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## Kangaroo care and postpartum depression: The role of oxytocin

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## ABSTRACT

**Problem:** Postpartum depression occurs in about 10–22% of women after birth and adversely affects their health and the health of their newborn. Kangaroo care is known to have many health-related benefits for both the mother and her newborn.

**Purpose:** The aim of this review was to gather the evidence linking the effects of kangaroo care with postpartum depression, specifically focusing on the proposed underlying mechanism involving the release of oxytocin.

**Method:** The literature review was conducted by targeting PubMed, CINAHL, and Google Scholar databases. The search terms used were postpartum depression, postnatal depression, oxytocin, oxytocin hormone, postpartum depression, kangaroo care, and skin-to-skin contact.

**Results:** Kangaroo care was found to play an important role in decreasing the risk for postpartum depression. Skin-to-skin contact during kangaroo care was found to trigger the release of oxytocin, which is hypothesized to minimize the risk for depressive symptoms as well as decrease maternal stress. The oxytocinergic system regulates the release of oxytocin, which is an effect that is opposite that which occurs with the human stress response, in which the sympathetic nervous system is activated to release catecholamines in response to harmful or threatening stimuli. The oxytocinergic system regulates calmness, connection, and socialization processes. During kangaroo care, oxytocin blocks the stress response and decreases the circulation of catecholamines, yielding positive outcomes that include maternal stress reduction and prevention of postpartum depression.

**Conclusion:** Kangaroo care can be used as a non-pharmacological intervention to prevent or decrease the risk of postpartum depression.

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## 1. Introduction

Postpartum depression (PPD) is an ongoing problem, affecting about 10–15% of women after birth [1]. The prevalence, however, is changing over time; during the postpartum period [2], the prevalence of PPD at 6–8 weeks postpartum ranges from 13% to 22%, and 10% at 12 weeks postpartum [3–5]. At 6 months of the postpartum period, the range is from 13% to 19% [6]. PPD is one of the most critical problems encountered during the postpartum period, not only because of its adverse effect on the mother and the newborn's health [7–10], but because 20% of postpartum deaths occur due to

suicide committed by the mother who was diagnosed with postpartum depression [11]. PPD negatively affects maternal-newborn interactions [9,12], the mother's social life and health [13].

Because the adverse outcomes of PPD are so profound, interventions and therapies have been sought to prevent or minimize PPD. An emerging therapy is skin-to-skin contact between the mother and her newborn, called kangaroo care (KC). The knowledge base relating KC to PPD treatment is still small, but growing. The paucity of literature linking KC with PPD may be contributing factor related to the limited use of KC by health care professionals [14].

In addition, a mechanism has been proposed by which KC may prevent or minimize the symptoms of PPD. It is likely that oxytocin, a hormone released into the bloodstream during childbirth and recently dubbed as the “cuddle chemical [15],” plays an intermediary role. The skin-to-skin contact provided during KC triggers the release of oxytocin, which may, in turn, minimize the new mother's

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risk of experiencing depressive symptoms. Therefore, the purpose of this literature review is to provide support for the hypothesis that oxytocin released during KC may minimize PPD. The evidence for the link between KC and PPD begins with a discussion of PPD, its theoretical definitions, etiology, signs, and symptoms. Then there will be a review of KC's physiology and, specifically, its effect on oxytocin levels. Finally, a description of KC's previously investigated effects on PPD will be presented. The literature review was conducted by targeting PubMed, CINAHL, and Google Scholar databases. The search terms used were postpartum depression, postnatal depression, oxytocin, oxytocin hormone, postpartum depression, kangaroo care, and skin-to-skin contact.

## 2. Postpartum depression (PPD)

Birth may not be so joyful when PPD is taken into consideration. Giving birth and having a newborn are stressful life events for some women because giving birth to a newborn can lead to major physiological, psychological, cultural, spiritual, and emotional changes [9]. The American Psychological Association (APA) defined PPD as a serious mental health problem characterized by a prolonged period of emotional instability, occurring up to four weeks after birth; PPD results from the major life change and increased responsibilities that follow the care of a newborn infant [16].

The signs and symptoms of PPD include changes in sleeping and eating patterns, anxiety and insecurity, emotional instability, mental confusion, loss of self, feelings of guilt and shame, and suicidal thoughts [8,9]. Based on a study by Kammerer and colleagues, 43% of the mothers who have experienced PPD lost their appetite, 16% had insomnia, 71% felt energy loss and fatigue, 50% experienced decreased concentration, 26% had feelings of worthlessness and a lack of self-esteem, and 16% experienced suicidal ideation [17].

### 2.1. Predisposing factors to PPD

Several predisposing factors for PPD exist; some are maternal in nature, whereas others are infant-based factors. The maternal factors include any social or personally challenging circumstances that the mother may have faced before, during, or after labor, as well as the mother's psychological or biochemical changes before, during, and after birth. Infant factors include any medical conditions that require the newborn to receive special care [7,18,19].

Beck [7] conducted a meta-analysis of 44 studies to determine the predictors of PPD revealed in the literature. The following predictors were identified: prenatal depression, maternity blues, stress, social support, prenatal anxiety, marital dissatisfaction, history of depression, infant temperament, maternal self-esteem, socioeconomic status, marital status, unplanned or unwanted pregnancy, and childcare stress. Beck used the effect sizes from the studies she reviewed to determine the strength of the link between each predictor and PPD. The effect sizes were set at 0.2 to represent a small relationship, 0.4 to indicate a medium relationship, and 0.8 for a strong relationship. The meta-analysis showed that the predictors with a small effect size were socioeconomic status, marital status, and unplanned or unwanted pregnancy. Most of the other predictors had a medium effect size; prenatal depression had the strongest effect size ( $d = 0.75$ ). This finding indicates that mothers who have a history of prenatal depression are at higher risk of developing postpartum depression.

Another study was conducted on 12,361 women who completed Edinburgh Postnatal Depression Scale (EPDS), wherein they were screened for the psychosocial factors that can lead to depression by using a self-report psychosocial risk factor questionnaire (PSRFQ). The results showed that 925 (7.5%) of the mothers had postpartum

depression because they scored more than 12 in the EPDS. The strongest risk factors for postpartum depression found among this population were: a previous history of depression and low social support [20]. Furthermore, Roomruangwong, Withayavanitchai, and Maes found similar results when they conducted their study on 53 postpartum women who had high levels of depression at 4–6 weeks postpartum [21].

Moreover, Dennis, Janssen, and Singer conducted a longitudinal study on 594 women at 1 and 8 weeks during their postpartum period in Vancouver, British Columbia. The risk factors they analyzed were sociodemographic factors, biological factors, pregnancy-related factors, life stressors, social support, obstetric factors, and adjustment to motherhood. The results of their study showed that 29.4% of the mothers had PPD at 1 week, and at 8 weeks the rate was 20.2%. The strongest predictors of postpartum depression found in their study were: history of depression, stressful life events, lack of perceived support, lack of readiness for hospital discharge, and dissatisfaction with infant feeding [22]. Eberhard-Gran, Eskild, Tambs, Samuelsen, and Opjordsmoen found similar results in their study. In addition to the history of depression and lack of social support, these researchers found that mothers who did not breastfeed their newborns and first-time mothers had higher depression scores [23].

### 2.2. Negative effects of PPD

PPD has several negative effects on infants, such as altered growth, greater risk of fussiness, less interaction with their mothers, and difficulties with sleeping and eating; separation problems have been found to occur later in life [24].

Surkan and colleagues [10] performed a prospective longitudinal study on 6550 singleton births followed from birth through 6 years of age and classified these according to the level of maternal depression. Mothers with moderate or severe PPD had children of shorter stature in their first 6 years of life than mothers who did not have PPD. Negative effects on maternal–infant interactions have been documented as well. Depressed mothers often experience less visual and focal communication with their newborns than non-depressed mothers [25–27]. Also, Beck [13] conducted a meta-analysis of 19 studies to examine the effects of PPD on mother–infant interactions. The results showed that PPD had medium to large negative effects on mother–infant interactions during the first year of birth. Beck explained that if the mother is emotionally unstable, the dyad interaction between a mother and her newborn is unlikely to occur.

In addition, PPD negatively affected breastfeeding and infant weight. Gaffney, Kitsantas, Brito, and Swamidoss conducted a study on 1447 mother–infant dyads and found that the mothers who had PPD breastfed their infants less frequently than mothers without PPD; these mothers also added cereal to the infant formula earlier, which led to an increased risk for being overweight among these infants [28]. Moreover, the researchers reported that infants of the depressed mothers were admitted to hospitals and visited emergency rooms more frequently during the first year than those infants born to non-depressed mothers. Infants with depressed mothers also had fewer checkup visits during the first 2 years of the child's life when compared to the infants of non-depressed mothers [29].

### 2.3. Strategies to treat postpartum depression

Several strategies are used to treat PPD, including pharmacological and non-pharmacological interventions [30]. Regarding pharmacological interventions, few studies have measured the effectiveness of pharmacological treatment in mothers diagnosed

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