

Reducing Postpartum Depression in Mothers with Preterm Infants: A Narrative Review.

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Abstract

Postpartum depression is a prevalent mood disorder that continues to affect mothers and their infants around the world. Mothers of preterm infants are more likely to experience symptoms of PPD as they are more likely to face challenges such as medical complications, prolonged neonatal intensive care unit (NICU) stays, and uncertainty about developmental outcomes. These factors increase their vulnerability to PPD, which, if untreated, can impair maternal caregiving, hinder emotional bonding, disrupt infant development, and lead to long-term consequences for both mother and child. This narrative review examines non-pharmaceutical interventions aimed at preventing PPD in mothers of preterm infants. Strategies evaluated include Kangaroo Mother Care (KMC), Cognitive Behavioral Therapy (CBT), educational interventions for NICU staff, parental engagement, and Problem-Solving Education (PSE). Among these, KMC and NICU-focused educational interventions demonstrated statistically significant reductions in PPD scores, supporting their potential to improve maternal mental health and promote positive infant outcomes. However, other methods, such as CBT and PSE, showed limited effectiveness and require further investigation. Preventing PPD in mothers of preterm infants is critical for maternal well-being and infant development. The

evidence stresses the vital need for targeted, evidence-based interventions while also emphasizing the necessity for further research to enhance care and outcomes for this vulnerable population. Early identification and intervention remain key to mitigating the adverse effects of PPD.

Keywords: neonatal intensive care unit; kangaroo mother care; cognitive behavioral therapy; problem-solving education; postpartum depression.

Introduction:

Postpartum depression (PPD) continues to be a serious mood disorder that occurs in some mothers after childbirth and is more prevalent in women with preterm infants. [1] It is estimated that 40% of mothers with preterm infants experience symptoms of PPD, compared to 10-20% of mothers with full-term infants who experience PPD symptoms. [1,2] PPD can develop in the weeks following childbirth with symptoms of persistent sadness, changes in behavior, hopelessness, changes in appetite, changes in sleep, irritability, and difficulty bonding with the baby. [2] Symptoms can develop during the first year postpartum, with various risk factors. PPD is generally treated with therapy, medications, or both. [2]

One of the biggest risk factors for PPD is the preterm birth of an infant. Preterm birth is defined as the delivery of a baby before 37 weeks of gestation. [3] Preterm infants face an increased risk of health complications because their vital organs, including the lungs, brain, and digestive system, are not fully developed. These complications may include respiratory difficulties, feeding challenges, infections, and potential long-term developmental issues. [3] The increased prevalence of PPD in mothers with preterm infants can be related to the complications involved in preterm birth, such as admission to the neonatal intensive care unit (NICU), health complications of the infant, threatened survival of the infant, uncertain developmental outcomes, and financial stressors. [4] Mothers of extremely preterm infants born before 28 weeks of gestation experience the highest rates of postpartum depression (PPD), primarily due to severe medical complications and prolonged hospital stays. [5] Furthermore, PPD symptoms in these mothers often last longer than in those of full-term infants, with many continuing to experience depressive symptoms well beyond the typical postpartum period. [6]

The postpartum period is already difficult and comes with many challenges, especially for mothers with preterm infants. PPD can have significant negative effects on mothers of preterm infants, which can, in turn, negatively affect the infant and the mother's support system. [4] Preventing PPD in mothers of preterm infants is essential because of the heightened vulnerabilities faced by both mother and child. Preterm infants often require specialized medical care, including prolonged stays in NICUs, regular medical follow-ups, and early developmental support. [4] These demands place significant emotional, physical, and financial burdens on mothers, increasing their risk of PPD. If left unaddressed, PPD can impair maternal caregiving and negatively impact the infant's health, development, and long-term well-being. [4] Postpartum depression in mothers of preterm infants often leads to decreased maternal responsiveness, which can disrupt emotional bonding and attachment, both essential for the infant's healthy development. [7] Preterm infants, who are already at an elevated risk for cognitive, emotional, and behavioral delays, rely on consistent, nurturing care to promote optimal neurodevelopment. [7] Untreated PPD can further hinder a mother's ability to engage in developmental therapies, maintain feeding routines, or manage critical medical follow-ups, compounding the challenges faced by the infant and potentially affecting long-term outcomes. [4] A mother's diagnosis of postpartum depression (PPD) is considered an Adverse Childhood Experience (ACE), which has been linked to negative effects on various aspects of a child's mental

and physical health throughout their life, which highlights the importance of reducing PPD in this population. [8]

In this paper, various methods of preventing PPD in mothers with preterm infants will be discussed. Multiple approaches include Kangaroo Mother Care, Cognitive Behavioral Therapy, educational intervention, parental engagement, and Problem-Solving Education. These methods strive to reduce PPD in mothers of preterm infants and, in turn, aim to reduce the negative consequences of PPD in this population.

Methods:

This paper is a narrative review of the current literature regarding the prevention of PPD in women with preterm infants born before 37 weeks of gestation. Electronic databases, including PubMed, Cochrane Database of Systemic Reviews, and CINAHL were utilized to locate randomized control trials, meta-analyses, research articles, systemic reviews, and prospective cohort studies. The search criteria identified studies ranging from 2004 to 2024. The keyword search items included "postpartum depression," "preterm infants," "NICU," and "prevention." Articles that were published in the English language were the only studies included. Abstracts of articles were examined to determine if they were relevant to the topic, and duplicates were removed. Once studies were selected for inclusion, the full-text articles were reviewed to assess their outcomes.

Results:

The prevention of PPD in mothers of preterm infants was evaluated by the literature. Most of the studies used the Edinburgh Postnatal Depression Scale to evaluate the likelihood of postpartum depression and to monitor changes in scores in the postnatal period. Preterm infants were defined as infants born before 37 weeks of gestation, and while some showed that results may be more effective in mothers of severely preterm infants, it is difficult to compare these situations as outcomes vary greatly depending on a multitude of factors. While postpartum depression may be treated pharmaceutically, most studies focused on non-pharmaceutical methods. Various approaches for reducing PPD in mothers of preterm infants were evaluated for effectiveness. These approaches included Kangaroo Mother Care, Cognitive Behavioral Therapy, educational intervention, parental engagement, and Problem-Solving Education. Of these various strategies, the use of Kangaroo Mother Care (KMC) proved to be statistically significant in its ability to reduce PPD in mothers with preterm infants.

Educational intervention for NICU staff also proved to be statistically significant in its ability to reduce depression scores in the intervention cohort. The use of Cognitive Behavioral Therapy, parental engagement, and Problem-Solving Education may have some benefits but due to their inability to demonstrate statistical significance, it is not recommended that these methods replace the standard of care, and they may require further analysis and additional studies. There may be many other non-pharmaceutical methods to help reduce PPD in this population that are not discussed in this paper due to the very limited studies conducted on this subject.

Discussion:

Kangaroo Mother Care (KMC):

Kangaroo Mother Care (KMC) is a method of care for preterm infants that involves early and prolonged skin-to-skin contact between the mother and the infant. [9] Kangaroo Mother Care (KMC) has been demonstrated to support thermal regulation, strengthen emotional bonding, increase breastfeeding success, and lower the rates of mortality and morbidity in preterm infants by addressing both their physiological and emotional needs. [9,10] While particularly advantageous in resource-limited settings, KMC is gaining global recognition and is increasingly being implemented as a standard of care for preterm and low-birth-weight infants. [9,10] Herizchi, S., Hosseini, M. B., and Ghoreishizadeh, M. conducted a prospective cohort study consisting of 60 mothers with preterm infants divided into two groups; those with 3 times or more per day of KMC and those with 3 times or less per day. [11] There was no significant difference in Edinburgh Postnatal Depression Scale (EPDS) scores on the 10th day ($p=0.07$); however, significant differences were observed on the 20th and 30th days ($p<0.001$). [11] These findings suggest that KMC may reduce the incidence of maternal depression over time.

A randomized control trial was conducted on mothers of low-birth-weight infants, and while they did not specifically study mothers of preterm infants, many of the infants included were preterm which resulted in a lower birth weight. Mothers were randomized into either the intervention group, which promoted KMC in the form of skin-to-skin contact and breastfeeding, or the standard care group. [12] The proportion of mothers with moderate-to-severe postpartum depressive symptoms was 10.8% (95% CI, 8.9%-12.9%; 105 of 974 mothers) in the intervention group vs 13.6% (95% CI, 11.4%-16.1%; 116 of 852 mothers) in the control group. [12] The adjusted relative risk of moderate-to-severe

maternal postpartum depressive symptoms was 0.75 (95% CI, 0.59-0.96). [12] The findings of this study support the use of community-initiated KMC practices to help reduce postpartum symptoms in mothers.

Cognitive Behavioral Therapy:

Cognitive Behavioral Therapy (CBT) is a form of psychotherapy that focuses on identifying and modifying negative thought patterns and behaviors to improve emotional regulation and problem-solving skills. [13] It is commonly used to treat various mental health conditions, including depression, anxiety disorders, post-traumatic stress disorder, and obsessive-compulsive disorder. [14] A randomized control trial aimed to reduce postpartum depression in mothers with preterm infants by randomizing participants to either six sessions of cognitive behavioral therapy or standard care for the control group. [15] A total of 199 women were enrolled in the study, with 101 randomized to the intervention group and 98 to the control group. Over the 12 months following a very preterm delivery, 54 mothers (27%) were diagnosed with minor or major depression. [15] This included 29 mothers (29%) in the intervention group and 25 mothers (26%) in the control group, resulting in a relative risk of 1.1 (95% CI, 0.80-1.5). [15] The intervention group did not reduce the prevalence of PPD in these mothers.

Educational Intervention:

The Close Collaboration with Parents intervention was implemented in the NICU at Turku University Hospital in Finland. [16] The study introduced a training program for NICU staff to help reduce postpartum depression in mothers with preterm infants. [16] The training focused on involving the whole healthcare team, using various teaching methods to observe infant behavior, behaviors of the families, and staff training to help families throughout the NICU stay and the transition home. [16] Depression scores were significantly lower in the post-intervention cohort compared to the pre-intervention cohort, with an estimated difference of 2.54 points (95% CI, 1.24-3.83; $p<0.001$). [16] Additionally, 10.3% of mothers in the pre-intervention cohort and 2.1% in the post-intervention cohort exceeded the threshold for depression, though this difference did not reach statistical significance ($p=0.066$). [16] The Close Collaboration with Parents intervention effectively reduced depression scores among mothers of very preterm infants.

Parental Engagement:

Xie, J., Zhu L., Zhu T., et al conducted a study where preterm infants were randomized to receive early parental interaction (EPI) or standard postnatal care. [17] Kangaroo Mother Care was considered the standard care and the EPI intervention was performed in addition to standard care. [17] Parents of infants in the intervention group were trained on daily infant massage therapy and activities to stimulate visual attention in the babies. [17] Early parent-infant interaction had no significant impact on infant development, either in the early stages or later on. Similarly, it did not affect early maternal adjustment or the long-term mother-infant relationship. [17] While the number of mothers to obtain an Edinburgh Postnatal Depression Scale of 12 or more was more in the standard care group compared to the EPI group, this was not statistically significant. Mean EDPS scores for the intervention group were 5.7 ± 3.5 , while the standard care group was 5.9 ± 3.9 with a p-value of 0.260. [17] In the EPI group, a EDPS of ≥ 12 was obtained from 9 mothers as compared to 11 mothers in the standard care group ($p=0.153$). [17] While there is no statistical significance to changing standard care to include EPI in postnatal care, it may still be implemented if parents wish. The skills practices included in EPI can be done with little to no cost and could be conducted by parents as a personal preference. More studies and trials may need to be conducted to show statistical significance.

Problem-Solving Education:

Problem-Solving Education (PSE) is a structured, manualized cognitive-behavioral intervention adapted from Problem-Solving Treatment, an evidence-based approach to depression treatment. [18] During a PSE session, educators assist participants in identifying a specific, measurable problem and guide them through a systematic process that includes goal setting, brainstorming potential solutions, evaluating options, selecting the best solution, and developing an actionable plan. [18] A randomized control trial developed a PSE course for the intervention group where four sessions were completed one-on-one with the parents of preterm infants and were conducted weekly or biweekly. PSE mothers experienced an episode of moderately severe depression symptoms over the 6-month follow-up period (24% vs. 44%; relative risk 0.66, 95% CI 0.39, 1.11). [18] Mothers who received PSE experienced an average of 0.52 symptomatic episodes over the 6 months of follow-up, compared to 1.19 episodes among control mothers (rate ratio 0.41, 95% CI 0.15, 1.17). [18] While no results proved to be statistically significant, it is suggested that PSE may still be helpful for low-income families pending further studies.

Conclusion:

Postpartum depression (PPD) is a significant mood disorder affecting up to 40% of mothers with preterm infants compared to 10-20% of mothers with full-term infants. [1,2] Mothers of preterm infants face unique challenges, including extended NICU stays, medical complications, and financial stressors, all of which heighten their risk for PPD. Untreated PPD can impair maternal caregiving, hinder infant development, and have long-term consequences for both mother and child. Given the heightened vulnerabilities of this population, preventing PPD is critical. Non-pharmaceutical interventions such as Kangaroo Mother Care (KMC), Cognitive Behavioral Therapy (CBT), parental engagement, and Problem-Solving Education have been explored as potential strategies to reduce PPD. Among these, KMC and educational interventions for NICU staff demonstrated statistically significant reductions in depression scores, whereas other methods showed limited effectiveness or lacked sufficient evidence.

In conclusion, addressing PPD in mothers of preterm infants is essential for improving maternal well-being and promoting optimal outcomes for infants. The effectiveness of KMC and NICU-focused educational interventions highlights the importance of targeted, evidence-based approaches. However, further research is needed to explore additional non-pharmaceutical methods and refine existing strategies to better support this vulnerable population. Early identification, prevention, and intervention remain vital to mitigating the consequences of PPD.

References:

1. Lefkowitz DS, Baxt C, Evans JR. Prevalence and Correlates of Posttraumatic Stress and Postpartum Depression in Parents of Infants in the Neonatal Intensive Care Unit (NICU). *J Clin Psychol Med Settings*. 2010;17(3):230-237.
2. O'Hara MW, Wisner KL. Perinatal mental illness: Definition, description and aetiology. *Best Pract Res Clin Obstet Gynaecol*. 2014;28(1):3-12.
3. Goldenberg RL, Culhane JF, Iams JD, Romero R. Epidemiology and causes of preterm birth. *The Lancet*. 2008;371(9606):75-84.
4. Miles MS, Holditch-Davis D, Schwartz TA, Scher M. Depressive Symptoms in Mothers of Prematurely Born Infants: *J Dev Behav Pediatr*. 2007;28(1):36-44.
5. Gorzilio DM, Garrido E, Gaspardo CM, Martinez FE, Linhares MBM. Neurobehavioral development prior to term-age of preterm infants and acute

stressful events during neonatal hospitalization. *Early Hum Dev.* 2015;91(12):769-775.

6. Poehlmann J, Schwichtenberg AM, Bolt D, Dilworth-Bart J. Predictors of depressive symptom trajectories in mothers of preterm or low birth weight infants. *J Fam Psychol.* 2009;23(5):690-704.
7. Field T. Postpartum depression effects on early interactions, parenting, and safety practices: A review. *Infant Behav Dev.* 2010;33(1):1-6.
8. Saharoy R, Potdukhe A, Wanjari M, Taksande AB. Postpartum Depression and Maternal Care: Exploring the Complex Effects on Mothers and Infants. *Cureus.* Published online July 4, 2023.
9. Charpak N, Gabriel Ruiz J, Zupan J, et al. Kangaroo Mother Care: 25 years after. *Acta Paediatr.* 2005;94(5):514-522.
10. Conde-Agudelo A, Díaz-Rossello JL. Kangaroo mother care to reduce morbidity and mortality in low birthweight infants. Cochrane Neonatal Group, ed. *Cochrane Database Syst Rev.* 2016;2017(2).
11. Herizchi S, Hosseini MB, Ghoreishizadeh M. The Impact of Kangaroo-Mother Care on Postpartum Depression in Mothers of Premature Infants. *Int J Womens Health Reprod Sci.* 2017;5(4):312-317.
12. Sinha B, Sommerfelt H, Ashorn P, et al. Effect of Community-Initiated Kangaroo Mother Care on Postpartum Depressive Symptoms and Stress Among Mothers of Low-Birth-Weight Infants: A Randomized Clinical Trial. *JAMA Netw Open.* 2021;4(4):e216040.
13. Beck AT. Cognitive therapy: Nature and relation to behavior therapy. *Behav Ther.* 1970;1(2):184-200.
14. Hofmann SG, Asnaani A, Vonk IJJ, Sawyer AT, Fang A. The Efficacy of Cognitive Behavioral Therapy: A Review of Meta-analyses. *Cogn Ther Res.* 2012;36(5):427-440.
15. Hagan R, Evans SF, Pope S. Preventing postnatal depression in mothers of very preterm infants: a randomised controlled trial. *BJOG Int J Obstet Gynaecol.* 2004;111(7):641-647.
16. Ahlqvist-Björkroth S, Axelin A, Korja R, Lehtonen L. An educational intervention for NICU staff decreased maternal postpartum depression. *Pediatr Res.* 2019;85(7):982-986.
17. Xie J, Zhu L, Zhu T, et al. Parental Engagement and Early Interactions With Preterm Infants Reduce Risk of Late Postpartum Depression. *J Nerv Ment Dis.* 2019;207(5):360-364.
18. Silverstein M, Feinberg E, Cabral H, et al. Problem-solving education to prevent depression among low-income mothers of preterm infants: a randomized controlled pilot trial. *Arch Womens Ment Health.* 2011;14(4):317-324.