Journal of Research High School

Vol. 2026 (5) 422 – 427
ISSN 2688-3651 [online]

The Effect of Music Therapy on Pregnant Women

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Received September 13, 2025; Revised January 28, 2026; Accepted March 9, 2026

Abstract

Although music therapy has gained increasing attention during pregnancy, existing research varies widely in its focus on outcomes such as anxiety, sleep quality, pain management, maternal–fetal bonding, and fetal responses, as well as in intervention type, timing, and measurement methods, making it difficult to draw consistent and standardized conclusions about its overall effectiveness. Music therapy provided non-invasive, cost-effective solutions to help pregnant women manage emotional and physical challenges, including anxiety, mood disorders, and pain. Current research has investigated prenatal auditory stimulation effects on fetal health and development and maternal–fetal bonding through active and passive musical experiences. This review drew from current studies identified using Google Scholar to demonstrate how music therapy helped decrease stress and anxiety, improve sleep quality, manage labor pain, and regulate cardiovascular and nervous system functions. This paper examined the various advantages of music therapy during pregnancy by studying its effects on maternal and fetal health from psychological, physiological, and prenatal perspectives. Despite its advantages, music therapy was applied cautiously, as certain music experiences could trigger negative emotions or ruminative thinking in vulnerable individuals. Overall, this synthesis showed how music therapy could be used as an alternative healthcare method while also highlighting limitations in the literature related to standardized methods and individual differences in response.

Keywords: Music Therapy; Pregnancy; Maternal-fetal health; Anxiety and stress reduction; Labor pain management; Prenatal auditory stimulation

1. Introduction

Music therapy has gained acceptance among healthcare professionals as a therapeutic approach that supports patients through its beneficial effects on emotional state and physical health (Perković et al., 2021). Music therapy provided a non-invasive and cost-effective method to support maternal health during pregnancy, particularly when women experienced anxiety, mood swings, and physical discomfort. This review examined how music therapy benefited pregnant women through psychological effects, physiological responses, and prenatal advantages, drawing from contemporary studies to demonstrate its stress reduction and pain management capabilities, as well as its benefits for fetal growth and maternal–infant bonding.

Pregnancy is a unique experience marked by physiological and emotional changes that can significantly influence women's mental health and overall quality of life. Roughly 20% of pregnant women experience mood and anxiety disorders, with more than one in ten reporting anxiety at some stage of pregnancy (Uguz et al., 2019). If left unaddressed, these mental health challenges can have lasting effects on both the mother and the developing fetus. Evidence suggests that music therapy not only alleviates symptoms of mood and anxiety disorders (Shafqat et al., 2024), but may also contribute to improved sleep quality (Hoegholt et al., 2024), lower blood pressure (Tervaniemi et al., 2021), and reduced perception of pain during labor (Vaid et al., 2025).

Despite increasing research interest, existing studies on music therapy during pregnancy remain fragmented and vary widely in outcome focus, intervention type, timing, and measurement methods. Many studies examine outcomes

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ISSN 2688-3651 [online]

such as anxiety reduction, sleep quality, pain management, maternal–fetal bonding, or fetal physiological responses in isolation, limiting the ability to draw comprehensive and standardized conclusions.

This review addressed these gaps by synthesizing current research on music therapy during pregnancy across psychological, physiological, and prenatal perspectives. By integrating findings on both maternal and fetal outcomes and comparing active and passive forms of music therapy, this paper aimed to clarify the potential benefits, limitations, and applications of music therapy during pregnancy.

2. Literature Review

2.1 Literature search and selection methods

This literature review was conducted using Google Scholar as the primary database. Peer-reviewed journal articles published primarily between 2010 and 2025 were considered to ensure relevance and currency of the findings. Studies were selected based on their focus on music therapy or music-based interventions during pregnancy and their reported psychological, physiological, fetal, or maternal–fetal bonding outcomes. Review articles, randomized controlled trials, systematic reviews, and observational studies were included. Sources that were not directly related to pregnancy or maternal–fetal outcomes were excluded. The selected literature was synthesized thematically to identify consistent patterns, trends, and limitations across studies.

2.2 Psychological Effects

Stress and anxiety reduction

Various studies showed that calming music positively impacted cortisol levels, a key stress hormone, by reducing its concentration in the body (Tervaniemi et al., 2021). Listening to calming music was associated with lower cortisol levels, improved heart rate variability, and reduced blood pressure. Classical music was frequently cited in the literature, although other genres perceived as relaxing by the listener were also effective in reducing cortisol levels (Tervaniemi et al., 2021).

Music therapy positively affected the mood of pregnant women by reducing stress, anxiety, and symptoms of depression. Music therapy significantly reduced anxiety symptoms in pregnant women (Perković et al., 2021). In this study, Perković and colleagues grouped 116 participants who listened to music for two weeks during pregnancy; these participants experienced notably lower levels of stress, anxiety, and depression compared to those in the control group who did not listen to music.

Sleep and emotional regulation

Music therapy significantly improved sleep quality in pregnant women. More specifically, music listening combined with sleep hygiene guidance—strategies designed to enhance sleep quality through healthy routines and optimization of the sleep environment—helped manage insomnia during pregnancy (Hoegholt et al., 2024). These interventions led to significant improvements in sleep quality and reduced the severity of insomnia.

In addition, music therapy enhanced the emotional connection between expecting mothers and their fetuses. Pregnant women who attended two music therapy sessions experienced increased physical bonding with their fetuses through singing, while those who attended songwriting sessions reported more open communication and the potential for developing family musical traditions (O'Reilly et al., 2023). Wulff et al. found that both music and singing interventions improved maternal well-being, reduced cortisol levels, and increased bonding hormones such as oxytocin. Notably, the singing group demonstrated a greater decrease in cortisol levels than the music-only group. Over time, these interventions to lead mothers to feel significantly closer to their unborn children, as measured on a visual analogue scale.

2.3 Physiological Effects

Pain management

Studies demonstrated that music therapy was highly effective in reducing pain perception during childbirth. Music

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therapy was linked to a significant decrease in pain intensity among women giving birth for the first time (Vaid et al., 2025). This reduction in pain was observed consistently across the latent, active, and second stages of labor. Results showed statistically significant improvements in Visual Analog Scale (VAS) scores, with women who received music therapy reporting less pain than those who did not. Overall, the body of evidence supported the integration of music therapy as a valuable approach to enhancing the childbirth experience.

Cardiovascular and nervous system response

Music had the remarkable ability to affect the autonomic nervous system (ANS), which was responsible for controlling involuntary bodily functions such as heart rate, blood pressure, and digestion. Soothing or calming music stimulated the parasympathetic branch of the ANS, and this branch was often referred to as the "rest and digest" system, as it helped the body to relax, unwind, and recover from stress (Riganello et al., 2015). According to Riganello et al. (2015), by activating the parasympathetic nervous system, calming music reduced the activity of the sympathetic nervous system, which was typically responsible for the "fight or flight" response and was associated with elevated heart rate and increased blood pressure during stressful situations. Additionally, participants who listened to classical music with a slow tempo experienced a notable reduction in their average heart rate, as well as both systolic and diastolic blood pressure (Darki et al., 2022). Slow, classical music had a measurable and beneficial impact on cardiovascular health by promoting a more relaxed physiological state.

3. Results

Across multiple clinical and experimental studies, prenatal music exposure was associated with measurable changes in fetal autonomic and behavioral indicators of reactivity to sound. Fathi et al. (2023) reported that, although mean fetal heart rate did not differ between music and control groups in a trial of 80 pregnant women, fetuses in the music group showed more heart rate accelerations and fewer decelerations, suggesting greater responsiveness to auditory stimuli. Hibiya et al. (2020) similarly observed increases in fetal heart rate accelerations from approximately 26 weeks of gestation onward, with the largest responses between 28 and 37 weeks, a period that overlaps with the maturation of fetal hearing. Massimello et al. (2022), using the Fetal Autonomic Nervous System Evaluation (FANTE) in 32 women between 32 and 38 weeks of pregnancy, found that music exposure did not alter mean fetal heart rate but significantly increased total heart rate variability, a widely used marker of autonomic nervous system activity, with higher variability typically interpreted as reflecting more robust parasympathetic modulation and physiological flexibility.

Evidence from fetal and neonatal studies also indicated that prenatal auditory stimulation may contribute to early neural encoding and later responsiveness to sound. Movalled et al. (2023) found that exposure to sound during the fetal period helped form memory traces for specific auditory stimuli and influenced both autonomic and neural responses to those sounds after birth, indicating continuity between prenatal and postnatal auditory processing. These postnatal responses encompassed rapid autonomic changes to salient auditory cues, as well as patterns compatible with relaxation and attentional engagement in response to particular sound types. Taken together, these studies suggest that music and sound presented during pregnancy can shape patterns of fetal and early infant autonomic and neural responsiveness to auditory input.

Studies also highlighted that the characteristics of the music and soundscape—tempo, intensity, and melodic contour—were important for shaping both fetal and maternal responses. Several authors emphasized the use of slow, steady, and relatively quiet music designed to promote relaxation, often likened to rhythms similar to a maternal heartbeat (Pino et al., 2023). López-Teijón et al. (2015) reported only small increases in fetal heart rate in response to a relaxing flute melody, whereas Granier-Deferre et al. (2011) observed more pronounced increases following ascending melodies, indicating that different musical structures may elicit distinct autonomic patterns. At the maternal level, González et al. (2017) found that exposure to relaxing, instrumental music was associated with reductions in systolic and diastolic blood pressure and heart rate, suggesting that such music could contribute to a calmer physiological state during pregnancy and potentially modify the acoustic and physiological environment to which the fetus is exposed.

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Maternal engagement with music during pregnancy was associated with distinct emotional and relational outcomes that differed by type of music activity. In a randomized study of 250 pregnant women, Arioli et al. (2025) compared a Passive Protocol (primarily listening to music) with an Active Protocol (including activities such as singing and dancing). Participants in the Active Protocol group reported higher levels of positive emotions and a stronger perceived bond with the fetus compared to those in the Passive Protocol group, although linear regression analyses did not show significant associations between level of involvement and either state or trait anxiety scores. With respect to depressive symptoms, the Passive Protocol group exhibited a statistically significant reduction in depression scores over time, whereas scores in the Active Protocol group showed relatively little change across measurement points. These patterns indicated that different forms of music engagement may be differentially related to specific dimensions of emotional well-being in pregnancy.

Research extending into the postpartum period further supported links between music-related activities and mother–infant relationship quality. Francourt and Perkins (2024) found that mothers who sang daily to their infants reported higher self-esteem and stronger mother–infant bonds, with these benefits not appearing to vary systematically by demographic factors. In a 5-week singing program involving mothers with postnatal depression, Van Puyvelde et al. (2014) observed increases in maternal–infant intersubjectivity, defined as shared affective experiences between mother and infant, as well as gains in maternal self-efficacy, reflecting increased confidence in managing the demands of early parenting.

In contrast to these largely beneficial patterns, several studies underscored that music exposure can also be associated with adverse or dysregulated experiences under certain conditions. Priya et al. (2021) surveyed individuals with anorexia who listened to music and then provided written responses about their experiences; while some participants described positive effects, others reported that particular songs triggered distressing emotions and memories linked to their illness. McFerran et al. (2013) similarly documented that depressed adolescents often engaged with music in ways characterized by repetitive listening, rumination, and avoidance, in contrast to nondepressed peers, suggesting that for some listeners music can become intertwined with maladaptive emotional processing. Together, these findings indicate that music engagement is not uniformly beneficial and may interact with existing psychopathology and listening patterns to yield either adaptive or maladaptive outcomes.

4. Discussion

Music therapy was a safe, cost-effective, and non-invasive approach that could support maternal health during pregnancy by addressing psychological and physiological needs and potentially benefiting fetal development. Studies in peer-reviewed journals showed that music exposure was associated with reductions in stress, anxiety, depression, and insomnia, sometimes accompanied by decreases in cortisol and improvements in sleep quality. Other work reported enhanced maternal–fetal bonding and improved mother–infant relationships in association with singing and other forms of active engagement, as well as possible links with oxytocin release. Music interventions were also related to lower blood pressure and heart rate and increased heart rate variability, patterns consistent with parasympathetic activation and autonomic flexibility. Additional findings suggested that prenatal music and sound stimulation might contribute to fetal learning, autonomic resilience, and early memory formation, particularly when the stimuli were gentle and rhythmically stable.

At the same time, the existing literature showed notable methodological variability that limited the strength and generalizability of conclusions. Sample sizes ranged from small pilot studies to larger randomized controlled trials, with substantial differences in gestational age at intervention, intervention duration, and follow-up length. Protocols differed in the type of music used (e.g., classical vs popular, slow vs fast tempo, live vs recorded), delivery format (headphones, speakers, singing), and outcome measures (self-report scales, salivary biomarkers, hemodynamic parameters, fetal heart rate indices, behavioral observations). Many studies relied on convenience samples and did not fully control for baseline mood or anxiety disorders, which are common in pregnancy and may influence both how participants use music and how they respond to it. Few trials directly compared different music-therapy formats or systematically assessed potential adverse effects, such as the use of loud, dissonant, or personally triggering music, even though some work in non-pregnant populations suggests that certain listening patterns can reinforce rumination

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and negative affect.

These limitations point to several important gaps and directions for future research. Larger, well-controlled randomized trials are needed to compare active (e.g., singing, dancing, playing instruments) and passive (listening-focused) protocols and to clarify which components are most effective for specific outcomes such as anxiety, depression, sleep, pain, autonomic regulation, and bonding. The use of standardized intervention parameters (e.g., tempo, intensity, session length) and common outcome measures would facilitate cross-study comparison and meta-analytic synthesis. Longitudinal studies following mothers and children beyond the perinatal period are needed to determine whether changes in fetal heart rate patterns, heart rate variability, and early auditory learning translate into durable developmental, cognitive, or relational benefits. Finally, research should explore how individual differences—including prior trauma, psychiatric history, cultural background, and pre-existing music preferences—shape responses to music interventions, as well as systematically examine any conditions under which music listening may exacerbate distress or maladaptive coping.

5. Conclusion

In sum, the current body of evidence suggests that music therapy offers a low-risk, accessible means of supporting maternal psychological well-being, physiological regulation, and early bonding, while also influencing fetal autonomic and auditory development through prenatal sound exposure. By integrating findings across diverse study designs, this work highlights both shared benefits of music-based interventions and important variations related to protocol, measurement, and participant characteristics, underscoring the need for more rigorous, standardized, and longitudinal research. Clarifying which types of music therapy are most effective, for which populations, and under what conditions will be essential for translating these promising results into evidence-based clinical and community practice that optimally supports both maternal health and child development.

Acknowledgment

I would like to thank Dr. Daud Lodin, Faculty Mentor, and Ms. Angelica Smith, Research Advisor, for their guidance and support throughout the development of this paper.

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