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The Effect of Music Therapy on Pregnant Women

By Erin Fang

AUTHOR BIO

Erin Fang is a junior at South Windsor High School interested in pre-med, public health, and women's rights. She volunteers at Connecticut Children's Hospital and is deeply involved in school health clubs, promoting wellness and advocacy. Passionate about maternal and child well-being, she explores how accessible approaches like music therapy can support women during pregnancy.

ABSTRACT

Music therapy provides non-invasive cost-effective solutions to help pregnant women manage their emotional and physical challenges, which include anxiety and mood disorders and pain. Current research investigates prenatal auditory stimulation effects on fetal health and development and maternal-fetal bonding through active and passive musical experiences. The review draws from current studies found using Google Scholar to demonstrate how music therapy helps decrease stress and anxiety, improve sleep quality, manage labor pain, and regulate cardiovascular and nervous system functions. This paper examines the various advantages of music therapy during pregnancy by studying its effects on maternal and fetal health through psychological and physiological and prenatal perspectives. Despite its advantages, music therapy must be applied cautiously, as certain music experiences may trigger negative emotions or ruminative thinking in vulnerable individuals. The synthesis shows how music therapy can be used as an alternative healthcare method but it also shows the limitations of the research in terms of standardized methods and individual differences in response.

Keywords: *Music Therapy; Pregnancy; Maternal-fetal health; Anxiety and stress reduction; Labor pain management; Prenatal auditory simulation; Maternal well-being; Prenatal bonding*

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INTRODUCTION

Music therapy has gained acceptance from healthcare professionals as a treatment which helps patients through its beneficial effects on emotional state and physical health. Music therapy provides a non-invasive and cost-effective method to support maternal health during pregnancy when women experience anxiety and mood swings and physical discomfort. The research examines how music therapy benefits pregnant women through psychological effects and physiological responses and prenatal advantages while drawing from contemporary studies to demonstrate its stress reduction and pain management capabilities and 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). These mental health challenges can have lasting effects on both the mother and the developing fetus, if left unaddressed. 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 (Tervaneimi et al., 2021), and reduced perception of pain during labor (Vaid et al., 2025).

LITERATURE REVIEW

Psychological Effects

Stress and anxiety reduction

Various studies show that calming music positively impacts cortisol levels (Tervaneimi et al., 2021), a key stress hormone, by reducing levels of it in the body. Listening to calming music has been associated with lower cortisol levels, heart rate variability, and blood pressure. Classical music is frequently cited in studies, though other genres as relaxing by the listener can also be effective in reducing cortisol levels (Tervaniemi et al., 2021.).

Music therapy positively affects the mood of pregnant women by reducing stress, anxiety, and depression symptoms. Music therapy can significantly reduce anxiety symptoms in pregnant women (Perkovic et al. 2021). Perkovic and colleagues (2021) grouped 116 participants that listened to music for two weeks during pregnancy; these participants experienced notably lower levels of stress, anxiety, and depression than those in the control group who did not listen to music.

Sleep and emotional regulation

Music therapy significantly improves sleep quality in pregnant women. More specifically, music listening and sleep hygiene guidance - strategies designed to enhance sleep quality and manage sleep issues through healthy routines and optimization of the sleep setting - can help with insomnia during pregnancy (Hoegholt et al., 2024). This showed that both approaches led to significant improvements in sleep quality and reduced the severity of insomnia.

Additionally, music therapy can also enhance 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 experienced more open communication and potential for family musical traditions (O'Reilly et al., 2023). Wulff et al. (2021) also found that both music and singing interventions improved well-being, reduced stress levels (cortisol levels), and increased bonding hormones (oxytocin). Notably, the singing group (the group that participated in singing sessions) showed a greater cortisol decrease than the music-only group (the group that joined sessions focusing on relaxation through music listening). Over time, these interventions also led to mothers feeling significantly closer to their unborn children, as assessed by a visual analogue scale.

Physiological Effects

Pain management

Studies demonstrate that music therapy can be highly effective with reducing pain perception during childbirth. Music therapy is linked to a significant decrease in the intensity of pain experienced by women who are giving birth for the first time (Vaid et al., 2025). This reduction in pain was observed consistently across various stages of labor, including the latent phase, active phase, and the second stage. The study's results showed statistically significant improvements in Visual Analog Scale (VAS) scores, with women who received music therapy reporting less pain compared to those who did not. The overall body of evidence strongly supports the integration of music therapy as a valuable approach to enhancing the overall childbirth experience for mothers.

Cardiovascular and nervous system response

Music has the remarkable ability to affect the autonomic nervous system (ANS), which is responsible for controlling involuntary bodily functions such as heart rate, blood pressure, and digestion. Soothing or calming music can stimulate the parasympathetic branch of the ANS; this branch is often referred to as the "rest and digest" system, as it helps 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 can reduce the activity of the sympathetic nervous system, which is typically responsible for the "fight or flight" response and is 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 can have a measurable and beneficial impact on cardiovascular health by promoting a more relaxed physiological state.

Additionally, research by Ooishi et al. (2017) explored the effects of slow-tempo music on hormonal responses related to stress and bonding. Their findings showed that participants who listened to a sequence of slow-paced music had significantly higher levels of salivary oxytocin, a hormone associated with social bonding and feelings of well-being. Interestingly, the level of salivary cortisol, a hormone linked to stress, remained stable and did not show a significant increase or decrease.

Together, these studies highlight the role that music, especially when characterized with a calming tempo, can play in enhancing both the physiological and emotional well-being of the individual. This is evident when music interacts with the autonomic nervous system, helping regulate heart rate and stress levels. Additionally, music's capacity to affect crucial hormones further demonstrates its impact on overall health.

Fetal and Developmental Impact

Fetal responses to music

According to a study conducted by Fathi et al, music can cause accelerations in fetal heart rate, an indication of fetal well-being as these accelerations are a sign that the fetus is moving and reacting to stimuli. This clinical trial included 80 women that were assigned into the intervention group (music therapy group) and the control group. Though there were no significant differences in the mean fetal heart rate between the groups, the intervention group was found to exhibit significant increases in heart rate accelerations and less decelerations. More specifically, Hibiya et al. (2020) found notable increases in fetal heart rate accelerations from 26 weeks of pregnancy onward, the strongest responses being between 28 and 37 weeks. This timeframe corresponds with the development of fetal hearing abilities, suggesting an important window for auditory intervention.

Massimello et al. (2022) recruited 32 women between 32 and 38 weeks pregnant; these women had an uncomplicated pregnancy. Fetal Autonomic Nervous System Evaluation (FANTE, a non-invasive tool evaluating ANS activity in fetuses) was registered in a 5 minute basal section, 10 minute music stimulus session, and a 5 minute post-stimulus session. Although mean fetal heart rate was not altered by music, the total Heart Rate Variability (HRV) was significantly increased, a marker used widely to evaluate ANS activity. This is noteworthy because it was found that a high HRV correlates to greater parasympathetic activity, indicating a more resilient autonomic system. This is helpful because it supports improved regulation of stress, emotions, and bodily functions (Lewine, 2024).

Auditory stimulation via music during pregnancy appears to have a beneficial impact on fetal brain development and can create enduring effects for infants. Movalled et al. (2023) discovered that, during the fetal stage, exposure to sound can help form specific memory traces related to those stimuli and influence both autonomic and neural responses to sound after birth - responses that play vital roles such as sensing danger (ex: the fire alarm triggers rapid autonomic responses), relaxation (reduced cortisol in response to calming sounds), and enhanced focus (specific soundscapes synchronize brainwave patterns, improving concentration). Their research further suggests that listening to music in the womb may support healthier behavioral responses in newborns, reflecting robust nervous system development and integration, where the brain and nervous system are adaptable, capable of performing complex functions even when encountering difficulties.

However, this also implies that the fetal neural system is vulnerable to potentially harmful and loud surrounding sounds, establishing the need for a specific type of auditory stimulation: slow and calm sounds. Pino et al. (2023) further supports this, concluding that music intended to promote relaxation

should feature slow, steady rhythms reminiscent of a mother's heartbeat, with a gentle and melodious quality, as a study conducted by Teijon et al. (2015) found that fetal heart rate had only a small increase with a relaxing flute melody, while Deferre et al. (2011) found that fetal heart rate increased significantly in response to an ascending melody . Gonzalez et al. (2017) found that when pregnant women are exposed to relaxing and instrumental music, it can lower their vital signs, including systolic and diastolic blood pressure as well as heart rate. These findings indicate the importance of the use of calm, rhythmically steady music for maternal relaxation for a safer auditory environment for the developing fetus.

Music therapy and maternal-fetal bonding

Active vs passive music therapy

Active music therapy (dancing, singing, playing an instrument) is associated with a stronger sense of positive emotions and a greater connection with the fetus, while passive music therapy (listening to music) proves more effective in improving daily coping mechanisms. Arioli et al. (2025) organized a study where 250 pregnant women were randomly assigned a Passive Protocol group or an Active Protocol group. The findings from their study indicated that participants in the Active Protocol group experienced and reported notably higher rates of positive emotions, as well as the mother-fetus bond, when compared to those in the Passive Protocol group. However, further analysis using linear regression did not demonstrate any meaningful links between the level of maternal involvement and either State Anxiety Scores, which reflect the anxiety level of an individual at a certain moment; or Trait Anxiety Scores, which reflect how prone someone is to experiencing anxiety.

Regarding depressive symptoms, Airolo et al. (2025) suggested that increased participation in activities such as singing and dancing- both of which are central components of the Active Protocol- was correlated with a greater reduction in depression scores. The Passive Protocol group exhibited a statistically significant decline in depressive symptoms over the course of the study, whereas depressive symptoms among the Active Protocol group showed little change at different timepoints. This pattern implies that the Passive Protocol might be more beneficial in aiding emotional regulation for pregnant women. This study suggests different types of maternal engagement can uniquely influence emotional wellbeing during this pregnancy.

Strengthening emotional connection

Playing music to a fetus can positively improve the bond between mother and child, as concluded by Francourt and Perkins (2024). Singing to babies daily led to enhanced self-esteem and self-reported mother-infant bonds, unaffected by demographic variables. Additionally, Puyvelde and colleagues (2014) set up a 5-week singing programme for mothers with postnatal depression, and found that it increased maternal-infant intersubjectivity (shared affective experiences between the mother and infant) and maternal self-efficacy (a mother's confidence in her ability to successfully tackle the demands of motherhood).

LIMITATIONS AND CONSIDERATIONS

Despite the numerous benefits of music therapy, music has potential harmful effects. When music is presented in a certain way, it may trigger unpleasant thoughts related to illnesses. Individuals diagnosed with anorexia participated in a questionnaire where they listened to music and then completed free text response questions about their time spent listening to the music (Priya et al., 2021). While some participants detailed positive experiences with the music listening, others described how specific songs influenced negative emotions and reminded them of difficult times during their eating disorder. McFerran and colleagues (2013) conducted a qualitative study with depressed and nondepressed adolescents and discovered that the depressed adolescents' musical engagement involved ruminative thinking by repetitively listening to music and using music to escape and avoid problems.

CONCLUSION

Music therapy is a safe, cost-effective, and non-invasive approach that can support maternal health during pregnancy by addressing psychological and physiological needs and positively supporting fetal development. Research articles published in reputable journals have shown that music therapy can lead to decreased levels of stress, anxiety, depression, and insomnia by decreasing cortisol levels; maternal-fetal bonding through the stimulation of oxytocin and emotional bonding through singing or active participation; lower blood pressure and slow heart rates associated with parasympathetic system activation; less perception of pain during labour; and development of healthy autonomic resilience and memory formation in brain development for fetuses through prenatal listening and steady, tame music.

Active music therapy allows for bonding through positive emotions in singing and dancing while passive listening has a greater impact on regulating mood and mitigating the effects of depression. Overall, music therapy has holistic benefits for both mother and child when considering selections and avoiding music that may induce negative emotion.

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