



## NEUROLOGICAL DISORDERS IN THE POSTNATAL PERIOD AMONG WOMEN IN CONDITIONS OF A PANDEMIC (LITERATURE REVIEW)

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### Abstract

The nervous system takes an active part in the complex mechanism of regulation of the functions of human organs and systems. It, in close interaction with the immune and endocrine systems, ensures the maintenance of homeostasis in a woman's body during pregnancy. Possessing the properties of integrativity and plasticity, the nervous system coordinates adaptation processes, which is a very important factor for the physiological course of the gestational process. Viral organ damage, disrupting the function of the nervous system, leads to a breakdown in adaptation mechanisms and to the emergence of complications of pregnancy, including the most common - hypertensive disorders and preeclampsia. Severe forms of preeclampsia will lead to increased maternal and perinatal mortality.

**Keywords.** nervous system, human organs, COVID-19, pneumonia caused, pregnant women, autonomic nervous.

### Introduction

Each trimester of pregnancy has its own specific norms. However, in the literature available to us, we have not come across data on a comprehensive study of the indicators of the nervous system that characterize each trimester of physiological pregnancy. There are only a few publications that present the results of a study of the bioelectric activity of the brain, the state of the autonomic nervous system, some hemodynamic parameters in pregnant women and women in labor.

The data from studies of cognitive functions in pregnant women at stages corresponding to the trimesters of pregnancy are very scarce. Changes in the nervous system in severe forms of preeclampsia are presented quite fully in the literature. At the same time, the indicators characterizing the state of the nervous system in the third trimester with mild preeclampsia, when the line between "the norm and





pathologies of pregnancy" can be erased, have not been sufficiently studied. Therefore, it is advisable and relevant to study the state of the nervous system in the I, II, III trimesters of physiological pregnancy and in the III trimester of pregnancy, complicated by coronavirus infection with mild and severe degrees.

The current pandemic, complicated by pneumonia caused by COVID-19, is a serious public health problem, especially for vulnerable populations. Pregnant women and newborns represent a high-risk group during outbreaks of infectious diseases complicating respiratory tract pathologies and neurological pathologies. Pharmacotherapy and psychotherapy of anxiety and depressive disorders, insomnia and post-traumatic stress disorder - PTSD, which are associated with COVID-19 in pregnant women and women in childbirth have not been studied.

Most publications on the PDP indicate that its frequency ranges from 10% to 20%, although there are variations in these indicators for different countries. The noted frequency of PRD can reveal differences depending on the questionnaires and scales used for diagnostics. When analyzing the scientific literature on the study of the frequency of occurrence of TRP, it is noted that in developing countries it ranges from 1.7% to 82.1%, with the lowest values in Pakistan, and the highest in Turkey. For developed countries, the frequency of DRP varies from 5.2% to 74.0%, with the lowest values in Germany and the highest percentage in the United States [1]. When used to diagnose VDP with the Edinburgh Postnatal Depression Scale, the incidence of VDP in developed countries ranges from 5.5% to 34.4%, and for developing countries the frequency of VDP is higher.

According to Norhayati et al. (2015), the frequency of PRD depends on the time after the birth of the child, so during the first 4 weeks after birth, the development of PRD ranged from 5.5% to 24.4%, from 4 to 8 weeks - from 2, 6% to 35.0%, up to 6 months - from 2.9% to 25.5% and up to 12 months - from 6.0% to 29.0%. These indicators were obtained in developed countries, while in developing countries, the percentage of DRP was significantly higher: up to 4 weeks - from 12.9% to 50.7%, from 4 to 8 weeks - from 4.9% to 50.9% , up to 6 months - from 8.2% to 38.2% and up to 12 months - from 21.0% to 33.2% [2].

Multiple pregnancies, delivery by caesarean section, maternal unwell after childbirth, and breastfeeding of the baby were factors associated with postpartum depression. After multiple logistic regression, the presence of postpartum depression ( $p = 0.000$ ; OR = 32.77; 95% CI = 7.23-148.58), lack of assistance in caring for the child ( $p = 0.008$ ; OR = 2.64; 95 % CI = 1.29- 5.42), partner violence ( $p = 0.000$ ; OR = 5.2; 95% CI = 2.23-11.91) and the presence of an unsupported partner ( $p = 0.018$ ; OR = 2, 6; 95% CI = 1.17-5.78) were identified as predictors of postpartum depression [4].



There are separate studies devoted to the issue of etiology, such as Krause D. and coauthors (2014). These authors found that in the prenatal and postpartum periods, immunological changes were observed with a significant increase in neopterin and reactive T-lymphocytes. It has been reported that established immunological changes associated with depressive symptoms are observed in mothers with PRD, and these immunological markers can predict the onset of PRD [5-6]. Another study suggests that vitamin D deficiency in mid-pregnancy may be a factor in the development of PDD [7].

Parker G. et al (2015) investigate changes in essential and saturated fatty acids as possible predictors of PDD in women in late pregnancy [8].

A study by Cloud and Brown (2015) identified some significant predictors of PDD such as stressful situations, anxiety and anxiety, especially in the third trimester of pregnancy and 4 to 6 months postpartum, proposed or performed caesarean section, sleep disorders, maternal problems related to the health of the child [11].

When considering socio-demographic risk factors for VDP, particular attention is paid to the age of the mother. On this issue, the opinions of the authors differ. Some authors have argued that the young age of mothers predisposes to depressive symptoms. Other publications claim that older women who give birth for the first time are more likely to develop PDD. For the third authors, the age of the mother does not affect the development of depressive syndrome [4]. The authors are completely unanimous about the lack of social support during pregnancy and the postpartum period as an important risk factor in PDD. Low family income and a low level of education of the mother are also significant risk factors for LDP [12]

Chou F.H., Avant K.C., Kuo S.H. et al. in their studies, it was found that unwanted pregnancies are classified as high risk for VDP among women [16].

Assisted reproductive techniques and delivery by caesarean section, assistance with vaginal delivery and postpartum obstetric complications are also risk factors for the development of PDD [13].

Lawson A. (2015) and Figueiredo B. (2014) with a team of authors studied the factor analysis of the development of PDD, as a result of which they obtained significant risk factors such as: stressful situations, sleep disorders of the mother and the child, illness of the child, anxiety about bodily changes associated with pregnancy, termination of breastfeeding [17]

PRD disrupts not only the health of the mother, but also has a negative impact on her relationship with family members and, in particular, negatively affects the relationship between the mother and the newborn child [19].



A study in Japan of 289 mothers who answered the Eding burgh Postnatal Depression Scale and Mother - to - Infant Bonding Scale during pregnancy and the postpartum period found that depressed mothers are strongly associated with disturbed mother-child relationships. These data give us reason to recommend early intervention for a therapeutic effect on maternal depressive symptoms. In this direction, new research is required, since we still do not have reliable evidence that the therapeutic methods that we have at our disposal will help to normalize the disturbed connection between the mother and the child [15].

The diagnosis of PRD is made on the basis of clinical manifestations and using clinical interviews, questionnaires and diagnostic scales. The most widely used is the Edinburgh Postnatal Depression Scale, which is suitable for both the diagnosis of PDD and the screening of adults to study the mental health of the population and identify depressive episodes [18].

Depending on the topic of research among pregnant women with depressive symptoms, other questionnaires are used - Social Support Appraisal, Scale, Network Orientation Scale, General Health Questionnaire, Marital Inventory Life Events Rating Scale, Parental Expectation Survey, etc. The Structured Clinical Interview and the Diagnostic and Statistical Manual of Mental Disorders can distinguish PRD from major depression [14].

Of course, against the background of internal conflict, pregnancy becomes a powerful stressor factor that leads to depressive disorders, which can be distinguished into several types, different in clinical manifestations and severity of the course. So, for example, Kolesnikov [11], examining pregnant women using the "pregnancy relationship test" (TOB), the depression questionnaire, the Giessen personality questionnaire, and the family adaptation and cohesion scale (FACES-3), found that 8.2 % have depressive and neurotic disorders, limited by the adaptation disorder in the form of prolonged reactions, in the symptomatology of which affective disorders predominate, and the symptoms reflecting violations of the ideational sphere are insignificantly expressed. And he identified, based on the leading emotion, 3 dominant syndromes: depressive, depressive with obsessiveness and anxiety-depressive. And a group of scientists led by G.E. Mazo [20.] studied 1000 pregnant women at a gestation period of 8 to 40 weeks, using the following psychological tools: the Hamilton scale required to assess the severity of symptoms of anxiety and depression; Beck Depression Scale - the severity of depression according to self-esteem; the Spielberger-Khanin scale for designating situational and personal anxiety; Etkind's color relationship test (CTO) to diagnose emotional attitudes towards significant persons and situations; "Test of the relationship of a pregnant





woman" to clarify the version of the psychological component that forms the gestational dominant (PCHD) and the type of pregnancy experience. After processing the obtained material, the authors identified the following disorder syndromes: anxious (20%), anxious-phobic (13.3%), anxious-depressive (10%), anxious-subdepressive (10%), separately highlighting the subsyndromal state (37% ) (because the severity of individual equivalents of anxiety did not fit into the clinic of the identified syndromes).

As can be seen from this conclusion, anxiety disorders in pregnant women are heterogeneous in their structure, and more often the equivalents of anxiety prevail - nonspecific somatic or autonomic symptoms: weakness, feeling of lightheadedness, dizziness, change in appetite, indigestion, sleep disturbance, irritability, muscle tension, etc. d. It is known that affective disorders of the prenatal period increase the risk of postpartum depression, therefore, according to the authors of this work, special attention should be paid to the subsyndromal state of a pregnant woman in terms of prevention, because it cannot be ruled out that it can subsequently degenerate into extensive anxious or depressive disorders.

Thus, PDD is widespread among women in the postpartum period, and psychosocial and obstetric factors play an important role in their development. High-risk pregnant women with postpartum depression need routine screening and targeted intervention for PDD. The analysis of scientific research proves the relevance of this research at the present stage. However, when studying the available sources, we did not find studies on this issue in Uzbekistan. We also studied the effect of COVID-19 infection on the development of PDD in women in the postpartum period.

#### Impact of COVID-19 on pregnancy and the puerperium

An analysis of numerous publications on the novel coronavirus infection (COVID-19) using the PubMed, Scopus and GoogleScholar databases indicates that the membranes, vessels, and parenchyma of the brain may be involved in the pathological process. Cell reactions arising under the influence of a viral agent that has penetrated the blood-brain barrier (BBB) into the central nervous system (CNS), depending on the state of the T- and B-cell immunity of the patient, can be asymptomatic, monosymptomatic, or cause clinical manifestations of meningitis, encephalitis, encephalopathy. The defeat of the cranial, peripheral nerves, skeletal muscles is manifested by mono- and polyneuropathies, muscle fatigue, myalgia, rhabdomyolysis [18.]

According to statistics, the infection has not spared any age group, everyone can become infected with it: from a baby to the elderly. Also, pregnant women should be attributed to the risk group. With a disease of this category, COVID-19 affects the





health of not only the mother, but also the child. Currently, a large number of scientists are studying this issue [22]. Pregnancy is a physiological process in which changes occur in a woman's body that affect the immune system, heart and lungs [15.] This is a contributing factor for the development of respiratory infections and increases the likelihood of their severe course [24].

However, the opinions of scientists on this matter were divided. Some believe that pregnant women suffer the disease more severely, while others, on the contrary, that their COVID-19 proceeds in the same way as for other categories of citizens, or even easier [19].

At the moment, there is no confirmation that pregnant women are more likely than others to experience complications from COVID19, on the contrary, foreign scientists cite statistics, according to which 85% of them have a mild disease [23]. This is due to the age of the patients, less than 40; there is also an assumption that hormonal levels have a beneficial effect on the course of the disease [12].

Most often, infected pregnant women complain of cough, high fever, diarrhea [27]. The asymptomatic course of the disease can be dangerous for a woman by developing pneumonia. Chinese scientists have conducted studies, according to which there is a possibility that COVID19 can cause premature birth and the development of fetal distress syndrome [25].

In the initial phase of infection with COVID-19, the virus can enter the cerebral bloodstream and slow down the movement of blood in microvessels, which may be one of the reasons contributing to the interaction between the COVID-19 spike protein and the ACE2 receptor. expression in capillary endothelium. Consequently, fragments of the virus growing from the capillary endothelium and damaging the endothelial layer can facilitate the penetration of the virus into the central nervous system. Once it enters the neuronal environment, its interaction with the expression of the ACE2 receptor can trigger the viral primordium cycle to which neuronal damage is attached without generating any significant inflammation.

Since physiological changes during pregnancy have a significant impact on the immune system, respiratory system, cardiovascular system and coagulation, they can have a positive or negative effect on the progression of COVID-19 disease.

The impact of SARS-CoV-2 on pregnancy remains to be determined, and a concerted global effort is needed to determine the impact on implantation, fetal growth and development, childbirth and neonatal health.

Asymptomatic infection is another challenge in terms of service delivery, prevention and treatment. Until now, all pregnant women or postpartum women who have undergone coronavirus infection suffer from any neurological or depressive





symptoms; sleep disturbance in 25%, nervousness 17%, headaches and tearfulness 27%, memory impairment 12%, muscle pain in 11%. Given the number of cases worldwide, continued weakness in some patients can have enormous health and economic implications. (20)

Having studied the neurological pathology that arose against the background of a confirmed diagnosis of coronavirus infection, scientists came to the conclusion that the detected encephalitis, accompanied by mental disorders in the form of delirium and other disorders of consciousness, was in this case one of the first symptoms of this formidable disease.

Thus, COVID19 is an infection that affects all segments of the population, including pregnant women. According to the studies, the coronavirus does not aggravate the course of pregnancy, however, such patients should be monitored, there is a possibility of the rapid development of a critical condition [7]. More attention should be paid to pregnant women with chronic diseases, together with the infection, they can negatively affect the health of the mother and child [17].

Also, do not forget that a pandemic is a stress factor for pregnant women, which can adversely affect the condition of both mother and child [13].

Thus, despite the disagreement on the problem of the state of the ANS during pregnancy and its role in the occurrence of pregnancy pathology and abnormalities in labor, almost all authors emphasize the importance of changes in the functional tone of the ANS sections in their development. Inadequate autonomic regulation can become, on the one hand, the cause of impaired gestation, on the other hand, a marker of its disadvantage. Consequently, the characteristics of the ANS using objective methods of research and registration can be used as an objective criterion for the state of pathogenetic adaptation mechanisms of a pregnant woman.

At the same time, it should be recognized that, despite numerous studies in this area, the information on autonomic regulation during pregnancy, accumulated to date, is insufficiently complete and often contradictory. In this regard, the problem of studying the influence of the ANS on the course of pregnancy, childbirth and the postpartum period, as well as the state of the newborn, is still very urgent.

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