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Review Article

The Influence of Labor and Delivery Experience on Postpartum Depression: The Role of Nursing Care

Franca Tani*

Full Professor of Developmental Psychology at the Department of Health Sciences and President of School of Psychology, University of Florence, Italy

***Corresponding Author:** Franca Tani, Full Professor of Developmental Psychology at the Department of Health Sciences and President of School of Psychology, University of Florence, Italy.

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Abstract

Post-partum depression (PPD) is a clinical condition occurring in the weeks or months following delivery. This clinical condition is characterized by sad mood, anxiety, irritability, lack of positive emotions, loss of pleasure, interests and energy, decreased appetite, inability to cope, fear of hurting themselves and their baby, and suicidal thoughts. Postpartum depression (PPD) represents the most relevant psychic complication related to the puerperium. Although with wide variability [1], in the western world it is estimated that PPD affects about 10 - 15% of women who give birth [2].

The first weeks immediately after childbirth are the most critical, and although the increased vulnerability continues for the following six months [3,4], PPD generally occurs within the first four weeks after delivery [5].

Keywords: *Post-Partum Depression (PPD); Labor; Delivery Experience; Nursing Care*

From a psychological perspective, depression occurring during the postpartum period assumes a particular relevance in a woman's life. In fact, it enhances the risk of a multitude of negative consequences for children, women, and families, including a worse prenatal attachment to child, a poor infant physical health and more frequent sickness, and physiological, psychological, emotional and psychomotor delays during infancy and early childhood [6,7].

Moreover, PPD can negatively affect the ability and the availability of women to adequately take care of their children. Regarding this, Henderson and colleagues have shown the important negative outcomes that PPD can have on mother-infant interactions, the child's growth, and the tendency to quit breastfeeding earlier [8]. Children of mothers with PPD tend to establish insecure attachment bonds and develop social difficulties with peers [9,10].

The vulnerability for this clinical condition is higher for primiparous mothers, who present an increased risk for depression in the postpartum period [11,12], especially in the first 90 days after delivery [13]. In fact, first-time mothers have more difficulties in early interaction with their infants due to maternal inexperience, and research has reported that the effect of maternal depression is greater in the nulliparous compared to the multiparous [14].

The birth of the first child has been identified as a major life event that can lead to many challenges for the woman. From a psychological perspective, in fact, pregnancy with the first baby involves the transition to motherhood, a major developmental period with impor-

tant implications for the mother, for the infant-mother relationship, and the infant's development. During the first pregnancy, a woman's maternal identity develops through the reorganization of mental self-representation and the elaboration of other significant relationships [15,16].

The woman's mental self-representation enriches with the maternal component, thus leading her to review the relationship with her own mother; the mental couple image gradually modifies with integration of the family image, and the marital relationship is reorganized with the parental component. The first baby's arrival may produce temporary changes in the quality of the marital relationship, as determined by the partners' capacity to adapt to these new challenges and to the parental relationship. Therefore, all the above physical, psychological and relational changes may increase risk for maternal emotional vulnerability, such as depressed emotions.

Because of the above relevant psychopathological consequences of PPD on the health and wellbeing of mothers and children, it is important to identify the risk factors that can be involved in the development of PPD in first-time mothers.

Research carried out until now has found several factors, both internal and external, to be related to PPD, and it is plausible that a complex interplay of these can be the cause of greater vulnerability, especially in women during their first pregnancy, compared to those who already have a child.

This is a very relevant, not only scientific but also social and clinical issue, because a depth knowledge of protective and risk factors can offer a significant contribution to all the health staff, doctors, midwives, nurses, psychologists and so on, who are involved daily in accompanying women on the delicate path to motherhood, helping them to prepare the optimal conditions for a healthy pregnancy and delivery and a serene transition to motherhood. Results obtained up until now allow us to start drawing a complex interplay of several protective and risk factors related to PDD onset [17].

In more recent studies, the influence of social relationships on health status has become increasingly recognized within assistance procedures and epidemiological research in obstetric, nursing, and neonatal medicine. In particular, having supportive relationships may significantly enhance feelings of well-being and personal control, and have a positive effect on mothers. Pregnant women who perceive high levels of social support feel the deep biological, emotional, and existential pregnancy-related changes less stressfully [18]. In contrast, poor social support during pregnancy increases the risk of a long, difficult, and painful childbirth experience, clinical birth complications, and poor neonatal health status [19].

Moreover, the social support mothers perceive during pregnancy is strongly connected with mothers' prenatal attachment to the child and their care behaviors towards him/her after childbirth [20,21]. In particular, research has shown that maternal prenatal attachment during the third trimester of pregnancy is significantly associated with postnatal maternal involvement in the child's care, serving as an important diagnostic aid to identify the cases in which mother-child interaction is likely to be sub-optimal [22,23]. Recently, other authors identified another relevant risk factor for the development of postpartum depression, that is a traumatic or stressful childbirth experience [24]. Moreover, this experience negatively interferes with the quality of postanal maternal-child attachment bond [25].

Alongside a series of relational risk factors, the significant role of psychopathological risk factors is highlighted, such as a lifetime history of depression, in the mother herself or in her family, and a presence of antenatal depression and prenatal anxiety. The comorbidity of depression and anxiety during pregnancy leads to complications during delivery and increases the risk to the newborn child (Ibanez., *et al*. 2012). Empirical studies found that a significant portion of pregnant women (21%) present clinically significant anxiety symptoms and, of these, 64% continue to have anxiety during the postpartum period (Huiznink, Mulder, Robles de Medina, Visser, Buitelaar, 2004). Moreover, several longitudinal studies have shown that prenatal anxiety disorder is one of the strongest risk factors for postnatal depression onset [17,26].

Maternal anxiety and depression during pregnancy be associated with various negative events during delivery, such as preterm labor, more painful labor, prolonged labor, obstetric complications and operative delivery (Alhusen and Alvarez 2016). According to a neurobiological point of view, the effects of prenatal anxiety and depression, both on labor and delivery, seem mediated via maternal-placental-fetal neuroendocrine mechanisms. In fact, anxiety may increase plasma concentrations of catecholamines, and high concentrations of catecholamines have been associated with both weak uterine contractility and prolonged labor, which implies the need for stimulant mediations for contractile activity, such as oxytocin (Johnson and Slade 2003). A study by Anim-Somuah and colleagues (2011) showed that significant relationships exist among oxytocin administration, epidural analgesia and labor length.

Moreover, anxiety leads to an increased pain reactivity, so women who are anxious during pregnancy may have a more painful labor, thus increasing the maternal request for analgesia [6,26].

In turn, epidural analgesia is associated with an increased rate of oxytocin administration. Given that induced labor seems to be less efficient than spontaneous labor (NICE Guideline 2008), oxytocin administration may be necessary, although it may render the labor more painful, making the use of pain relief necessary. Moreover, high doses of oxytocin were associated with an increased length of labor in spontaneous vaginal birth (Kenyon., *et al*. 2013), and epidural analgesia is associated with a longer labor.

Finally, from a psychological perspective, depressive symptoms are associated with a cognitive catastrophic style in which pain is viewed as intolerable and uncontrollable. This tendency to catastrophisation may, in turn, lead to pain anticipation and attention to pain, influencing the maternal experience of childbirth pain (Flink., *et al*. 2009). In the same line of thought, anxiety during pregnancy is associated with expecting more negative events during birth (i.e. more negative emotions and pain), focusing on the experience of expected maximum labor pain, and enhancing the perception of loss of control and feelings of powerlessness that have been found to be positively related to a prolonged labor (Paarlberg., *et al*. 2006). We know that the clinical aspect of labor may influence the newborn's well-being. Therefore, prolonged labor has been associated with offspring hypoxia (Adams., *et al*. 2012; Altman., *et al*. 2015), thus resulting in lower Apgar scores. Moreover, the use of epidural analgesia is related with lower Apgar scores (Antonakou and Papoutsis 2016).

Most of studies carried out, however, have mainly been focused on the separate effects of anxiety and depression on labor and delivery, or neonatal well-being and the impact of labor and delivery on the offspring's well-being. Little research has been done on the combined effects of both depression and anxiety experienced by the mother on labor and delivery and, consequently, birth outcome. Based on the previous literature, it was hypothesized that a mood disorder might have an influence on birth complications and child health indirectly, through the labor experience.

To verify this hypothesis, together Martina Smorti and Lucia Ponti, I carried out a study, published in 2019, to analyze the role that prenatal anxiety and depression symptomatology jointly have on the well-being of the newborn through their influence on the clinical aspects of labor. In particular, our aim was to test the theoretical model reported in figure 1.

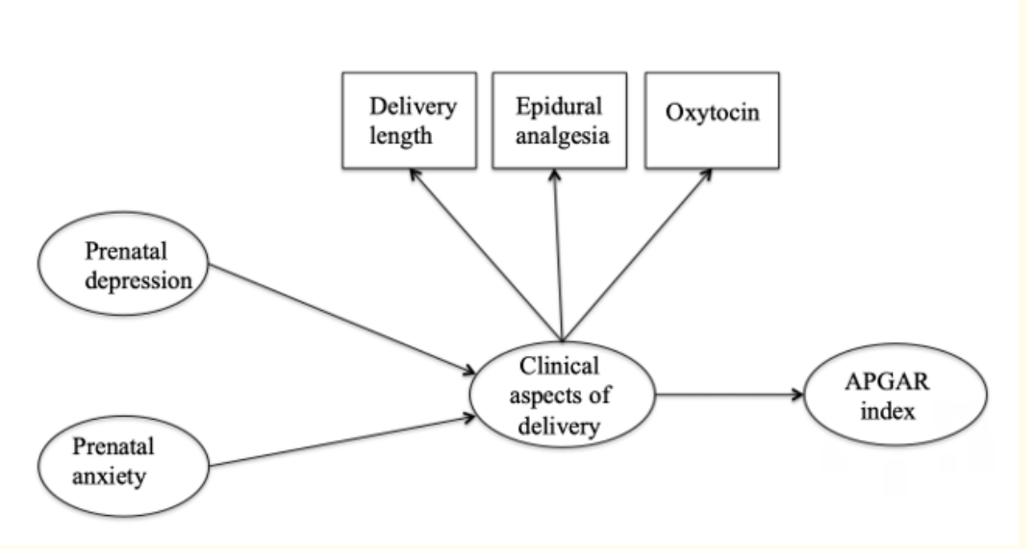

Figure 1: *Theoretical tested model.*

To this aim, a cohort longitudinal study was carried out on a sample of 171 nulliparous native Italian women, aged 19 - 41 years, with a low risk singleton pregnancy, and no previous psychopathological diagnosis. All the women were recruited when attending delivery preparation courses.

Data were collected at two different times: (1) 31 - 32 weeks of gestation; and (2) the day of childbirth.

At time 1, all the participants were requested to fill out a battery of questionnaires to determine their socio-demographical data (e.g. age, educational level, work status, marital status, information about the length of their couple relationship) and the level of their psychopathological symptomatology, in terms of the presence of depression (Beck Depression Inventory (BDI) (Beck., *et al*. 1979; Ghisi., *et al*. 2006) and anxiety (Italian version of the State Anxiety Inventory (STAI_Y2; Spielberger., *et al*. 1983; Predabissi and Santinello 1989) symptoms.

At time 2, information regarding labor and childbirth was obtained from hospital records after delivery. This information included three labor outcomes, i.e.: duration of labor, administration of epidural analgesia, and administration of oxytocin.

Results showed that within the sample there were no premature deliveries (before 37 weeks) or newborns who needed intensive care. The duration of labor ranged from 4 to 18h. Seventy-seven women needed oxytocin administration and 48 needed epidural analgesia.

Moreover, results showed that high levels of prenatal anxiety and depression were significantly and positively associated with all of the clinical aspects of labor and negatively with the Apgar index. All variables linked to psychopathological symptomatology and labor aspects were significantly and negatively associated with the Apgar index.

Finally, as showed in figure 2, our results confirmed literature that psychopathogical symptomatology in third trimester is a significant risk factor for the well-being of the newborn, assessed through the Apgar index (Hasanjanzadeh and Faramarzi 2017).

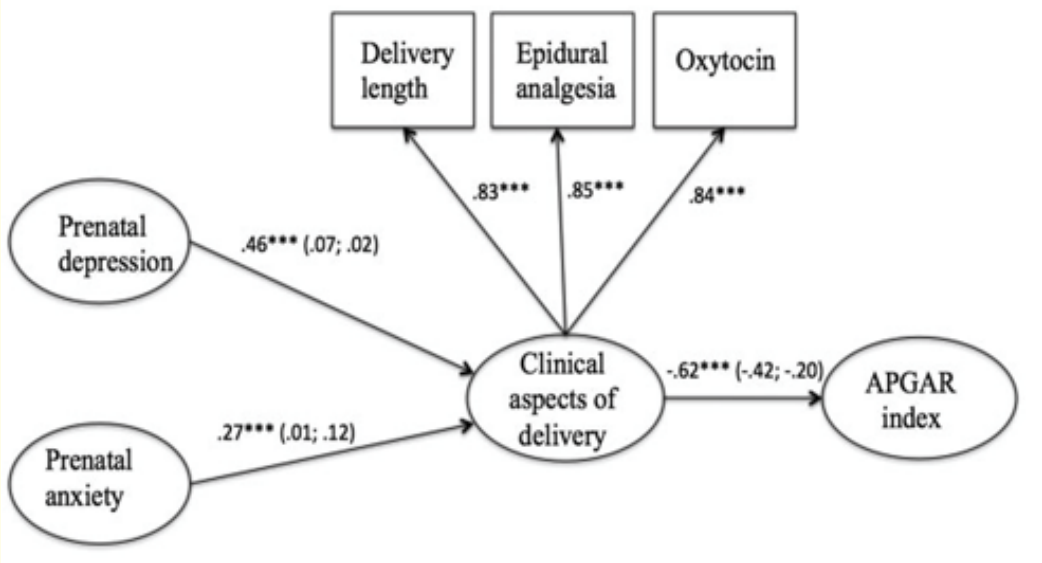

Figure 1: *Theoretical tested model.*

Specifically, both prenatal anxiety and depression symptomatology significantly affect the labor experience. The higher levels of these symptomatologies tend to predict a worse labor experience in terms of labor length and the amount of oxytocin and epidural analgesia. These clinical aspects of labor negatively influence the Apgar index of newborns.

Moreover, we found a significant and negative indirect effect of prenatal anxiety and depression on the Apgar index.

In line with the previous research, prenatal depressive symptomatology presents a significant risk condition for the well-being of newborns. According to previous studies, prenatal anxiety and depression may adversely affect the labor via maternal-placental-fetal neuroendocrine mechanisms (Johnson and Slade 2003). However, to our knowledge, this is the first study to analyze the indirect effect of affective disorder on fetal well-being via labor. It is reasonable to suppose that depression, from a psychological perspective, enhances pessimism, anger and ruminations about labor that, in turn, may affect labor management, resulting in a more negative neonatal outcome. Thus, it is possible that depressed women perceive the administration of oxytocin and epidural as signs of being unable to manage labor, in turn enhancing anger and sense of inability related to depression. In agreement with this, a recent study showed that anger may be related to maternal mood disorders during the perinatal period (Bruno., *et al*. 2018).

These encouraging results, however, did not seem sufficient to understand the complex interplay of several, both internal and external, factors related to delivery experience and PDD onset. Therefore, in a subsequent study, we tried to investigate the role of the birth experience on women's physical and mental health and wellbeing.

As I said, the birth of a child, especially if he/she is the first child, is a crucial event in a woman's life, and a positive delivery experience can result in a sense of accomplishment and feelings of self-worth and self-confidence. On the contrary, a negative experience in terms of complications with labor and delivery or medical intervention in delivery can result in detrimental consequences, ranging from feelings of maternal distress to PPD [21,27], especially in nulliparous who tend to be less self-confident in the maternal role [28].

Starting from these considerations, with Lucia Ponti, Andrea Smorti and I carried out a more recent study to investigate the influence of clinical aspects of labor in PPD onset.

To this aim, a new cohort longitudinal study was carried out in accordance with the guidelines for the ethical treatment of human participants of the Italian Psychological Association, in the Maternity ward of a public university hospital of the metropolitan area of Florence, Italy.

In this study, 186 nulliparous native Italian women, age >18 years, low risk singleton pregnancy, and no previous psychopathological diagnosis or pharmacological treatment for a mental disorder, were recruited when they attended delivery preparation courses.

The data was collected at two different times:

- At T1, the day of birth, clinical information regarding labor and delivery were registered from hospital records. Labor outcomes included: mode of delivery (vaginal vs. caesarian), duration of labor, administration of epidural analgesia, and administration of oxytocin. The last three outcomes were measured in hours (no analgesia or oxytocin administration = 0) and were treated as continuous variables.

- At T2, one month after birth, the level of mothers' PPD was assessed using the Italian version of the Edinburgh Postnatal Depression Scale (EPDS) [3].

For the data analysis, descriptive statistics and correlation analysis between the EPDS score and the clinical information about labor and delivery were performed. In addition, a linear regression analysis with the labor characteristics as independent variables and the PPD score as dependent variable was carried out.

Results showed that 88.2% of the women had a vaginal delivery (n = 164/ 186), and the remaining 11.8% had a caesarean delivery (n = 22).

Descriptive statistics and correlation analysis between all study variables are reported in table 1.

	M	SD	1	2	3	4
1. Duration of labor	7.48	2.34	-	.69**	.72**	.54**
2. Epidural analgesia	1.97	2.95		-	.76**	.61**
3. Oxytocin	1.23	1.97			-	.51**
4. Postpartum depression	8.16	5.20				-

Table 1: *Descriptive statistics and correlation analysis.*

As the table shows, PPD presents significant and positive correlations with all clinical variables regarding labor and delivery. In particular, high levels of women's depressive symptomatology were significantly and positively associated with delivery length, epidural analgesia and oxytocin.

Moreover, delivery length, epidural analgesia and oxytocin were all significantly and positively associated with each other.

Table 2 reports the summary of the linear regression analysis.

	B	SE	B St.	t	p	95% CI	
Duration of labor	.558	.192	.251	2.91	.004	.180	.936
Epidural analgesia	.750	.162	.426	4.64	.000	.431	1.07
Oxytocin	-.451	.295	-.171	-1.53	.128	-1.03	.131
Typology of delivery	-3.98	1.31	-.248	-3.04	.003	-6.57	-1.40

Table 2: *The summary of the linear regression analysis.*

Results of the linear regression analysis showed that the model composed by duration of labor, epidural analgesia, oxytocin and typology of delivery explained 42% of the variance.

Data analyses showed that caesarean delivery, and the duration of the administration of epidural analgesia, positively affected the severity of PPD. On the contrary, oxytocin administration did not significantly influence PPD onset.

Overall, our data show that the labor experience is a relevant factor that can significantly affect the subsequent maternal mood and PPD onset, and, consequently, have relevant effects on the child's health and development. For this reason, in order to foster a positive transition to motherhood, one of the main goals of nursing care is providing women with better information about the various possibilities and consequences of different types of labor, in order to help them understand and better control what is happening in this important moment of their life [29].

Conclusion

To conclude, what are the implications of these findings for clinical practice and/or further research?

In my opinion, these data confirm the importance of putting a new light on maternal psychological status during pregnancy and birth experience, considering them a complex human process in which psychological and physical aspects are highly interconnected, influencing maternal and newborn health and wellbeing.

These results highlight how important it is that, when approaching the delivery experience, healthcare professionals pay attention not only to the physical condition of pregnant women and newborns, but also to the psychological condition of women, given the impact this can have on delivery and, therefore, on the mothers' and children's wellbeing and development.

The promotion of physical and mental health during pregnancy constitutes a target in the new millennium.

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