevention regimens [2, 3, 5, 11, 21, 22, 23, 26, 27, 30, 31] of dental pathologies during pregnancy, based on modern diagnostic methods.

It is highly important to be aware of the correct information approaches to clinical and additional examination of women during pregnancy, which will allow us to substantiate the high-quality, individualized, etiological, pathogenetic treatment and prevention of periodontal diseases.

Borisenko A.V. et al. advocate the identification of correlation relationships between clinical and laboratory (cytological) indicators: new gradations of semiquantitative and qualitative cytological indices from the sites of oral mucosa and periodontium have been discovered, which allows improving diagnosis, predicting the course of mucous diseases of the oral cavity and periodontium, development of adequate and modern therapeutic measures in pregnant women [32]. Virtually every pregnant woman in the third trimester develops latent iron deficiency, against the background of which IDA develops in 30-40% [33, 34]. According to the literary data [Budanov], changes in the hemogram and the parameters of iron metabolism increase respectively to the degree of iron deficiency. It was found that the serum erythropoietin values were significantly different in the same degree of anemia, which depends on the absolute parameters of hemoglobin and hematocrit. That is why the study of adequacy in serum erythropoietin production, reduction in red blood cell count, saturation ratio of iron transferrin, increase in the total iron binding capacity of blood serum – pathogenetic mechanisms of the onset of anemia – is reasonable and justified. The above data occupy a significant place in the planning of therapeutic and prophylactic measures for women during pregnancy.

L.N. Denisenko [35] recommends to identify pregnant women with iron deficiency anemia as a risk group for dental

pathology with an increase in the number of examinations every two months to prevent dental changes and development of complications. The author suggests compulsory prophylactic medical examinations in the postpartum period. Meanwhile, in the group of increased risk for development of dental diseases, it is necessary to pay closer attention to primigravida women aged 18-20 with IDA and to increase the number of examinations and sanitation for these patients (monthly).

Interesting are the data provided by Skryabin V.V. [36], in which the evaluation of the LII index in pregnant women as an integrative indicator of "white blood" is more informative than the standard blood test. Thus, the increase in the digital values of LII and the tendency to increase in the percentage of lymphocytes during the first trimester is prognostically unfavorable for the development of any complications of pregnancy – inflammatory reactions and increase in endogenous intoxication.

At present, the scientific literature provides the data that the development of inflammatory periodontal diseases in pregnant women is determined by the action of many factors acting at the systemic level and arising during pregnancy, in particular, determination of the immune and hormonal status, bone metabolism [37]. The authors [38] conducted studies on the clinical and immunological features of periodontal status and cytokine profile in the oral cavity of pregnant women, which showed an increase in frequency and severity of the pathology in both hard and periodontal tissues, oral mucosa in pathological pregnancy.

Thus, Dubrovskaya M.V. et al. (2013) have established the effect of exogenous and endogenous factors acting locally and systemically: deterioration of oral hygiene, smoking, extragenital pathology, immunosuppression and local cytokine imbalance, which is closely related to gestosis [37]. In order to enhance the diagnostics and prognosis for the development of inflammatory diseases in pregnant women, the authors recommend using the analysis of cellular immunity indices (CD 3 -, CD 4 -, CD 8 -, CD 16 -, CD 22 - lymphocytes) and the content of the tumor necrosis factor- α , interleukin 4, less pronounced interleukin-8, transforming growth factor- β 1 in the oral fluid. Furthermore, disorders of immune homeostasis in pregnancy complicated by gestosis (significantly more pronounced) have been established, which contributes to the development of gingivitis and periodontitis. Imbalance of cytokines in the oral fluid can be used as a diagnostic and prognostic marker of the onset of periodontal diseases and even the severity of their course [38]. The latter should be taken into account when planning individual preventive measures for the period of pregnancy.

At the same time, the researchers' attention is attracted by a new molecular biological method – polymerase chain reaction (PCR), imitating the normal replication of nucleic acids using universal primers and giving the opportunity to obtain fragments of DNA sequences sufficient for detection. The PCR technique allows to determine microorganisms in sufficiently small amounts when it is not possible to detect them by another method [39]. In addition, the quantitative

and qualitative detection of major parodontopathogens DNA allows to assess the degree of dysbiotic disorders of oral microflora, to prescribe adequate therapy and to evaluate the effectiveness of treatment [40]. In dentistry, modern molecular methods open up new perspectives in solving the problems of etiology and pathogenesis of dental diseases, and, consequently, in addressing prevention and treatment issues.

It is important to observe that Toll-like receptors constitute the most powerful cell modulators. Due to the atraumatic nature of the material sampling for PCR diagnostics, this method is acceptable for women during pregnancy.

Thus, domestic clinical and laboratory studies of buccal epithelium in pregnant women established the presence of allele G, which is reliably associated with the occurrence of inflammation in the tissues of periodontium. Therefore, today it is necessary to take into account the diagnostics of genes polymorphism, namely Asp299Gly of Toll-like receptor (TLR 4), in order to predict the occurrence and development of inflammatory diseases of periodontal tissues, which is important for justification and development of prophylactic and therapeutic measures in pregnant women [41, 42, 43].

It should be noted that pregnancy and childbirth are extremely powerful emotional factors, which significantly affect all psychosomatic components of women. The problem of cause-and-effect relations in the formation and development of periodontal tissue diseases remains important from the point of view of the role of psychosomatic relationships. Thus, according to the scientific literature, the indices of vegetative regulation and the psychoemotional status of pregnant women indicate the sufficient vegetative support of activity and a high level of adaptive and compensatory possibilities of the body [44]. The obtained data are included in the scheme for prophylaxis of periodontal diseases during pregnancy [45].

It is known that the level of health in a pregnant woman largely forms the somatic and dental health of a future child, determines the physiological course of pregnancy, childbirth and the postpartum period, as well as further optimal functioning of the woman's body [11].

It should be noted that the problem of preventing dental diseases in pregnant women have always attracted the attention of dentists. In most European countries, the prevention programs for dental diseases have been implemented, and they have yielded positive results [7, 46, 47, 48, 49].

The American Academy of Periodontology (AAP) offers recommendations as follows: all pregnant women, as well as women planning pregnancy, should undergo periodontal examinations with possible implementation of preventive or therapeutic procedures [50]. To date, the effectiveness of preventive measures has been proven. They are implemented by dentists during the period of pregnancy and in the postpartum period [1, 2, 5, 19, 21, 13, 23].

It is important to remember that during pregnancy and breastfeeding, the need for vitamins and trace elements is increased; the deficiency of them is due to intensification of metabolic processes.

It is necessary to pay attention to the significant amount of data from the scientific literature on the prescription of vitamin and mineral complexes, as well as studies of their interaction in pregnant women [51]. It is known that increased diet does not ensure the satisfaction of requirements of the woman's body during pregnancy. Deficiency of vitamins and microelements during pregnancy adversely affects the health of not only the future mother, but also the vitamin and mineral status of the fetus, which greatly increases the risk of perinatal pathology, the rate of physical, mental and psychic disorders, as well as congenital malformations [52, 53].

Improper nutrition of pregnant women can be reflected as an excessive increase in the body weight of a pregnant woman and fetus, as well as decrease in the body's defense systems. During pregnancy, the intensity of metabolism and elimination of vitamins and microelements undergoes changes [54]. A number of foreign authors indicate the need for significant changes in the diet of pregnant women. At the same time, future mothers should not "eat for two", but the level of micronutrients during this period should be increased by 20-40% [55, 56, 57, 58, 59].

At present, foreign authors discuss the concept of micronutrient programming for the development of the future baby during pregnancy [57]. The expediency of using multivitamin complexes today should be considered through the prism of the body's physiological need, and not as an action of medications [52]. The main task of dentists, obstetricians and gynecologists is to create a conscious understanding of the importance of timely dental care in pregnant women by forming a positive motivation for dental care in mothers-to-be [4].

When carrying out dental preventive and therapeutic measures in pregnant women, it is necessary to take into account that the woman should be in a semilying position. During manipulations, one should monitor the blood pressure, heart rate, whose changes are caused by psychoemotional stress in anticipation of pain and are possible during the visit at the dentist's.

Very important and interesting are the data from the scientific literature in which a comprehensive individualized treatment of pregnant women with inflammatory changes in gingival tissues is substantiated for the first time with the use of topical medications "Tonzinal", "Propol", "TsM-2" plates with calcium, and "Apilaka", Magne B6 for combined action on the body [45].

In the research, the leading indicators of changes in the woman's body during pregnancy are the psychological and hemodynamic characteristics of the pregnant woman, the mineralizing function of the oral fluid, the state of oral hygiene, and the intensity of the carious process. The concept of primary prevention of periodontal diseases in pregnant women has been developed, based on individualized activities and means taking into account the general state of health, gynecological anamnesis, features of nervous regulation, dental status, living conditions, the presence of bad habits, and the level of education of the pregnant woman [60, 61].

CONCLUSIONS

In the present article, the main schemes and modern approaches to the prevention of periodontal diseases in pregnant women have been examined. Analyzing the above, it can be concluded that an individual approach to primary and secondary prevention of changes in the periodontal tissues of pregnant women is obviously seen as the only way for the problem solving. This can be implemented through the detailed study of somatic and dental history, functional systemic changes of the entire body, establishing a set of individual preventive measures and improving therapy of the revealed disturbances in the periodontal tissues.

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Conflict of interest:

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