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### The Effect of Infant Massage on Postpartum Depression and Maternal Attachment: A Literature Review

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#### **Abstract**

The postpartum period can be both exciting and challenging for mothers. During this time, women may potentially experience postpartum depression (PPD) due to various factors such as hormonal changes, breastfeeding and sleep problems, increased stress load, infant care, and adjustment to maternal roles. PPD poses a serious risk to both maternal and infant health. Infant massage, with its positive effects on PPD and maternal attachment, has been encouraged as a practice taught to mothers in recent years. This review examines the effects of infant massage on mothers during the postpartum period. Findings suggest that infant massage may be an effective method in reducing PPD symptoms and strengthening maternal attachment. By enhancing the emotional bond between mother and baby, reducing stress, and increasing oxytocin levels, infant massage contributes to alleviating symptoms of PPD. It is important for nurses to educate and promote infant massage among mothers during the postpartum period. Infant massage may play a significant role in reducing PPD risk and enhancing mother-infant attachment. Further research could evaluate the long-term effects of infant massage and its effects on mothers from different demographic groups in more detail. This review demonstrates that infant massage is a beneficial practice for mothers during the postpartum period and highlights the importance of nurses promoting this practice.

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## 1. Introduction

The postpartum period is an exciting, yet equally challenging time in women's lives. New mothers experience immense joy with the birth of their baby, but they also face significant physical and emotional changes and adaptation. Factors such as hormonal changes, breastfeeding and sleep problems, increased stress load, infant care, and adjustment to maternal roles during this period can make women emotionally vulnerable and potentially lead to serious psychological disorders such as postpartum depression (PPD) (Klein et al., 2024).

PPD is a serious mood disorder associated with biological changes in hormone levels and other postpartum-related factors (Yu et al., 2021). According to the Diagnostic and Statistical Manual of Mental Disorders: DSM-5™ criteria, PPD is defined as depressive symptoms that begin during pregnancy or within four weeks following childbirth (American Psychiatric Association, 2013). Postpartum depressive symptoms can persist up to 12 months after childbirth (Centers for Disease Control and Prevention, 2008; World Health Organization, 2016). According to a comprehensive meta-analysis examining the prevalence of PPD worldwide, it was found to be 17.22% (Wang et al., 2021). Another meta-analysis revealed that approximately one in eight women experiences depressive symptoms postpartum, with one in fifteen experiencing severe depression, and the prevalence is higher in low- and middle-income countries compared to developed countries (Bai et al., 2023). In Turkey, meta-analytical studies have indicated a prevalence of PPD ranging from 21.2% to 25% (Karaçam et al., 2018; Özcan et al.,

2017). Although the exact cause of PPD remains unclear, it is known to be influenced by biological, psychological, and psychosocial factors, along with various risk factors. Pregnancy and postpartum hormonal changes, age, history of previous depression, body image disturbance due to weight changes, low self-esteem, unwanted pregnancy, obstetric stressors, increased daily life stress with the addition of infant care, difficult infant temperament, poor marital relationship and inadequate social support, low socioeconomic status, and domestic violence are mentioned as factors predisposing to PPD (Cafiero & Zabala, 2024; Klein et al., 2024; Ozkan-Sat & Söylemez, 2024; Sharma & Khera, 2024; Stewart & Vigod, 2019; Wang et al., 2024). Women experiencing PPD may exhibit frequent crying, appetite disturbances, sleep problems, feelings of helplessness, emotional instability, guilt feelings, anhedonia, indifference, low energy, fatigue, irritability, decreased concentration, memory and libido, along with symptoms such as decreased libido (Cafiero & Zabala, 2024; Sharma & Khera, 2024; Stewart & Vigod, 2019; Wang et al., 2024). Additionally, symptoms such as suicidal ideation can be observed in women with PPD. In a study, it was stated that the risk of suicidal behavior in women with PPD is three times higher compared to women without depression (Yu et al., 2024). Moreover, the disturbing thought of harming their babies in women with advanced PPD to psychosis is a worrying situation for maternal and infant health (Brockington, 2017; Spinelli & Bramante, 2022).

The depressive symptoms experienced by the mother can affect her daily activities and have a negative impact on infant care. Furthermore, the depression experienced by the mother can have significant negative effects on her infant's emotional, behavioral, cognitive, and language development (Cafiero & Zabala, 2024; Saharoy et al., 2023). PPD can also affect maternal-infant attachment (Cafiero & Zabala, 2024). Maternal-infant attachment forms the basis for healthy emotional development. A healthy bond established between mother and baby helps babies feel secure, emotionally satisfied, and adapt to the world (Epstein, 2023). The first year of motherhood involves getting to know and establishing a strong bond with the baby. During this process, the mother's ability to identify and provide appropriate responses to the baby's needs is directly proportional to her capacity for bonding with the baby. A mother who forms a healthy bond with her baby can respond appropriately to the baby's needs to the same extent (Lang, 2018; Shoghi et al., 2018). However, mothers experiencing PPD may struggle with the attachment process, which can negatively affect their baby's emotional development (O'Dea et al., 2023). Depression and maternal attachment are closely related concepts. Both through the effect of depression on the mother's attachment process and the effect of the quality of the mother's attachment on depressive symptoms, they are interrelated (Li, 2023; Özşahin et al., 2020; Śliwerski et al., 2020).

Therefore, it is important to address these two factors together, as a positive change in one can positively affect the other (Li, 2023).

Infant massage has been encouraged as a practice taught to mothers in recent years due to its positive effects on both depression and maternal attachment (Geary et al., 2023). Infant massage is a traditional practice used by mothers in many cultures for thousands of years (Hétu, 2023; Katona, 2021; McClure, 2017). Recent research has revealed numerous physiological and emotional benefits of infant massage for both mother and baby (Chan et al., 2018; Erçelik & Yılmaz, 2023; Midtsund et al., 2019; Moussa et al., 2021; Mrljak et al., 2022). This review aims to examine the effects of infant massage on PPD and maternal attachment experienced by mothers during the postpartum period. Additionally, it will help better understand the role of infant massage as a preventive approach to improving maternal health.

## 2. Infant Massage

Infant massage is essentially a technique performed on the baby's body using gentle touches, soft movements, and light pressure (Field, 1994; McClure, 2017). Infant massage has positive effects on both maternal and infant health with its physiological, emotional, and psychological benefits (Nousia, 2023). The roots of infant massage can be traced back to ancient times. In India, as part of Ayurvedic medicine, it is known that babies were massaged to improve their physical and emotional health (Field, 1994; McClure, 2017).

More commonly in Africa and Asia, infant massage is widely used to promote healthy development and strengthen immune systems by massaging babies for several months after birth. Infant massage is also a common practice worldwide outside Africa and Asia (Auckett, 1979; Field, 1994; McClure, 2000). Modern applications of infant massage began to gain popularity in the West in the 1970s. Dr. Frederick Leboyer, observing Indian infant massage in 1979, shared his research and recommendations on the benefits of infant massage for mothers and babies in his book, contributing to the spread of infant massage in Western culture (Leboyer & Elbrecht, 2013). Two important figures in spreading infant massage in Western societies are Tiffany Field and Vimala McClure. Tiffany Field established the Touch Research Institute in Miami, United States, in 1992, and made numerous scientific contributions to the literature on the effects of touch and massage on human health (the University of Miami School of Medicine, 2024). Vimala McClure, on the other hand, founded the International Association of Infant Massage (IAIM) in the United States in 1976, providing guidance on the implementation and education of infant massage. She has been training infant massage educators and promoting the spread of infant massage worldwide through representations established in 100 countries (International Association of Infant Massage, 2024). The IAIM program, established by Vimala McClure, is based on the combination of Indian and Swedish massage, gentle yoga movements, and reflexology principles. The IAIM infant massage program is based on specific principles and techniques. The program teaches parents massage techniques while encouraging them to practice on their babies simultaneously, helping

them to build a stronger bond with their infants. The training includes massage and relaxation techniques, understanding infant cues, and bonding activities. The program respects different cultural practices and traditions. The IAIM program consists of weekly sessions over 5 weeks and is conducted by certified instructors who regularly form groups for implementation (McClure, 2017).

### 3. The Effects of Massage on Postpartum Depression

When examining the effects of infant massage on PPD, it is observed that various psychological and physiological factors come together to contribute significantly to the reduction of depression symptoms and the improvement of the mother's well-being. Infant massage is believed to affect PPD symptoms through a set of physiological mechanisms involving hormonal processes (Field, 2016). It has been found that individuals showing depression symptoms have low levels of oxytocin (Tuman et al., 2021). Gentle touches and skin contact during infant massage have been found to increase oxytocin levels in both mothers and babies (Moussa et al., 2021). The increase in oxytocin levels is believed to contribute to a decrease in anxiety levels and a transition to a calmer state of mind (Nagahashi-Araki et al., 2022), thus aiding in reducing PPD symptoms. A systematic review focusing on the effects of mother-led infant massage on PPD symptoms found that mothers who massaged their babies had lower depression scale scores compared to the non-massage group (Geary et al., 2023). Another systematic review also indicated that mother-led infant massage reduced anxiety, stress, and

depressive symptoms, while enhancing mother-infant interaction (McCarty et al., 2023).

Another hormone playing a role in the effects of infant massage on PPD is cortisol. Cortisol is a hormone released during times of stress. High levels of cortisol in the body can lead to stress, anxiety, and depression (Chojnowska et al., 2021). In a study, saliva samples were collected from mothers immediately after massaging their babies, and a significant decrease in cortisol levels was observed compared to saliva samples taken before the massage (McCarty et al., 2024). The decrease in cortisol levels is thought to contribute to a reduction in stress and anxiety, and thus a alleviation of depression symptoms (Chojnowska et al., 2021).

Serotonin and dopamine, known as happiness hormones, are also hormones that could potentially affect PPD. It is known that levels of serotonin and dopamine are low in depressive patients (Jauhar et al., 2023; Mizuno et al., 2023). Serotonin and dopamine are hormones that contribute to mood improvement, pleasure, increased feelings of happiness, and coping with stress (Baixauli, 2017). It has been found that touches during infant massage increase serotonin by 28% and dopamine by 31% (Field et al., 2005).

During massage, activation of the vagal nerve occurs by stimulating pressure receptors under the baby's skin. Vagal activation stimulates the parasympathetic nervous system, leading to a decrease in the baby's heart rate, relaxation, and calming. A mother who relaxes and calms her baby through massage increases her self-confidence and can cope more effectively with daily challenges (Field, 2019).

In addition to hormonal processes and activation of the vagal nerve, infant massage can also provide benefits for PPD through psychological effects. In a systematic review examining 8 eight articles on this topic conducted in 2023, it was reported that women who massaged their babies experienced a decrease in depression symptoms and depression scale scores, an increase in sleep quality, an improvement in overall mood, and were more motivated to engage in touch with their babies. The study also found that mothers developed closer bonds with their babies, experienced a decrease in feelings of guilt, and increased calmness and self-confidence (Geary et al., 2023).

#### **4. The Effects of Infant Massage on Maternal Attachment**

There is a strong relationship between PPD and maternal bonding (Li, 2023). The positive effects of infant massage on PPD can also be anticipated to extend to maternal bonding. A systematic review and meta-analysis have found that infant massage enhances mother-infant bonding (Zhang et al., 2023).

When examining the effects of infant massage on maternal bonding, it is evident that it contributes to the strengthening of emotional relationships between mothers and their babies (Nousia, 2023). One significant factor behind this strengthening is the role of oxytocin hormone. Oxytocin, known as the love and bonding hormone, promotes emotional bonding (Shorey et al., 2023). It has been observed that both mothers and babies experience an increase in oxytocin levels due to infant massage (Moussa et al., 2021; Shorey et al., 2023). The increased oxytocin levels facilitate mothers in forming stronger emotional bonds

with their babies (Li et al., 2022; Saharoy et al., 2023; Shorey et al., 2023).

Effective communication between a mother and her baby enables the mother to interpret her baby's responses more accurately, understand her baby better, and respond more sensitively to her baby's needs. Massaging the baby contributes to the mother's ability to understand her baby. This, in turn, leads to the mother feeling more successful and increases her self-confidence. A study found that mothers who massage their babies have higher self-confidence scale scores compared to those who do not (Erçelik & Yılmaz, 2023). Mother's self-confidence also emerges as a factor that enhances the bond between the mother and her baby (Kadiroğlu & Güdücü Tüfekci, 2022).

A decrease in stress levels during infant massage can lead to a more positive interaction between the mother and her baby, strengthening their bond (Bonacquisti et al., 2020; Lutkiewicz et al., 2020). Studies have shown that mothers who massage their babies are more likely to accept the maternal role, feel more competent in this role, experience an increase in the quality of time spent with their baby, have a positive impact on their own parenting skills, and strengthen their self-respect (Chan et al., 2018; Midtsund et al., 2019).

### **5. The Role of Nurses in Promoting Baby Massage Practice During the Postpartum Period**

The postpartum period is a critical time during which nurses play an important role in providing care focused on maternal and infant health. Infant massage emerges as a significant practice supporting the health of both mothers and infants during this period. Nurses

play a vital role in promoting the implementation of infant massage in the postpartum period. Nurses can provide education to parents about the benefits of infant massage to contribute to strengthening the bond between mother and baby. These educational sessions can assist mothers in learning infant massage techniques and confidently applying them. Additionally, nurses can highlight the emotional relaxation and bonding benefits of infant massage by understanding the emotional challenges experienced by mothers in the postpartum period. It is crucial for nurses to provide counseling and guidance to ensure the proper application of infant massage. By listening to mothers' concerns and offering support tailored to their needs, nurses can facilitate the practice of infant massage. Furthermore, nurses can provide information about the physiological and emotional benefits of infant massage and emphasize its positive effects on maternal and infant health. In this way, nurses can contribute to increasing the implementation of infant massage in the postpartum period and play a significant role in supporting maternal and infant health (Erçelik & Yılmaz, 2023; Gürol & Polat, 2012).

### **6. Conclusion**

This review has evaluated the effects of infant massage on mothers during the postpartum period by examining the existing literature and has reached significant findings. It emphasizes the potential positive impact of infant massage on postpartum depression (PPD) and maternal attachment. The data obtained indicate that infant massage may be an effective method for reducing PPD symptoms. This supports the use of infant massage for maintaining and improving maternal mental health. Additionally, a



positive effect of infant massage on maternal attachment has been observed. Mothers who perform infant massage tend to engage in more frequent and in-depth interactions with their infants. This could contribute to mothers forming a healthy attachment with their infants and could be associated with positive long-term child development. However, considering the studies conducted, more randomized controlled trials and long-term follow-up research are needed. Such studies could further evaluate the long-term effects of infant massage and its effects on mothers from different demographic groups in more detail. Educating mothers about infant massage and encouraging this practice during the postpartum period can play a critical role in reducing PPD symptoms and strengthening mother-infant attachment. Nursing practice can take a leading role in adopting infant massage as an intervention that supports both psychological and emotional well-being.

### **Ethical Statement**

Ethics committee approval was deemed unnecessary for this study, given that open access sources were utilized.

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### **Presentation Information**

The findings of this study have not been presented at any conference or journal.

### **Conflicts of Interest**

The authors declare no conflicts of interest regarding this study. Any institution or organization providing funding for this research did not have any role in the design, data collection, analysis, interpretation, or publication to influence or distort the findings.

### **Author Contributions**

The contributions of the authors are as follows: Ceyda Sarper Erkilic contributed to literature search and editing the report. Ayten Şentürk Erenel conducted the supervision and final revision of the manuscript.

### **References**

- American Psychiatric Association, D. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5* (Vol. 5). American Psychiatric Association Washington, DC.
- Auckett, A. (1979). Baby massage: An alternative to drugs. *The Australian Nurses' Journal, Royal Australian Nursing Federation*, 9(5), 24-27.
- Bai, Y., Li, Q., Cheng, K. K., Caine, E. D., Tong, Y., Wu, X., & Gong, W. (2023). Prevalence of Postpartum Depression Based on Diagnostic Interviews: A Systematic Review and Meta-Analysis. *Depression and Anxiety*, 2023. <https://doi.org/10.1155/2023/8403222>
- Baixaui, E. (2017). Happiness: Role of Dopamine and Serotonin on mood and negative emotions. *Emergency Medicine (Los Angel)*, 7(2), 350. <https://doi.org/10.4172/2165-7548.1000350>
- Bonacquisti, A., Geller, P. A., & Patterson, C. A. (2020). Maternal depression, anxiety, stress, and maternal-infant attachment in the neonatal intensive care unit. *Journal of Reproductive and Infant Psychology*, 38(3), 297-310. <https://doi.org/10.1080/02646838.2019.1695041>
- Brockington, I. (2017). Suicide and filicide in postpartum psychosis. *Archives of women's mental health*, 20(1), 63-69. <https://doi.org/10.1007/s00737-016-0675-8>
- Cafiero, P. J., & Zabala, P. J. (2024). Postpartum depression: Impact on pregnant women and the postnatal physical, emotional, and cognitive development of their children. An ecological perspective. *Archivos Argentinos de Pediatría*,

- e202310217. <https://doi.org/10.5546/aap.2023-10217.eng>
- Centers for Disease Control and Prevention, C. (2008). Prevalence of self-reported postpartum depressive symptoms--17 states, 2004-2005. *Morbidity and Mortality Weekly Report*, 57(14), 361-366.
- Chan, K., Pawi, S., Lee, S., Hii, E., Ooi, C., Arabi, Z., & Hazmi, H. (2018). Experience of mothers' learning and doing infant massage. *Malaysian Applied Biology*, 47(1), 189-194.
- Chojnowska, S., Ptasińska-Sarosiek, I., Kępcza, A., Knaś, M., & Waszkiewicz, N. (2021). Salivary biomarkers of stress, anxiety and depression. *Journal of Clinical Medicine*, 10(3), 517. <https://doi.org/10.3390/jcm10030517>
- Epstein, O. B. (2023). John Bowlby, Attachment Theory, and Attachment-Based Psychoanalytic Psychotherapy. In *Underlying assumptions in psychoanalytic schools* (pp. 78-88). Routledge.
- Erçelik, Z. E., & Yılmaz, H. B. (2023). Effectiveness of infant massage on babies growth, mother-baby attachment and mothers' self-confidence: A randomized controlled trial. *Infant Behavior and Development*, 73, 101897. <https://doi.org/10.1016/j.infbeh.2023.101897>
- Field, T. (1994). Infant massage. *The Journal of Perinatal Education*, 3(3), 7-13.
- Field, T. (2016). Massage therapy research review. *Complementary Therapies in Clinical Practice*, 24, 19-31. <https://doi.org/10.1016/j.ctcp.2016.04.005>
- Field, T. (2019). Pediatric Massage Therapy Research: A Narrative Review. *Children (Basel)*, 6(6). <https://doi.org/10.3390/children6060078>
- Field, T., Hernandez-Reif, M., Diego, M., Schanberg, S., & Kuhn, C. (2005). Cortisol decreases and serotonin and dopamine increase following massage therapy. *International Journal of Neuroscience*, 115(10), 1397-1413. <https://doi.org/10.1080/00207450590956459>
- Geary, O., Grealish, A., & Bright, A.-M. (2023). The effectiveness of mother-led infant massage on symptoms of maternal postnatal depression: A systematic review. *Plos one*, 18(12), e0294156. <https://doi.org/10.1371/journal.pone.0294156>
- Gürol, A., & Polat, S. (2012). The Effects of Baby Massage on Attachment between Mother and their Infants. *Asian Nursing Research*, 6(1), 35-41. <https://doi.org/https://doi.org/10.1016/j.anr.2012.02.006>
- Hétu, S. (2023). Infant massage: Ancient as the world-modern necessity The work of the International Association of Infant Massage (IAIM). *International Journal of Birth & Parent Education*, 11(1).
- International Association of Infant Massage. (2024). *An Inspiring Woman*. Retrieved April 20, 2024 from <https://iaim.net/an-inspiring-woman/>
- Jauhar, S., Cowen, P. J., & Browning, M. (2023). Fifty years on: Serotonin and depression. *Journal of Psychopharmacology*, 37(3), 237-241. <https://doi.org/10.1177/026988112311618>
- Kadiroğlu, T., & Güdücü Tüfekçi, F. (2022). Effect of infant care training on maternal bonding, motherhood self-efficacy, and self-confidence in mothers of preterm newborns. *Maternal and Child Health Journal*, 26, 131-138. <https://doi.org/10.1007/s10995-021-03287-0>
- Karaçam, Z., Çoban, A., Akbaş, B., & Karabulut, E. (2018). Status of postpartum depression in Turkey: A meta-analysis. *Health Care for Women International*, 39(7), 821-841. <https://doi.org/10.1080/07399332.2018.1466144>
- Katona, J. (2021). *What can be learnt from observing a 5-week baby massage group in a Parent Infant Mental Health Service?* Tavistock and Portman NHS Foundation Trust/University of Essex]. <https://repository.tavistockandportman.ac.uk/2679/>
- Klein, S., Blazek, M., & Swietlik, D. (2024). Risk and protective factors for postpartum depression among Polish women - a prospective study. *Journal of Psychosomatic Obstetrics & Gynecology*, 45(1). <https://doi.org/10.1080/0167482X.2023.2291634>
- Lang, C. (2018). *Bağlanma: Doğum Öncesi ve Sonrası Dönemde Bağlanmanın Güçlendirilmesi*. Modern Tıp kitabevi.
- Leboyer, F., & Elbrecht, A. (2013). *Sanfte Hände: die traditionelle Kunst der indischen Baby-Massage*. Kösel-Verlag.
- Li, H. (2023). Maternal-Infant Attachment and its Relationships with Postpartum Depression, Anxiety, Affective Instability, Stress, and Social Support in a Canadian Community Sample. *Psychiatric Quarterly*, 94(1), 9-22. <https://doi.org/10.1007/s11126-022-10011-w>
- Li, Q., Zhao, W. H., & Kendrick, K. M. (2022). Affective touch in the context of development, oxytocin signaling, and autism. *Frontiers in Psychology* 13(967791). <https://doi.org/10.3389/fpsyg.2022.967791>
- Lutkiewicz, K., Bieleninik, Ł., Cieślak, M., & Bidzan, M. (2020). Maternal-infant bonding and its relationships with maternal depressive symptoms, stress and anxiety in the early postpartum period in a Polish sample. *International Journal of Environmental Research and Public Health*, 17(15), 5427. <https://doi.org/10.3390/ijerph17155427>
- McCarty, D., Silver, R., Quinn, L., Dusing, S., & O'Shea, T. M. (2024). Infant massage as a stress management technique for parents of hospitalized extremely preterm infants. *Infant Mental Health Journal*, 45(1), 11-21. <https://doi.org/10.1002/imhj.22095>



- McCarty, D. B., Willett, S., Kimmel, M., & Dusing, S. C. (2023). Benefits of maternally-administered infant massage for mothers of hospitalized preterm infants: a scoping review. *Maternal Health, Neonatology and Perinatology*, 9(1), 6. <https://doi.org/10.1186/s40748-023-00151-7>
- McClure, V. (2000). Infant massage. *The American Journal of Maternal/Child Nursing*, 25(5), 276. <https://doi.org/10.1097/00005721-200009000-00013>
- McClure, V. (2017). *Infant massage: A handbook for loving parents*. Bantam.
- Midtsund, A., Litland, A., & Hjalmhult, E. (2019). Mothers' experiences learning and performing infant massage-A qualitative study. *Journal of Clinical Nursing*, 28(3-4), 489-498. <https://doi.org/10.1111/jocn.14634>
- Mizuno, Y., Ashok, A. H., Bhat, B. B., Jauhar, S., & Howes, O. D. (2023). Dopamine in major depressive disorder: A systematic review and meta-analysis of in vivo imaging studies. *Journal of Psychopharmacology*, 37(11), 1058-1069. <https://doi.org/10.1177/026988112312008>
- Moussa, S., Fawaz, L., Ibrahim, W., Fathelbab Elsayed, M., & Mostafa Ahmed, M. (2021). Effect of infant massage on salivary oxytocin level of mothers and infants with normal and disordered bonding. *Journal of Primary Care & Community Health*, 12, 21501327211012942. <https://doi.org/10.1177/21501327211012942>
- Mrljak, R., Arnsteg Danielsson, A., Hedov, G., & Garmy, P. (2022). Effects of infant massage: a systematic review. *International Journal of Environmental Research and Public Health*, 19(11), 6378. <https://doi.org/10.3390/ijerph19116378>
- Nagahashi-Araki, M., Tasaka, M., Takamura, T., Eto, H., Sasaki, N., Fujita, W., Miyazaki, A., Morifuji, K., Honda, N., & Miyamura, T. (2022). Endogenous oxytocin levels in extracted saliva elevates during breastfeeding correlated with lower postpartum anxiety in primiparous mothers. *Bmc Pregnancy and Childbirth*, 22(1), 711. <https://doi.org/10.1186/s12884-022-05026-x>
- Nousia, A. (2023). Healthy touch and infant massage: Two main factors in infants daily care and healthy development. *European Journal of Education Studies*, 10(6). <https://doi.org/10.46827/ejes.v10i6.4854>
- O'Dea, G. A., Youssef, G. J., Hagg, L. J., Francis, L. M., Spry, E. A., Rossen, L., Smith, I., Teague, S. J., Mansour, K., & Booth, A. (2023). Associations between maternal psychological distress and mother-infant bonding: a systematic review and meta-analysis. *Archives of Women's Mental Health*, 26(4), 441-452. <https://doi.org/10.1007/s00737-023-01332-1>
- Ozkan-Sat, S., & Söylemez, F. (2024). The Association of Domestic Violence During Pregnancy with Maternal Psychological Well-Being in The Early Postpartum Period: A Sample from Women with Low Socioeconomic Status in Eastern Turkey. *Midwifery*, 104000. <https://doi.org/10.1016/j.midw.2024.104000>
- Özcan, N. K., Boyacıoğlu, N. E., & Dinç, H. (2017). Postpartum depression prevalence and risk factors in Turkey: a systematic review and meta-analysis. *Archives of Psychiatric Nursing*, 31(4), 420-428. <https://doi.org/10.1016/j.apnu.2017.04.006>
- Özşahin, Z., Emine, A., & GÖKBULUT, N. (2020). Postpartum depresyon düzeyi ile maternal bağlanma arasındaki ilişki. *İnönü Üniversitesi Sağlık Hizmetleri Meslek Yüksek Okulu Dergisi*, 8(3), 715-724. <https://doi.org/10.33715/inonusaglik.757249>
- Saharoy, R., Potdukhe, A., Wanjari, M., & Taksande, A. B. (2023). Postpartum depression and maternal care: exploring the complex effects on mothers and infants. *Cureus*, 15(7). <https://doi.org/10.7759/cureus.41381>
- Sharma, P., & Khera, K. (2024). A novel tool for risk assessment, screening, diagnosis, assessment, and therapy in postpartum depression. *International Journal of Gynecology & Obstetrics*. <https://doi.org/10.1002/ijgo.15421>
- Shoghi, M., Sohrabi, S., & Rasouli, M. (2018). The Effects of Massage by Mothers on Mother-Infant Attachment. *Alternative Therapies in Health and Medicine*, 24(3), 34-39. <https://www.ncbi.nlm.nih.gov/pubmed/29101776>
- Shorey, S., Asurlekar, A. R., Chua, J. S., & Lim, L. H. K. (2023). Influence of oxytocin on parenting behaviors and parent-child bonding: a systematic review. *Developmental Psychobiology*, 65(2), e22359. <https://doi.org/10.1002/dev.22359>
- Śliwerski, A., Kossakowska, K., Jarecka, K., Świtalska, J., & Bielawska-Batorowicz, E. (2020). The effect of maternal depression on infant attachment: A systematic review. *International Journal of Environmental Research and Public Health*, 17(8), 2675. <https://doi.org/10.3390/ijerph17082675>
- Spinelli, M., & Bramante, A. (2022). Maternal suicide and filicide. In *Key Topics in Perinatal Mental Health* (pp. 185-198). Springer.
- Stewart, D. E., & Vigod, S. N. (2019). Postpartum depression: pathophysiology, treatment, and emerging therapeutics. *Annual Review of Medicine*, 70, 183-196. <https://doi.org/10.1146/annurev-med-041217-011106>
- The University of Miami School of Medicine. (2024). *Touch Research Institute (Archives). Mailman Center for Child Development*. Retrieved April 20, 2024 from <https://med.miami.edu/centers-and-institutes/mailman-center/community/other->

community-based-programs/touch-research-institute-(archives)

- Tuman, T. C., YILDIRIM, O., & Tufan, A. E. (2021). Evaluation of serum oxytocin levels in patients with depression, generalized anxiety disorder, panic disorder, and social anxiety disorder: A case-control study. *Journal of Surgery and Medicine*, 5(7), 670-675. <https://doi.org/10.28982/josam.922612>
- Wang, X. X., Zhang, L., Lin, X. F., Nian, S. W., Wang, X. Q., & Lu, Y. (2024). Prevalence and risk factors of postpartum depressive symptoms at 42 days among 2462 women in China. *Journal of Affective Disorders*, 350, 706-712. <https://doi.org/10.1016/j.jad.2024.01.135>
- Wang, Z., Liu, J., Shuai, H., Cai, Z., Fu, X., Liu, Y., Xiao, X., Zhang, W., Krabbendam, E., & Liu, S. (2021). Mapping global prevalence of depression among postpartum women. *Translational Psychiatry*, 11(1), 543. <https://doi.org/10.1038/s41398-021-01663-6>
- World Health Organization. (2016). *mhGAP intervention guide for mental, neurological and substance use disorders in non-specialized health settings: mental health Gap Action Programme (mhGAP)*. World Health Organization.
- Yu, H., Shen, Q., Bränn, E., Yang, Y., Oberg, A. S., Valdimarsdóttir, U. A., & Lu, D. (2024). Perinatal depression and risk of suicidal behavior. *JAMA network open*, 7(1), e2350897. <https://doi.org/10.1001/jamanetworkopen.2023.50897>
- Yu, Y., Liang, H.-F., Chen, J., Li, Z.-B., Han, Y.-S., Chen, J.-X., & Li, J.-C. (2021). Postpartum depression: Current status and possible identification using biomarkers. *Frontiers in Psychiatry*, 12, 620371. <https://doi.org/10.3389/fpsy.2021.620371>
- Zhang, Y., Duan, C. L., Cheng, L. Y., & Li, H. H. (2023). Effects of massage therapy on preterm infants and their mothers: a systematic review and meta-analysis of randomized controlled trials. *Frontiers in Pediatrics*, 11. <https://doi.org/10.3389/fped.2023.1198730>