Mediterranean Journal of Clinical Psychology

ISSN 2282-1619

MJCP

Volume 9, n 2, 2021

Reports

Management of Postpartum Depression in the Covid Pandemic

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Keywords:
Covid-19; Postpartum depression; Neuropsychic manifestations.

Received: 17 May 2021
Accepted: 31 July 2021
Published: 8 August 2021

Citation: Balanau, O. D., Bacalbaşa, N., Loghin, M., Dimitriu, A. S., Paunica, S., Balalau, C. (2021). Management of Postpartum Depression in the Covid Pandemic. *Mediterranean Journal of Clinical Psychology, 9*(2). https://doi.org/10.13129/2282-1619/mjcp-3071

One of the most common complications after childbirth is postpartum depression.

Suffering caused by current COVID pandemic, besides having had strong repercussions in the field of heterogeneous clinical and psychopathological phenomena (Cao et al., 2020; Dimitriu et al., 2020; Frisone et al., 2020a; Serafini et al., 2020), it seems to have caused an increase in the incidence of postpartum depression, both by direct damage to the central nervous system by the SARS-COV2 virus, but also indirectly by maintaining social distance, lack of effective doctor-patient communication. As well documented by previous published research, psychological dynamics interfering with patients' health status have a considerable role (Barchetta et al., 2021; Durankuş & Aksu, 2020; Gugliandolo et al., 2020; Liang et al., 2020; Marchini et al., 2021; Martino et al., 2021; Pariente et al., 2020; Vicario et al., 2021). Severe onsets of psychopathological manifestations occur both to patients and clinicians,

demonstrating the need to study in depth present and future directions assumed by phenomena (Barello & Graffigna, 2020; Giusti et al., 2020; Martínez-López et al., 2020; Merlo et al., 2020, 2021b).

Postpartum depression negatively affects the mother-child relationship, by decreasing the time spent with it, so there are changes in the physical and mental development of the newborn. These make it necessary to establish a diagnosis as early as possible and to start treatment.

For positive patients at birth, caesarean section does not decrease the rate of transmission of the virus, but increases the biological inflammatory process, with its negative repercussions. Even for positive patients, skin-to-skin contact with the newborn, breastfeeding and room-in service are allowed, although at the beginning of the pandemic all this was contraindicated.

During the COVID pandemic, in addition to biohumoral considerations, histopathological changes in the central nervous system, another important role in postpartum depression has its admission in intensive care units, the severe form of disease, a prolonged hospitalization, fear of cardio/respiratory decompensation during labor and birth.

Acute episodes of depression may subside spontaneously, may remit under drug therapy, but there is an increased risk of recurrence, so the history of psychiatric complications during the postpartum period should be carefully evaluated.

SARS-COV-2 is an RNA virus covered by a viral envelope similar to that of SARS-COV-1 virus.

Spike proteins (S), glycoproteins and membrane proteins are found on the viral envelope. Spike proteins mediate the virus's entry into the cell by binding to angiotensin convertase 2 (ACE 2) (Yan et al., 2020). During viral replication, mutations occur at the level of different structures, the most important being the mutations of the S-port, which can increase the infectivity of the virus or the severity of the disease (Korber et al., 2020).

The pandemic created by SARS-COV-2 is larger than that caused by infection with SARS-COV-1 because the S protein binds more strongly to the ACE2 receptor than in the case of SARS-COV-1. Another explanation is the increased affinity for the upper respiratory tract with reaching a maximum viremia in the first five days after infection (Cevik et al., 2020a, 2020c; Hui et al., 2020a; Wrapp et al., 2020).

In most cases 17 days after the onset of the disease, the RT-PCR test is negative, but in cases of marked immunosuppression the test may remain positive for up to 83 days (Buitrago-Garcia et al., 2020; Cevik et al., 2020b; Meyerowitz et al., 2020; Qiu et al., 2020).

Viral replication takes place in the lung, olfactory, endothelial cells. Endothelial cell damage explains systemic damage, including central nervous system damage with neurological and neuropsychic manifestations (Agrawal et al., 2020; Monteil et al., 2020; Sia et al., 2020).

The body's response to infection is the release of T lymphocytes and thus healing occurs in most cases. There are cases with aberrant immune response with destruction of the alveolar capillary membrane, hyaline deposition, inflammatory infiltrate with mononuclear, acute respiratory distress syndrome.

The neuropsychic impairment can be attributed to the massive inflammatory infiltrate in the brain together with the endothelial damage, which leads to the alteration of the quality of the blood-brain barrier (Agrawal et al., 2020; Blanco-Melo et al., 2020; Carsana et al., 2020; Xu et al., 2020; Wang et al., 2020a)

In addition to these structural changes, there are bio-humoral changes with the increase of serum troponins, atrial natriuretic peptides and D-dimers. The increase in D-dimers is associated with a procoagulant status, prothrombotic status. Along with a severe evolution of the infection, the coagulation factors are consumed leading to the appearance of disseminated intravascular coagulation syndrome. *These last changes are responsible for the neurological and neuropsychic manifestations* (Liu et al., 2020; Wu et al., 2020).

The pandemic itself, together with the measures taken by the authorities (isolation, social distancing), led to an increase in the number of neuropsychiatric manifestations. Among the most common manifestations are anxiety, depression, insomnia, stress, panic attacks and feelings of helplessness (Cui et al., 2019; Frisone et al., 2021; Huang et al., 2020; Hui et al., 2020b; Liu et al., 2016; Merlo et al., 2021a).

Depression during pregnancy is a fairly common and important problem, even in the absence of a pandemic. Since the beginning of the pandemic, there has been an increase in cases of depression in pregnancy, reaching a percentage of 9-17% among positive women (Wang et al., 2020b). In addition to the positive COVID status, the limitation of access to medical services also contributed to the increase in the incidence of depression, also most likely due to the fact that many public health caregivers have had to stop their daily service (Settineri et al., 2019a) due to supervened ministerial restrictions (Wang et al., 2020). SARS-COV-2 infection can directly affect the central nervous system causing ischemic or hemorrhagic stroke, personality, cognition or behavioral disorders, and headache (Helms et al., 2020; Mao et al., 2020; Varatharaj et al., 2020).

In most cases of depressive syndrome in COVID, it was observed that the RT-PCR test in the cerebrospinal fluid is negative, thus implying an indirect damage to the central nervous system, most likely based on systemic inflammation and secondary encephalopathy. Encephalopathy is caused by severe inflammatory processes, increased production of proinflammatory cytokines (IL-6) and decreased circulating lymphocytes. Medication can also cause neuropsychiatric manifestations, for example during treatment with glucocorticoids. (Helms et al., 2020; Troyer et al., 2020). In general, depression affects 10-25% of pregnant women, but during the pandemic it was observed that their number increased to 37%. Sustained depression in the antepartum period is a risk factor for miscarriage, premature birth, immaturity, low birth rate and postpartum depression (Accortt et al., 2015; Bayrampour et al., 2016; Coussons-Read, 2013; Grigoriadis et al., 2018; Qu et al., 2017; Rondó et al., 2003; Stein et al., 2012).

The number of consultations during pregnancy for positive patients was reduced compared to that of negative COVID patients, which led to the impairment of the doctor-patient relationship and is an indirect factor that participates in the occurrence of various clinical conditions (Settineri et al., 2019b), including that related to postpartum depression. One method often used since the beginning of the pandemic has been telemedicine, but it has raised issues among at-risk populations and people with hearing impairments (Royal College of Obstetricians & Gynaecologists, n. d.).

In the case of asymptomatic / asymptomatic patients, the birth by cesarean section does not decrease the risk of infection of the newborn (Bălălău, 2017; Cai et al., 2021; Walker et al., 2020). For pregnant women with moderate or severe form, cesarean section is performed if we have acute respiratory distress, with the intention of improving the mother's respiratory function or for any obstetric indication (Allotey et al., 2020; Khalil et al., 2020; Mullins et al., 2021; Rotshenker-Olshinka et al., 2021; Wei et al., 2021).

Another study found that there were no significant differences in the rate of infection of the newborn or the improvement of respiratory symptoms between the two ways of birth (Gurol-Urganci et al., 2021).

Other studies have concluded that cesarean delivery increases the inflammatory process, with cytokine discharge and thus leads to worsening of cardiorespiratory decompensation. In addition to affecting lung function, cytokine discharge also leads to inflammation of the brain thus directly affecting postpartum depression (Gray et al., 2021; Oliver et al., 2021; U.S. Food & Drug Administration, n. d.). Among positive patients, spontaneous birth was more common than cesarean section.

There have been cases in which patients have opted for cesarean delivery due to tokophobia, but to reduce the risk of cytokine storms during the early delivery period, vaginal birth was chosen. Changing the birth pathway in the case of tokophobia has led to an increase in cases of postpartum depression (Gray et al., 2021).

The vertical transmission is unclear, it is considered that the percentage is 2-3% (American Academy of Pediatrics, n.d.; Popescu et al., 2020; Von Kohorn et al., 2020). On histopathological examination of the placenta, most show no signs of infection (Baud et al., 2020; Edlow et al., 2020; Kirtsman et al., 2020; Martinez-Portilla et al., 2021; Penfield et al., 2020). Vaginal discharge and amniotic fluid cultures were negative in most cases (Patanè et al., 2020).

Analgesia during vaginal birth is beneficial for reducing the risk of cardiorespiratory decompensation, but also for decreasing the psychological impact in case of tokophobia (Slayton-Milam et al., 2020).

To improve the mother-child relationship, skin-to-skin contact is allowed in the delivery room with minimal risk of infection if the mother wears the correct facial mass (Ashokka et al., 2020; Salvatore et al., 2020).

After admission to the neonatology department, the baby is tested for RT-PCR 24 hours after the anesthesia and 48 hours after the birth to rule out the possibility of a false positive result because of passing through an infected vaginal canal (McDevitt et al., 2020).

A study conducted by Ples et al. (Liana et al., 2018) showed that the pain decreases in intensity in the first six hours after vaginal birth, while after cesarean delivery it decreases after 12-24 hours. Cesarean section is more common with complications, in 14.5% of cases, compared to 10.5% of cases. Patients who gave birth by cesarean section considered that they had a better relationship with the doctor than those who gave birth vaginally. Prematurity was considered a traumatic event by most patients. The study concluded that there were no differences between the two methods of giving birth in terms of the risk of postpartum depression (Fisher et al., 2016).

Postpartum depression is one of the most common psychiatric complications during childbirth. In more than 50% of cases it is installed since the antepartum period (Liana et al., 2018). In the case of depression installed during childbirth, most appear in the first month after birth (Iwata et al., 2016).

It is more common in patients with a history of depression, increased stress in the postnatal period, and more common in covid positive patients (Bălălău et al., 2020a; Dietz et al., 2007; Gaillard et al., 2014; Howard et al., 2014; Norhayati et al., 2015; O'hara & McCabe, 2013). Cesarean delivery is an additional risk factor (Balalau et al., 2016, 2020a, 2020b; Stanescu et al., 2018).

Risk factors for postpartum depression are assessed using the Edinburg scale. Postpartum depression affects the mother-child reality, they often do not read enough to children or tell fewer stories (Field, 2010a; Josefsson & Sydsjö, 2007). Also, mothers breastfeed less and take care of the child less: they do not position them correctly for sleep, it has also been observed that they do not follow the vaccination schemes (Paulson et al., 2006). Suicide rates are low, even in patients diagnosed with postpartum depression. Another rare but important problem is infanticide. It is more common in patients diagnosed with postpartum psychosis. It has also been observed that these children have an abnormal development, both physically and psychoemotional, which, over time, could contribute to the generation of symptomatic pictures related to the onset of phobias, isolation and maladaptive behaviors (Bacalbasa et al., 2019; Frisone et al., 2020b; Settineri et al., 2018, 2019c; Sicari et al., 2021).

The initial assessment of patients for postpartum depression must assess the following aspects: the presence of dysphonia, the feeling of guilt, the feeling of helplessness, cannot make decisions alone, the idea of suicide. In addition to these symptoms, we must also evaluate the somatic symptoms: altered sleep-wake rhythm, decreased energy, altered appetite, fatigue, decreased libido. These symptoms occur both in patients with postpartum depression but can also occur in the postpartum period in women without depression (Chojenta et al., 2016; Committee on Obstetric Practice, 2015).

Patients hospitalized in the departments of infectious diseases, pneumology, intensive care with acute respiratory failure may present agitation (69%), confusion (65%), corticospinal tract injuries (67%), neuropsychiatric impairment (33%). Another study concluded that 60% of these patients have anxiety disorder, depressive disorder, headache, insomnia and meowing (Helms et al., 2020), suggesting the importance of resorting to psychotherapeutic aid (Frisone, 2019). Acute respiratory failure exacerbates other psychiatric conditions including depression, anxiety disorders, schizophrenia and social marginalization (Romero-Sánchez et al., 2020; Troyer et al., 2020).

At the beginning of the pandemic, breastfeeding was considered a risk factor for infecting the newborn. This has led to a delay in establishing the mother-son relationship, with an increase in cases of postpartum depression. Lately, breastfeeding is allowed if the mother wears a mask, as it has been shown that breast milk does not contain SARS COV-2 viral particles (Centers for Disease Control and Prevention, n. d.).

Initially, the newborn could not stay in the same room with his mother. Currently, the baby stays in the room with the mother, so breastfeeding is facilitated and the mother-child relationship is improved. All these rules have led to an increase in maternal stress during the period of early childbirth. Another problem was the mother's fear of not infecting her child. All this has contributed to the increase in cases of psychiatric complications in postpartum period (Bloch et al., 2000). Also, patients with a history of breast cancer who cannot breastfeed are frequently affected by depression (Scaunasu et al., 2018).

Postpartum depression occurs through several mechanisms, some of which are increased by SARS VOC-2 infection directly, but also indirectly by affecting the mother-child relationship or because of excessive anxiety (Hendrick et al., 1988). In the early postpartum estrogen and progesterone levels decrease (Ahokas et al., 2001; Bohiltea et al., 2020; Gregoire et al., 1996; Lawrie et al., 1998) there are changes in thyroid hormones, cortisol, melatonin, oxytocin (de Rezende et al., 2016; Parry et al., 2008; Skrundz et al., 2011; Yonkers et al., 2012). A predictive bio-humoral factor for postpartum depression is beta-hCG levels at week 25 of gestation. An increased level is associated with an increased risk. Monoamine oxidase A imbalance in the prefrontal lobe and anterior cingulate gyrus is another mechanism of postpartum depression along with decreased serotonin, norepinephrine and dopamine. Monoamine oxidase is responsible for degrading dopamine, norepinephrine and serotonin. There are other studies that show a decrease in serotonergic activity in postpartum depression (Sacher et al., 2015).

SARS-COV-2 infection can directly affect the central nervous system causing ischemic or hemorrhagic stroke, personality, cognition or behavioral disorders, and headache. In most cases of depressive syndrome in COVID, it was observed that the RT-PCR test in the cerebrospinal fluid is negative, thus implying an indirect damage to the central nervous system, most likely based on systemic inflammation and secondary encephalopathy.

Encephalopathy is caused by severe inflammatory processes, increased production of proinflammatory cytokines (IL-6) and decreased circulating lymphocytes.

Medication can also cause neuropsychiatric manifestations, for example during treatment with glucocorticoids. In general, depression affects 10-25% of pregnant women, but during the pandemic it was observed that their number increased to 37%. Admission of patients to intensive care units is another important risk factor for COVID depression (Bălălău et al., 2019; Rogers et al., 2020). Another way to indirectly affect mental health is the global economic crisis caused by the COVID pandemic, which is much more severe than that caused by other pandemics: SARS-COV1, MERS, Ebola.

In addition to these bio-humoral and histopathological changes, postpartum depression is closely related to various socio-economic and demographic components: stressful events in daily life, young mother's age, single-parent family, multiparity, domestic violence, unwanted pregnancy, fear of birth, anxiety, PMS (Dennis & Dowswell, 2013; O'Hara & Wisner, 2014; Parker et al., 2015; Paschetta et al., 2014; Räisänen et al., 2013).

The evolution of depression is unpredictable, it can be treated spontaneously or under treatment, or it can become a chronic depression (Howard et al., 2014). People who go through the acute episode have an increased risk of developing a depressive disorder in the event of a new pregnancy. It is considered that the lack of breastfeeding and the lack of room-in service are cases of depression, but they also represent consequences of depression (Field, 2010b; O'hara & McCabe, 2013; Sakka et al., 2020; Stewart, 2011).

A study conducted by Pariente et al. (2020) revealed that the rate of postpartum depression during the COVID pandemic was lower, since patients received more help from the family, working from home for family members, thus strengthening all types of family relationships. Another possible explanation is the early discharge of patients to limit the spread of SARS COV-2 infection. According to Brockington, the shorter the postpartum period spent in the hospital, the lower the risk of early-onset postpartum depression (Brockington, 2004).

Several scales are used to diagnose depressive syndrome, including Hamilton and Patient Health Questionnaire-9.

The Hamilton scale contains 17 statements that are rated from 0 to 4 points. A result between 0-7 points means normal depression, 8-17 points mild depression, 17-25 points moderate depression, more than 25 points, severe depression.

The Patient Health Questionnaire-9 test assesses the patient's condition in the last two weeks. It contains 9 statements to which the patient responds by giving a score between zero and three.

A score between 5 and 9 corresponds to mild depression, 10-14 points to moderate depression, 15-19 points to severe depression and anything over 20 means severe depression (Bălălău et al., 2020b).

The DASS scale (depression anxiety stress scales) is used to identify negative emotions such as anxiety and depression. The original version contains a questionnaire with 42 statements, but there is also an abbreviated version with only 21 statements. This scale can be used for clinical diagnosis, but also for research (Stein et al., 2014; Tikotzky, 2016).

Since the beginning of the COVID pandemic, the doctor-patient relationship has suffered as a result of tele-medicine and the isolation of positive patients, suggesting that it advances in health are still insufficient (Frisone & Micali, 2020).

The birth route indicated for COVID positive patients is the vaginal one, the birth by cesarean section keeping the obstetric indications and in addition the acute respiratory distress syndrome.

Cesarean section increases the biological inflammatory syndrome, thus causing inflammatory changes in the brain.

The risk of transmission from mother to newborn is low, so breastfeeding and room-in service is allowed.

Most studies have concluded that postpartum depression is more common since the onset of the pandemic, except for one study led by Pariente et al. (2020) which revealed that the rate of postpartum depression during the COVID pandemic was lower.

Postpartum depression in covid positive patients occurs through direct but also indirect mechanisms: inflammatory process in the brain, separation of the newborn mother, admission to intensive care units, socio-economic status

Postpartum depression has an unpredictable course, can heal spontaneously or remit from medication, but there is an increased risk of recurrence.

Conflict of Interest Statement

The authors declare that the research was conducted in the absence of any potential conflict of interest.

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Mediterranean Journal of Clinical Psychology, Vol. 9, No. 2 (2021).

DOI: 10.13129/2282-1619/mjcp-3071