International Journal of Reproduction, Contraception, Obstetrics and Gynecology
Mehra P et al. Int J Reprod Contracept Obstet Gynecol. 2024 Aug;13(8):2220-2227
www.ijrcog.org
pISSN 2320-1770 | eISSN 2320-1789

DOI: https://dx.doi.org/10.18203/2320-1770.ijrcog20242105

Review Article

Association of breastfeeding related musculoskeletal pain, sleep quality and physical activity among postpartum women: a literature review

Pooja Mehra*, Nitesh Verma, Geetanjali Kaul, Ankit Kumar

Department of Physiotherapy, Maharishi Markandeshwar Medical College and Hospital, Kumarhatti, Solan, Himachal Pradesh, India

Received: 18 June 2024
Revised: 16 July 2024
Accepted: 17 July 2024

***Correspondence:**
Dr. Pooja Mehra,
E-mail: mehra.drpooja@gmail.com

ABSTRACT

Women often report musculoskeletal ailments during perinatal period resulting in less sleep hours and decline in physical activity. It has been speculated that physical activity can lower the frequency of muscular pain and enhance good quality sleep among women. Hence, the review aimed to investigate the association of breastfeeding related musculoskeletal pain, sleep quality and physical activity thus refining quality of life among women. Literature search was performed using search strategy on PubMed, Scopus and Pedro databases during 2019-2023. A total 54,037 articles were found via database searching out of which only 16 studies were relevant meeting the inclusion criteria. All the studies found that breastfeeding related musculoskeletal pain, sleep quality and physical activity are associated with each other. To lower the incidence of muscular pain and improve sleep quality, physical activity can be incorporated thus preventing occurrence of future complications. Hence, it has been suggested that physical activity is key solution of emerging musculoskeletal pain and broken sleep quality. Evidence from this literature supports that prenatal education emphasizing necessity of physical activity should be routinely integrated into maternal care in an effort to reduce chances of future complications.

Keywords: Arthralgia, Breastfeeding, Exercise, Sleep deprivation, Postpartum period

INTRODUCTION

Breastmilk serves as physiological benchmark for infant nutrition. Breastfeeding is a global practice and an essential component of natural childcare, having a variety of biological and emotional effects on mother and newborn health. Additionally, it has been discovered to prevent delays in young children's language and motor ability development. WHO recommends exclusive breastfeeding for first six months postpartum (>8 times per day) for infant in order to maximize benefits of breastfeeding (BF) over the course of two years.[1]

Due to both physiological and psychological processes, pregnancy is a crucial time in women's life. Therefore, pregnancy and lactation are two specific times when women's health needs to be closely monitored. Worries, anxiety, and discomfort can interfere with maternal-neonatal health. The mother, who is in a crucial stage of assuming a new role in society, receives less attention from community during the lactation period because it is focused more on a newborn. Aspects such as physical activity, sleep quality, and mental and physical wellness may go out of window as these elements are crucial for health of both mother and newborn.[2] The aim of this review was to provide insights related to breastfeeding

musculoskeletal pains, disturbed sleep and reduced physical activity during the postpartum period.

The specific objectives of this review were to determine how improper breastfeeding positions cause various types of musculoskeletal pain during postpartum period; to determine how breastfeeding interferes with sleep during postpartum; and to explore the causes of reduced physical activity in postpartum women.

METHODS

Three electronic databases (PubMed, Scopus, and Pedro) were systematically searched from 1st January 2019 to December 31st 2023. To gather an extensive range of papers, six search terms were chosen, such as "Breastfeeding AND Musculoskeletal pain," "Breastfeeding AND Sleep quality," or "Breastfeeding AND Physical activity." Qualitative research and randomized controlled trials were used to gather data.

RESULTS

The primary search strategy retrieved 54,037 articles in total. A total of 37,781 articles remained after duplicates were eliminated. In total, 27,419 articles were eliminated based on the abstract and title data. In all, 18,927 articles did not fit the requirements for inclusion. In addition, 7,960 of the 13,658 full-text papers that were evaluated for eligibility had inadequate methodology. After a thorough analysis of 5,698 publications, only 16 were found to match the inclusion criteria.

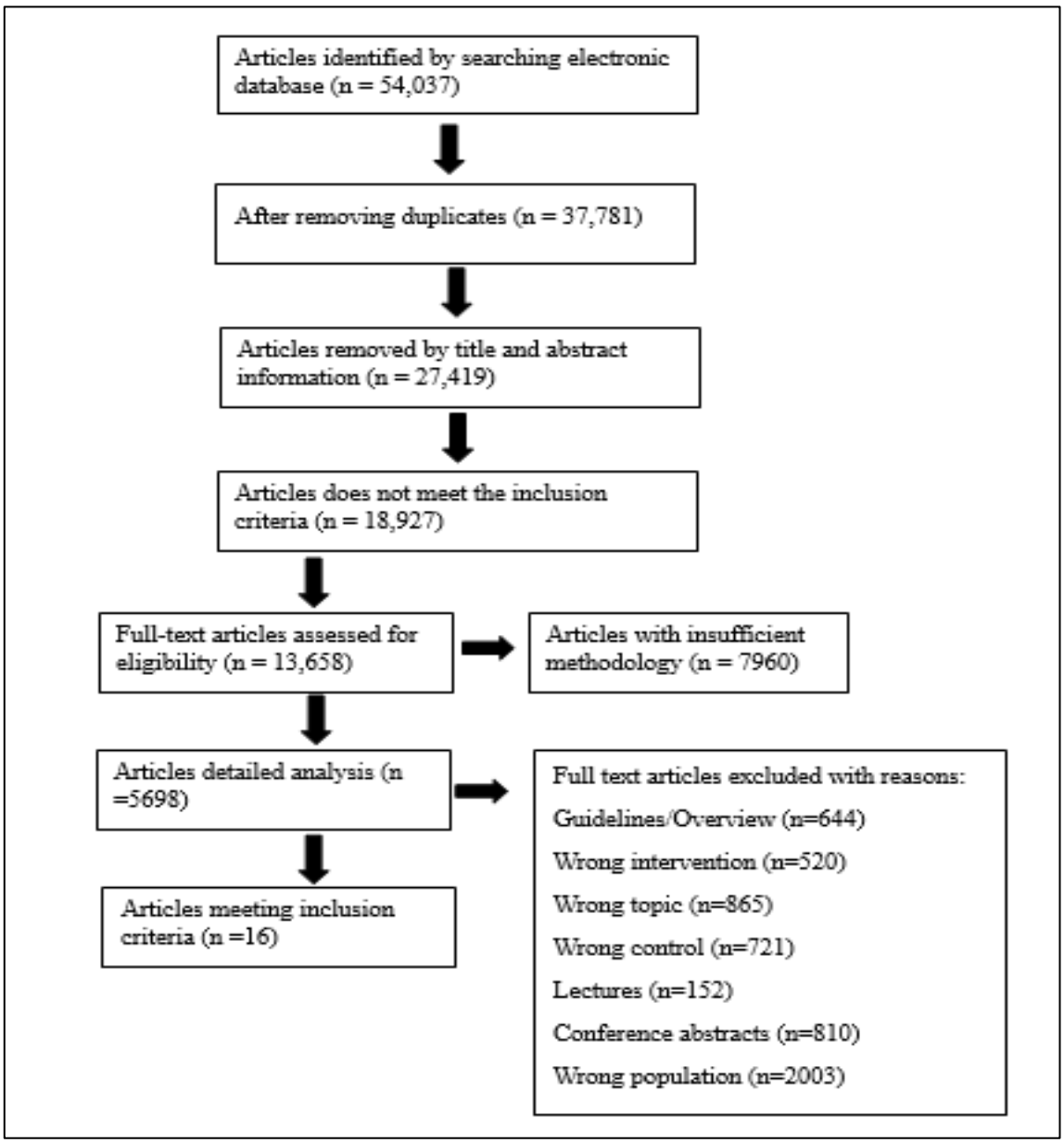

Figure 1: Selecting studies for review.

Table 1: Characteristics of studies including breastfeeding and musculoskeletal pain.

Study authors	Objectives	Participants	Study design	Result	Conclusion
Alazmi et al[18]	To assess the prevalence of MSP and its association with the positioning of lactating mothers in Riyadh, Saudi Arabia.	336 women	Cross sectional study	MSP ranged from 58.6% (arm and hand) to 72.3% (lower back pain). Back pain was significantly associated with breastfeeding position.	High prevalence of lower back and neck pain among breastfeeding mothers.
Aburub et al[3]	To explore nursing mothers' experiences of breastfeeding-related musculoskeletal pain	493 nursing mothers	Cross sectional mixed method study	Nursing mothers reported experiencing nonspecific pain in lower back, neck, shoulder, and hand, attributed to breastfeeding.	Nursing mothers in Jordan are not receiving proper education about optimal postures for breastfeeding and reported musculoskeletal pain, attributed to breastfeeding.
Charette et al[6]	To determine the possible relationship between pain experienced by mothers with breastfeeding and musculoskeletal impairment commonly seen in physiotherapy practice.	11 mothers	Case series	Pain was resolved or alleviated by 80% in five mothers after 1–3 weekly treatments.	Treating musculoskeletal impairment referred pain to breast or nipple with physiotherapy practices used in a non-breastfeeding patients can help alleviate or resolve pain with breastfeeding.
Kim et al[19]	To determine the association of prior breastfeeding duration with current joint pain and knee osteoarthritis in middle-aged Korean women.	3454 women	Cross sectional study	Joint pain and knee osteoarthritis was more positively correlated with extended breastfeeding duration (joint pain=0.005; knee osteoarthritis= 0.012)	Long-term feeding for more than 25 months was associated with an increased prevalence of joint pain and degenerative arthritis
Ojukwu et al[20]	To assess the prevalence and correlates of BFRNP among Nigerian nursing mothers.	310 lactating mothers	Cross sectional descriptive survey	BFRNP was seen in 51.7% of women, of which 55.0% reported moderate pain intensity and 60.0% experienced this pain during BF.	There is a high prevalence of BFRNP among nursing mothers.
Dandekar et al[21]	To find if there is any correlation between musculoskeletal neck pain and breastfeeding position in post-partum mothers.	207 postpartum mothers	Cross sectional observational study	All those mothers reported neck pain while breastfeeding in different positions especially in side-lying and cross-cradle positions	Neck pain was found in most women out of which side-lying and cross cradle was more prevalent breastfeeding positions
Prasanna K et al[4]	To determine prevalence of musculoskeletal discomfort among breastfeeding women	90 subjects	Observational study	Musculoskeletal discomforts were distributed as neck (61%), shoulders (59%), upper back (58%), lower back (46%), elbow	Upper back and shoulder were found to have higher incidence of discomfort

Continued.

Study authors	Objectives	Participants	Study design	Result	Conclusion
				(41%), wrist and hand (22%)	

Table 2: Characteristics of studies including breastfeeding and sleep quality.

Study authors	Objectives	Participants	Study design	Result	Conclusion
Astbury et al[11]	To investigate how breastfeeding is associated with total nighttime sleep duration and sleep efficiency (percentage of total sleep time in bed) in nulliparous participants over the first two postpartum years.	155	Single blinded randomized controlled trial	Greater numbers of nighttime feeds, regardless of feeding content, were strongly associated with shorter sleep duration and poor sleep efficiency (*P*-values <0.05).	Breastfeeding percentage was not associated with shorter or poor nocturnal sleep, but the number of nighttime feeds was.
Ruan et al[22]	To explore sleep duration among Chinese lactating mothers and preliminarily investigate the relationship between sleep duration and feeding pattern.	115	Longitudinal cohort and cross sectional	Percentage of insufficient maternal sleep was highest at 5–7 months postpartum (34.29%). Frequency of formula feeding per day is related to reduced maternal sleep duration at 2-4 months.	Formula feeding may be related to the mother's sleep loss, while breastfeeding (especially direct breastfeeding) may be related to increased maternal sleep duration.
Smith et al[23]	To identify associations between maternal sleep hours and feeding practices, and explore how maternal sleep hours may relate to mothers' domestic or other work commitments, and free time for leisure or personal care.	156	Time use study	Exclusive breastfeeding was associated with reduced maternal sleep hours (average 7.08 h daily)	Optimal breastfeeding may require realistic maternal sleep expectations and equitable sharing of paid and unpaid work burdens with other household members in the months after the birth of an infant.
Aksu et al[24]	To determine the relationship between sleep quality and breastfeeding self-efficacy of the mothers in the postpartum period.	128 primiparous women	Descriptive study	Strong relationship in the negative direction was detected between the scores gotten from Postpartum Sleep Quality Scale and Breastfeeding Self-efficacy Scale (p<0.01)	As sleep quality of mothers in the postpartum period increases their breastfeeding self-efficacy increases as well

Table 3: Characteristics of studies including breastfeeding and physical activity.

Study authors	Objectives	Participants	Study design	Results	Conclusion
Snyder et al[25]	To explore women's perceptions of healthy eating and physical	24 breastfeeding women	Cross-sectional qualitative design	Breastfeeding women have a lack of information and support regarding	Women need greater access to education and resources regarding healthy

Continued.

Study authors	Objectives	Participants	Study design	Results	Conclusion
	activity while breastfeeding.			healthy eating and physical activity while breastfeeding and many are receiving misinformation through resources such as *Facebook* support groups.	eating and physical activity while breastfeeding.
Dominguez et al[26]	To assess the psychological capital, quality of life, sleep hygiene and physical activity in a cohort of women during pregnancy and lactation periods	125 women	Observational and cross-sectional study	A decrease in physical daily activities were associated with both the end of gestation and the lactation periods.	During lactation, the poorer sleep and physical activity, together with a lower social support of the woman, may lead to deficient mental health adjustment.
Holmen et al[27]	To determine the acute effects of endurance exercise on adiponectin concentrations in human breast milk.	20	Randomized cross over study	Adinopectin concentrations increased 1 h after HIIT, from 4.6 (± 2.2) µg/L in the 07:00 h sample to 5.6 (± 2.6) µg/L	HIIT may increase adinopectin concentrations in breast milk acutely after exercise.
Synder et al[28]	To determine the physical activity levels of breastfeeding women as well as to better understand their motivation and barriers for engaging in physical activity	633 breastfeeding mothers	Cross sectional study	Majority of breastfeeding mothers are engaging in light activity (eg, walking) regularly; nevertheless, 1 in 5 mothers is predominantly sedentary and only 1 in 20 mothers is engaging in heavy exercise (eg, running) regularly.	Breastfeeding women may need additional support for engaging in physical activity and further education and resource development is needed.
Synder et al[29]	To examine barriers to physical activity among breastfeeding women from SEM representatives.	49	Observational study	General themes found included a lack of time and lack of ability for self-care.	Interventions should focus on enhancing maternal desire for self-care, opportunities to engage in activity with baby and increasing education on how to be active while breastfeeding

BREASTFEEDING AND MUSCULOSKELETAL PAIN

Mothers often experience significant physical and energetic strain during breastfeeding. Most frequently they experience nipple soreness, decreased bone mineral density, and musculoskeletal pain because of breastfeeding. The cradle, cross-cradle, football hold and side-lying positions are recommended for breastfeeding.[1]

According to a 2022 study side sleeping and cross-cradle breastfeeding positions are associated with a higher incidence of neck pain. In a study conducted in 2022, nursing mothers reported non-specific pain in the lumbar back, neck, shoulder, and hand.[3] Musculoskeletal discomforts were distributed as follows, based on 2019 study: neck (61%), shoulders (59%), upper back (58%), lower back (46%), elbow (41%), wrist and hand (22%).[4] Back pain is one of the most common symptoms

throughout the gestational period and was found to be linked with breastfeeding position.[18] Pregnancy period is also notable for postural alterations, with increased rate of forward head, rounded shoulder and anterior pelvic tilt. Moreover, occurrence of joint pain was found be positively related with duration of breastfeeding.[19] Breastfeeding related neck pain was reported more commonly in side-lying and cross cradle positions.[20,21] It is noteworthy that these alterations are the result of pregnancy because of the compensation brought on, continuing into puerperium by the rigorous routine of caring for infant, especially during breastfeeding, which requires woman to maintain same position for several hours.[5] Leaning to one side towards the baby while nursing results in shear posture or lateral displacement of the trunk.[6] Apart from inappropriate posture used during breastfeeding, holding baby on the lap or performing other tasks related to his care place an excessive load in front of the body, causing the spine to extend excessively and changes of physiological curvatures when the person is standing.[5] Diastasis recti abdominis muscle (67%) and low back pain (30-50%), wrist pain (2-25%), hip pain, patellofemoral dysfunction, pubic symphyseal discomfort, breast engorgement, and calf and foot pain are common postpartum impairments.[7]

BREASTFEEDING AND SLEEP

Sleep disturbance is often encountered in the first few months of postpartum due to particular feeding habits and newborn care.[8] Following delivery, gestating parent's sleep quality is at its lowest, with a gradual rebound thereafter.[9,10] As women adjust to the new demands of motherhood, concerns about sleep deprivation, exhaustion, and lack of sleep are frequently voiced.[9] However, awakenings caused by infant feeding requirements and sleep-wake cycles are the most frequent cause of maternal sleep disruptions.[10] Postpartum sleep disturbance is associated with signs of depression and anxiety, a negative effect on the mother-infant bond, lower daily functioning, and poor quality of life.[11] Short sleep duration (≤5 hr/night) has also been linked to increased adiposity, a larger waist circumference and increased postpartum weight retention over the first six to twelve months after birth.[8]

Previous studies have concluded that maternal sleep is more disturbed around 5-7 months after delivery.[22] Exclusive breastfeeding is often linked to a reduction in maternal sleep hours.[23] Recurrent nighttime breastfeeding leads to less sleep hours in nursing mothers.[24] The majority of studies on the effects of maternal sleep disorders on a mother's functioning have concentrated on the associations between maternal sleep and depression. The strong correlation between inadequate maternal sleep and more severe depressive symptoms has been discovered. Additionally, maternal emotional discomfort and newborn sleep issues are related, indicating that infant night wakings affect maternal sleep, which in turn affects maternal mood. In addition, poor parental sleep is strongly correlated with marital problems and family dysfunction.[10]

BREASTFEEDING AND PHYSICAL ACTIVITY

Owing to its high incidence and links to cardiovascular illnesses, hypertension, and diabetes mellitus, obesity is a global public health issue. Pregnancy is a phase of reproductive cycle during which rapid and natural weight increases. For fetus to grow and develop, weight gain during this period must stay within the acceptable parameters (11.3-15.9 kg). The risk of women becoming overweight or obese later in life is higher when pregnancy-related weight gain and/or postpartum weight retention (PWR) are excessive. PWR has been linked to prenatal and postnatal health factors, such as breastfeeding and pre-pregnancy body mass index.[12] Women are less inclined to exercise during their free time or engage in strenuous physical activity.[13] Additional reductions in physical activity may occur during pregnancy because of concerns about fetal growth, as well as in postpartum period because of physiological changes and childcare obligations. Research on postpartum physical exercise is mostly restricted to the connection with weight loss. However, for women, postpartum period is characterized by elevated levels of anxiety and melancholy. Physical activity appears to help women feel better overall and reduces signs of anxiety and despair while also boosting their positive mood states.[13]

Research has revealed that site-specific exercises that apply direct force to the bone are the most effective at inducing bone development.[14,15] It has been hypothesized in earlier studies that inadequate sleep, physical activity, and social support during lactation cause women to have inadequate health adjustments.[2,26] According to a study by Holmen et al, breastmilk may exhibit an initial rise in adinopectin concentrations following exercise when high-intensity interval training (HIIT) is implemented.[27]

More resources should be created and assistance should be offered to nursing mothers so they can exercise.[25,28] Physical activity during nursing may enhance sleep quality, boost energy, and reduce postpartum maternal tiredness. Regular physical activity is associated with improved self-efficacy, quality of life, and decreased anxiety and depression. Pregnant women are encouraged to exercise, and even light exercise can help prevent postpartum depression. However, a sedentary lifestyle may exacerbate anxiety symptoms in the days following delivery. Moderate to strenuous physical activity during lactation has no deleterious effects on breast milk composition or volume.[16]

DISCUSSION

Puerperium emerges to be quite grueling, as it proposes both emotional and physical stipulations. Occurrence of musculoskeletal pain and disturbed sleep results in declined physical activity as women tend to spend more

time taking care of newborn and doing housework and less time exercising or participating in sports.[29] As a result, there is a decrease in their physical activity trend. Postpartum sedentary behaviours can contribute to pernicious mental and physical health outcomes.[17] According to previous research, women who continue to exercise from pre-pregnancy to the postpartum period experiences good well-being in comparison to women who do not engage in physical activity.[17] Ergonomics along with exercises are equivalently crucial and should be advised to prevent injuries to muscles and joints. Accommodating semi-reclined position during breastfeeding makes women and newborns comfortable as the spine aligns in neutral position.

Weight-training and core-strengthening exercise program can help nursing mothers to alleviate pain.[14,15,17] Adaptation of physical activity can reduce rate of musculoskeletal issues and sleep deprivations as well as minimizes the likelihood of diabetes mellitus, hypertension, obesity, depression and other metabolic diseases in future.[17] Exercise is highly important; therefore, physical activity should be initiated as soon as the baby is delivered and should continue throughout the postpartum phase.

CONCLUSION

Physical activity is an indispensable contributor to maternal health. Counselling regarding significance of physical activity should be initiated from antenatal period and continued throughout postpartum. Emphasis should be focused on advantages and drawbacks of early physical activity during perinatal period. Early implementation of physical activity program is essential, as it can reduce the likelihood of musculoskeletal pain, promote good quality sleep and refine postpartum quality of life.

ACKNOWLEDGEMENTS

Authors would like to acknowledge Dr. Abhishek Sharma for his guidance and support in writing this review.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

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Cite this article as: Mehra P, Verma N, Kaul G, Kumar A. Association of breastfeeding related musculoskeletal pain, sleep quality and physical activity among postpartum women: a literature review. Int J Reprod Contracept Obstet Gynecol 2024;13:2220-7.