The consequences of the postpartum depression on breastfeeding

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ABSTRACT

Postpartum depression (PPD) is a major health problem, and in recent years its prevalence has been increasing. The physiological changes and mood disorders associated with pregnancy and the postnatal period are mainly due to a hormonal imbalance. Destabilizing the mother's hypothalamic pituitary adrenal (HPA) axis increases the susceptibility to depression, probably by significantly increasing plasma cortisol. Stress and inflammation play a key role in postpartum. Also, lactogenic hormones have antidepressant and anxiolytic effects, the low concentration of oxytocin in the perinatal period being a triggering factor of PPD.

Natural nutrition, ideal for every newborn and infant, positively influences the mother's mental health and may reduce the risk of developing PPD, possibly by attenuating cortisol response to stress. The link between breastfeeding and PPD has not been thoroughly approached. PPD is associated with early termination of breastfeeding, while long-term breastfeeding reduced the risk of PPD. The mother's willingness to breastfeed, her confidence in the ability to breastfeed, her mental health during pregnancy, her family's support, and trained medical staff are some of the mediators that can contribute to the maintenance of natural nutrition in PPD.

KEYWORDS:**Postpartum depression, breastfeeding, mental health.**

Postpartum depression (PPD) is a mood disorder that starts in the first four weeks after birth, reaches a critical level in the first six months, and can be maintained until the end of the first postpartum year. This disorder has similar clinical symptomatology to that of an endogenous depressive episode. Loss of interest is the most common and constant symptom. Depressive mood, loss of pleasure, suicide attempt, appetite changes accompanied by a significant loss, or weight gain are suggestive for a depressive episode. Anxiety symptoms or panic attacks support the anxious component. In postpartum depression, obsessive behavior related to the safety and health of the child, its nutrition, or the fear of not hurting it, are characteristic. Mothers in this situation do not trust their ability to breastfeed their children or are not willing to continue breastfeeding. Therefore, the feeling of uselessness and the impossibility of entering the role of mother can have negative consequences for both the child and the whole family (1). The prevalence of depression is 10-20% in postpartum women after the first pregnancy and can increase to 40-50% in those who have had postpartum depression in previous pregnancies (2, 3).

Pregnancy is associated with significant physiological changes (4). Mood disorders during pregnancy and in the immediate aftermath may be due to a hormonal imbalance triggered largely by the placenta, an organ with important endocrine function (5, 6). With its development, more and more placental corticotrophin-releasing hormones (CRH) are released, which join CRH produced by the mother's hypothalamus. Typically, CRH stimulates the release of adrenocorticotrophic hormone (ACTH) from

the anterior hypothalamic-pituitary, which subsequently results in the release of glucocorticoid hormones from the adrenal gland, thus cortisol. In pregnancy, as a result of destabilizing the mother's HPA axis, cortisol release has a reverse effect, stimulating CRH production in the placenta and not blocking it. Therefore, placental CRH and plasma cortisol have a significant growth rate during pregnancy, reaching a maximum value at birth. During a natural birth, the cortisol level is at least twice that during a caesarean section (7). With the elimination of the placenta, the source of placental CRH disappears, plasma CRH returns to normal within 15 hours after birth (8). In postpartum, cortisol suffers a sharp decrease, and the HPA axis is severely disturbed. Most of the time, the maternal body manages to adapt to these hormonal changes.

There are studies that suggest that cortisol hypersecretion during the second and third trimesters of pregnancy increases the risk of prenatal and postnatal depression, especially in the presence of stress factors. Stressful events during pregnancy affect the mental health of the future mother, the emotional reactions being much more amplified than in non-pregnancy conditions. On the opposite side, postpartum depression may be due to hypocortisolemia occurring immediately after birth (9). There are also situations where the rapid transition from hypercorticism to hypocorticism can trigger the typical symptoms of postpartum depression. Also, low prenatal levels of dopamine and serotonin may increase the risk of disease (10). The neuroendocrine mechanisms responsible for this effect have not been defined yet. Some studies indicate that hypercortisolemia is related to transient depressive states, while

hypocortisolemia is linked to chronic postpartum depression (11).

The connection between breastfeeding and postpartum depression is not fully understood. The identification of the biological mechanisms underlying this association is still a concern for many researchers. Stress and inflammation are considered the major cause of postpartum depression. Breastfeeding could alleviate stress response and implicitly decrease the risk of postpartum depression by stabilizing cortisol secretion, although evaluating this aspect is still an open topic. In 2009, Janet A. Amico et al. realized a study on breastfeeding women and assessed the effect of suction on serum cortisol concentrations. The mean serum cortisol concentration at 15 minutes after breastfeeding was significantly lower ($p = 0.001$) than before breastfeeding. This decrease was due to the circadian variation of cortisol secretion, but also to the significant decline of adrenocorticotrophic hormone (ACTH) during lactation (12).

In the last trimester of pregnancy and in the postpartum period, the level of proinflammatory cytokines of the pregnant woman is physiologically increased as a result of the immune system's response to stress. When their level reaches very high values, the risk of depression increases. Proinflammatory cytokines shown to be significantly elevated in depression are interleukin- 1β (IL- 1β), interleukin-6 (IL-6), tumor necrosis factor (TNF- α), and interferon- γ (IFN- γ). These can trigger changes in sleep, appetite, mood and social behavior, symptoms typical of the disease. By decreasing stress, breastfeeding has a modulation effect of the inflammatory response (13).

Lactogenic hormones, oxytocin and prolactin are associated with antidepressant and

anxiolytic effects. The inhibitory action of lactogen peptides on the mother's HPA axis is very discussed lately and has a decreasing impact on plasma levels of ACTH and cortisol (14, 15). The low plasma concentration of oxytocin during pregnancy and shortly after birth is a triggering factor for depressive symptomatology. In a pilot study of 34 pregnant women enrolled in the third trimester of pregnancy and followed up for eight weeks after birth, Lara-Cinisomo et al., in a study realized in 2017, aimed to identify an association between PPD, breastfeeding, and plasma levels of oxytocin. Depression was assessed using the Edinburgh Postnatal Depression Scale (EPDS) three times (third trimester of pregnancy, four and eight weeks postpartum). Only one-third of the pregnant women in the study were diagnosed with PPD. The conclusion was that women who had PPD and who stopped breastfeeding at eight weeks after birth had significantly lower oxytocin levels than non-depressive mothers who have stopped breastfeeding at the same time ($p < 0.05$) (16). Similar results have been reported in 2013 by Stuebe et al. in a prospective cohort study performed on 47 pregnant women enrolled in the third trimester of pregnancy and who intended to breastfeed at least three months after birth. Of these, 23 had no history of depression, 16 had a lifetime history, and eight were currently depressed. The neuroendocrine response was measured at enrollment and during feeding sessions at two and eight weeks postpartum. In the third trimester of pregnancy, the plasma oxytocin level was inversely correlated with the Edinburgh Postnatal Depression Score (EPDS) ($p = 0.03$). At two weeks postpartum, no significant changes in neuroendocrine profiles were detected. In 39 women, at eight weeks, oxytocin was inversely correlated with EPDS maternal score ($p \leq 0.01$) (17).

World Health Organisation recommends exclusive breastfeeding in the first six months of life and its continuation, in parallel with diversified nutrition, up to the age of two years. The benefits for the child are peerless. Natural nutrition is ideal for newborns and infants because human milk is the most physiological food. Breast milk has all the necessary nutritional principles, in perfect quantities and proportions, and with maximum bioavailability to ensure optimal physical development of the child. Studies also prove that neuropsychiatric development is superior to naturally fed infants (18). On the other hand, breastfeeding influences the mother's mental state beneficially, giving her strong emotional affections. For this reason, the promotion of natural nutrition should be aimed at both the newborn and his mother. The cascade of positive emotional responses that are triggered by contact between the mother and the baby during breastfeeding from the first days supports the mother's mental health and diminishes the risk of postpartum depressive states.

There are studies in which the causal link between breastfeeding and postpartum depression has been interpreted in both ways. PPD can have a significant impact on breastfeeding, the lower probability of breastfeeding, leading to early weaning. At the same time, long-term exclusive breastfeeding is associated with decreased risk of PPD (19). In addition, women diagnosed with prenatal depression have an increased risk of developing postnatal depression after cessation of breastfeeding (20).

Chiu HC et al., in 2019, in a study comprising 333 Taiwanese pregnant women showed that higher scores on PPD were significantly associated with lower rates of breastfeeding, which suggests that giving up breastfeeding is

an important risk factor for PPD (Odds ratio: 2,159, CI: 1,220-3,821, $p = .008$) (21).

A prospective study realized in China, that included 956 mother-child pairs aimed to evaluate the association between PPD and infant feeding types (exclusive/partial breastfeeding or artificial milk formula). Symptoms of PPD were assessed by the EPDS at four weeks postpartum. Mothers with PPD were correlated with an increased risk of stopping exclusive breastfeeding ($\beta = -0.049$, $P = 0.047$) or partial breastfeeding ($\beta = -0.082$, respectively $P = 0.006$). Also, compared with non-PPD mothers, mothers with PPD started artificial feeding in the first year of life at a statistically significant percentage ($\beta = 0.074$, $P = 0.016$) (22).

A study of 1745 Australian women recruited from postnatal sections looked at the impact of postpartum depression on breastfeeding duration. Breastfeeding was initiated in 96% of participants. Of the 18% diagnosed with postpartum depression, 63% started in the first two months after birth. The average duration of breastfeeding was 26 weeks for women with early-onset depression, 28 weeks for women with late-onset depression, and 39 weeks for women without depression. Early termination of breastfeeding was significantly associated with postnatal depression (adjusted hazard ratio 1.25, 95% CI 1.03-1.52) (23).

The relationship between breastfeeding and postpartum depression is influenced by many factors. The decision to breastfeed made during pregnancy, breastfeeding in the first hours of the life of the newborn, support from family and medical staff are encouraging reasons to initiate and continue breastfeeding. Specialized nursing care should also be a desirable goal, the benefits on mental health of new mothers being significant. Self-efficacy plays a decisive role in breastfeeding

behaviors. The mother's confidence in her ability to breastfeed her baby is very important, and overcoming any breastfeeding problem is considered a new challenge. The effects of breastfeeding on postpartum depression are extremely heterogeneous, being conditioned by the intention of breastfeeding the future mother, but also by her mental health, even during pregnancy (24). Mothers who are not depressed during pregnancy, who plan to breastfeed and succeed, have a very low risk of triggering PPD. On the other hand, the failure of breastfeeding can be the cause of PPD. A mother who is unable to follow her breastfeeding intent for different causes may become vulnerable to this disorder. The mother's exaggerated desire to breastfeed in any conditions, stress related to the quality and quantity of her milk, or the weight curve of the newborn are arguments for triggering depressive symptoms. Mothers with depression are less capable to support breastfeeding and resort to mixed nutrition or artificial milk formula (25). In most studies, the duration of breastfeeding is associated with postpartum depression (26, 27, 28, 29). The maintenance or not of exclusive breastfeeding is closely linked to the degree of postpartum depression. The low socio-economic status of the family, the relationship between spouses, single mother, young maternal age, lower maternal education, stressful events during pregnancy, a history of depression, or the health of the child at birth are potentially destabilizing factors of the relationship between breastfeeding and postpartum depression. (30, 31, 32, 33, 34)

Results of a cohort study realized in 2018 by Vieira et al., on 83 women with postpartum depression who started breastfeeding showed that postpartum depression is a risk factor for interruption breastfeeding, while breastfeeding self-efficacy is a protector

factor for women doing it exclusively. The tools used were the Edinburgh Postnatal Depression Scale and Breastfeeding Self-Efficacy Scale. Postpartum women with an EPDS score greater or equal to ten stopped exclusively breastfeeding on average ten days earlier than those with an EPDS score under or equal nine, whose average duration of breastfeeding was 38 days postpartum. The chances of stopping exclusive breastfeeding decreased by 48% when self-efficacy increased from low to medium level and 80% when switching from medium to high level (35).

In 2013, a similar study conducted by Zubaran et al. suggested that mothers who suffer from postpartum depression have less confidence in their ability to breastfeed. They included 89 mothers at maximum 12 weeks postpartum, of whom 69 (77%) were breastfeeding exclusively, and 20 (22.7%) were breastfeeding partially. Depression was assessed with PDSS and EPDS, while self-efficacy of breastfeeding with BSES-SF. Mothers who opted for breastfeeding and bottle-feeding had higher PDSS and EPDS scores. BSES-SF scores were higher in mothers who exclusively breastfed and were negatively associated ($p < 0.001$) with both EPDS and PDSS scores (36).

A mother's sleep is a parameter to be considered, as it has beneficial effects on the mother's mental status and implicitly on breastfeeding. Sleep disorders and fatigue are physical and psychological stressors that increase the risk of depression. Between sleep disorders and depression, there is a reciprocal relationship, both of which have a negative impact on breastfeeding (37). A study of 6410 mothers of infants aged 0 to 12 months showed that breastfeeding women benefited from more hours of sleep and better physical and mental health than mothers who fed their

children with mixed nutrition or with milk formula. The risk of developing postpartum depression was significantly lower in breastfeeding mothers (38). The sleep of breastfeeding mothers is much more

qualitative than that of mothers who choose another infant feeding option, possibly due to the calming effects of oxytocin that is secreted during the act of breastfeed (39).

CONCLUSIONS

Currently, there are several concerns about postpartum depression due to the short and long-term influence on the mother and child. Breastfeeding creates and strengthens the interaction between mother and child by triggering positive emotional reactions. The superiority of natural dietary consists of the well-known nutritional benefits on the infant, but also of maintaining the proper mental health of the mother and child. The mechanisms of care underlying the relationship between breastfeeding and postpartum depression are mostly unknown. The natural diet decreases the risk of triggering the postpartum depression of the mother, and at the same time, PPD can have a significant impact on the duration of breastfeeding. Many variables influence the relationship between breastfeeding and depression. Therefore, breastfeeding of the newborn baby from a mother with DPP must be encouraged and supported and abandoned only in extreme situations.

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