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Is music therapy a complementary treatment option for perinatal women experiencing stress and anxiety?

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A SELECTIVE EVIDENCE BASED MEDICINE REVIEW

In Partial Fulfillment of the Requirements For

The Degree of Master of Science

In

Health Sciences – Physician Assistant

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ABSTRACT

Objective: The objective of this selective EBM review is to determine whether or not music therapy is a complementary treatment option for perinatal women experiencing stress and anxiety.

Study Design: Literature review of three English language studies, published between 2006 and present.

Data Sources: Three randomized controlled trials (RCTs) were found using a search of Pubmed, Medline, OVID, and Cochrane databases. These studies analyzed the use of a music therapy intervention among pregnant or postpartum women suffering stress, anxiety and/or depression.

Outcomes Measured: The outcomes of interest include stress, anxiety and severity of depression symptoms. Outcomes were measured using the Perceived Stress Scale (PSS), the Scale of the State-Trait Anxiety Inventory (S-STAI), and the Edinburgh Postnatal Depression Scale (EPDS).

Results: Chang et al found that following a two-week music therapy intervention the experimental group had lower mean scores for PSS, S-STAI and EPDS when compared to baseline ($p < 0.001$; $p = 0.01$; $p < 0.001$, respectively). Moreover, an ANCOVA analysis comparing the effectiveness of the music therapy revealed that women in the experimental group had relatively lower scores than the control group for S-STAI, EPDS, and PSS. Tseng et al determined that there were no significant differences in PSS and S-STAI scores between the control group and experimental group post-intervention ($F = 0.61$, $p = 0.438$; $F = 1.30$, $p = 0.258$). The authors concluded that postpartum mothers who listened to music for two weeks did not show significantly decreased PSS and S-STAI scores. Yang et al determined that following music therapy, S-STAI scores among the intervention group improved significantly ($p < 0.01$), supporting the fact that music therapy was effective in reducing anxiety among high-risk pregnant women.

Conclusions: Two of three studies demonstrated that music therapy is an effective treatment for perinatal stress and anxiety. Given its low cost and ease of administration, music therapy can be utilized as a primary treatment option or adjunctively to the current standard of care. Future studies would benefit from focusing on the long-term effects of music therapy on perinatal anxiety and stress.

Key words: music therapy, perinatal, prenatal, postpartum, stress, anxiety, pregnancy

INTRODUCTION

Pregnancy can be an exciting time in a woman's life, but it can also be stressful, not only due to the medical demands of labor and delivery, but also due to the need to adjust to new maternal demands and expectations.¹ Additional psychological conditions, such as anxiety and depression can further complicate a woman's emotional stability. Research has found that pregnancy and the postpartum period can be the triggering mechanism for the first onset of a mood or anxiety disorder or can increase the risk of recurrence or relapse of symptoms for those with a history of psychiatric disorder.¹

Recognizing and treating psychological distress related to states of stress, anxiety and depression are crucial for the wellbeing of both mother and child. Healthy mother-infant interactions are critical for a child's physical, cognitive, and psychological development.² These interactions can be negatively impacted by maternal states of anxiety and stress, leading to outcomes of infant mal-adaptation³, premature birth, and low birth weights.⁴ Likewise, perinatal anxiety and depression have been linked with outcomes related to feelings of parental inefficacy, reduced maternal coping capabilities, and decreased maternal reactivity and sensitivity.³

Often quantifying those with postpartum depression, let alone those suffering from perinatal anxiety and stress, can be difficult as women can feel ashamed for seeking treatment. However, it has been estimated that the annual cost of not treating a mother with depression is \$7,200. If extrapolated to estimate the cost for the 600,000 mothers each year untreated for maternal depression alone, it would cost the U.S. \$4.2 billion dollars.⁵ In relation to health care utilization, few national statistics exist on perinatal or postpartum problems encountered by new mothers.⁶ However, in terms of population impact, it has been estimated that 17% of mothers suffer from anxiety after giving birth compared to 6% who suffer from postpartum depression.⁷

Unfortunately, much less attention is paid to maternal anxiety and stress during the perinatal and postpartum period.³

Current medical management typically includes antidepressant medications, cognitive behavioral or interpersonal therapy and social support.⁸ However, the use of psychotropic medications may be conflicting to some women during pregnancy and breastfeeding.⁸ Natural alternative therapies, such as music therapy, may provide women an inexpensive and non-stigmatizing means of treatment for their stress, anxiety, and/or depression.

Yang describes music therapy as a “systematic process where the therapist helps the patient promote health using music experiences and the relationships that develop through them.”⁹ This type of therapy has been utilized for conditions such as dementia, autism and pain control to name a few. Its low cost, ease of administration, and minimal to no adverse side effects make it an ideal treatment option¹⁰, especially for pregnant or postpartum women undergoing stress and anxiety.

OBJECTIVE

The objective of this selective EBM review is to determine whether or not music therapy is a complementary treatment option for perinatal women experiencing stress and anxiety.

METHODS

The three studies analyzed in this review all met the following criteria. Studies are randomized controlled trials (RCTs); two of which include a pretest-posttest analysis. The population comprises of perinatal women over the age of 18 years receiving some form of music therapy as a treatment regimen. The comparison groups among the three studies received only general prenatal or usual care. The outcomes of measurement include: stress, anxiety, and severity of depressive symptoms.

A detailed search of PubMed, Medline, and OVID databases was completed by the author using the keywords “music therapy”, “stress”, “anxiety”, “pregnancy”, “prenatal”, “perinatal” and “postpartum”. Review articles, meta-analyses, and systematic reviews cross-checked on COCHRANE database that answered the same question were excluded. Articles were selected based on their relevance to practice and importance to patient-oriented outcomes (POEMs: Patient Oriented Evidence that Matters). Inclusion criteria for article selection were as follows. All articles were RCTs published in an English language peer-reviewed journal. The studies were published during or after 2006. Those studies focusing on music therapy interventions for pain management during labor and delivery were excluded.

A summary of statistics reported or used include p-values as calculated by independent t-tests, paired t-tests, chi squares and ANCOVA scores and 95% confidence intervals. Table 1 displays the demographics and characteristics of the three selected articles.

Table 1. Demographics and Characteristics of Included Studies

	Type	No. enrolled	Mean Age (years)	Inclusion Criteria	Exclusion Criteria	Attrition	Interventions
Chang et al ⁴	Randomized controlled trial with a prospective pretest-posttest experimental design	236	Experimental 30.48 (Range 24-42) Control 29.58 (Range 20-39)	1. Over 18 years of age 2. Women who expected to have uncomplicated vaginal deliveries 3. Gestational age of 18-22 weeks or 30-34 weeks	N/A	0	Music therapy via prerecorded CD that was to be listened to at least 30 minutes a day for two weeks at any time of the day. Participants were asked to record in a diary what they had listened to and what they were doing while listening.
Tseng et al ¹²	Pretest, posttest randomized controlled trial	92	Experimental 30.43 (SD 3.87) Control 30.78 (SD 4.77)	1. At least 18 years old and married. 2. Delivery of a mature and normal newborn. 3. Consent to participate.	1. Postnatal women with apparent postpartum complications or illness requiring prescription medication		Music therapy via prerecorded CD for at least 30 minutes a day for 2 weeks plus general postpartum care

Yang et al ⁹	Randomized control trial	120		<ol style="list-style-type: none"> 1. Pregnant women admitted with the diagnosis of threatened preterm birth caused by early onset uterine contractions, placenta previa hemorrhage, or premature rupture of membranes 2. Gestational age between 28-36 weeks 3. Hospitalized 48 hours or more 4. Singleton pregnancy without polyhydramnios, deformity, or congenital diseases confirmed by B mode U/S 5. Receiving fetal heart monitoring 	<ol style="list-style-type: none"> 1. Severe visual and/or auditory disorders. 2. Severe medical and/or surgical complications 3. Mental or cognitive disorders 	0	Three individual sessions of music therapy, one session for 3 consecutive days, 2 hours post lunch for 30 minutes
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OUTCOMES MEASURED

As mentioned above, outcomes used for analysis include stress, anxiety and severity of depressive symptoms. All three authors utilized the Scale of State-Trait Anxiety Inventory (S-STAI), while Chang et al and Tseng et al also used the Perceived Stress Scale (PSS). In addition, Chang et al applied the Edinburgh Postnatal Depression Scale (EPDS).

The S-STAI measures and examines each patient's feelings of apprehension, tension, nervousness, and worry via a 20 question self-report inventory. Current feelings of anxiety are assessed using a four-point Likert scale from 'not at all' (1) to 'very much so' (4). Score range from 20 to 80 with higher scores indicating a high level of anxiety.

Perceived stress was mainly evaluated using the 10-item PSS, which focuses on feelings and thoughts experienced during the previous week. Items were designed to determine how

controlled, unpredictable and overloaded respondents felt their lives were. Responses were rated on a 5-point Likert Scale ranging from 'never' (0) to 'very often' (4). Higher scored responses indicated high levels of perceived stress.

The 10-item EPDS assesses a woman's severity of depressive symptoms. Women are asked, 'How depressed have you felt in the past seven days, not just how you feel today?' Answers are rated from 'not at all' (0) to 'Yes, most of the time' (3). Scores range from 0-30.

RESULTS

The following results from the three studies presented below contain continuous data. As a result, the analysis of risk reduction (RRR), absolute risk reduction (ARR), and numbers needed to treat (NNT) could not be calculated.

Chang et al designed a prospective pretest-posttest experimental study with a permuted block randomization. Two hundred and forty one women were enrolled at the beginning of the study; five declined follow-up, leaving data for 236 women at the time of analysis. The intervention consisted of the experimental group listening to at least one compact disc (CD) per day for a two week period; women were allowed to listen to music at any time of the day. The CDs were prerecorded, each containing approximately 30 minutes of music consisting of lullabies, classical music, nature sounds, or crystal music performing Chinese children's rhymes and songs. Participants of the experimental group were also asked to maintain a diary specifying type and volume of music listening daily.

The authors determined there were no significant differences between the experimental and control groups in terms of demographic characteristics and baseline PSS, S-STAI, and EPDS scores (Table 2). A paired t-test was performed to determine if the PSS, S-STAI, and EPDS scores changed after 2 weeks (Table 3). Comparing baseline with posttest scores for the

experimental group, analysis revealed significantly lower means for PSS, S-STAI and EPDS ($p < 0.001$; $p = 0.01$; $p < 0.001$, respectively). In the control group, only the PSS score was significantly lower posttest compared to baseline ($p = 0.017$).

Chang et al also conducted a one-way between-group analysis of covariance (ANCOVA) to compare the effectiveness of the music therapy. For the S-STAI scores, the ANCOVA analysis demonstrated that women in the experimental group typically had lower scores than the control group by an average of 2.63 units. Similar findings were also ascertained for the EPDS and PSS, i.e. women in the experimental group generally had lower scores than the control group by an average of 1.83 and 1.12 units, respectively.

Table 2. Comparison of baseline data in pregnant women receiving music therapy and the controls, Mean \pm SD, (range)^a

Scale	Experimental (<i>n</i> = 116)	Control (<i>n</i> = 120)	<i>t</i> -value	<i>p</i> -value
PSS	17.44 \pm 4.56, (4-32)	16.71 \pm 4.31, (7-26)	1.27	0.21
S-STAI	37.92 \pm 9.79, (20-63)	37.08 \pm 10.04, (20-66)	0.66	0.51
EPDS	12.11 \pm 3.54, (3-20)	12.17 \pm 3.92, (3-21)	-0.11	0.91

^aData derived directly from Chang et al⁴

Table 3. Mean (SD) and *t*-values of dependent variables after 2-week changes in the 2 groups^a

Outcome	Experimental Group (<i>n</i> = 116)			Control Group (<i>n</i> = 120)		
	Baseline	Posttest	<i>t</i>	Baseline	Posttest	<i>t</i>
PSS	17.44 (4.56)	15.29 (5.22)	5.33**	16.71 (4.31)	15.79 (5.99)	2.43*
S-STAI	37.92 (9.79)	35.70 (10.86)	2.59*	37.08 (10.04)	37.79 (12.11)	-0.83
EPDS	12.11 (3.54)	10.27 (4.05)	6.95**	12.17 (3.92)	12.14 (4.60)	0.09

^aData derived directly from Chang et al⁴

* $p < 0.05$; ** $p < 0.01$

Tseng et al designed a RCT containing a pretest, posttest component. Ninety two women met inclusion criteria and were randomly assigned to either the experimental group or the control

group; 77 women completed the two period assessment. Similar to the intervention designed by Chang et al, women in the experimental group were asked to spend at least 30 minutes a day for a two week period listening to a prerecorded CD containing lullabies, classical music, nature sounds, or crystal music. In addition, women were asked to follow up with their general postpartum care.

The authors reported no significant differences between the two groups in terms of demographic characteristics, with the exception of education, which was later controlled for in advance statistical analysis. Tseng et al also determined that there was no statistical difference in the means of the two psychological parameters (PSS and S-STAI) between the two groups before the intervention ($p > 0.05$).

Controlling for pretest PSS, S-STAI and education, the authors utilized an ANCOVA analysis to determine that there were no significant differences between the control group and experimental group post-intervention for PSS and S-STAI scores ($F = 0.61, p = 0.438; F = 1.30, p = 0.258$)(Table 4). The authors concluded that postpartum mothers who listened to music for two weeks did not show significantly decreased PSS and S-STAI scores.

Table 4. Pretest and posttest means (SD) by group and analysis of covariance for PSS and S-STAI ^a

Variable	Experimental		Control		<i>F</i>	<i>p</i>
	Pretest	Posttest	Pretest	Posttest		
PSS	15.27 (4.81)	16.49 (4.27)	15.43 (5.27)	15.65 (6.46)	0.61	0.438
S-STAI	36.19 (9.99)	40.05 (11.00)	35.00 (9.81)	35.33 (11.45)	1.30	0.258

^aData derived directly from Tseng et al¹²

Yang et al randomized 120 high-risk pregnant women to one of two groups. The intervention group included usual care plus three individual private sessions of music therapy, one session for three consecutive days given two hours post lunch. Sessions lasted for 30 minutes and began on the third day of hospitalization. Three types of music selections were available to the women - classical, pleasant, and Chinese folk music.

The author's outcomes of interest included anxiety as well as physiological responses. For the purpose of this review, only anxiety resultants will be discussed. Yang et al determined that following music therapy, S-STAI scores among the intervention group improved significantly ($p < 0.01$). Anxiety values did not differ significantly among the control after their similar period of rest without music ($p > 0.05$)(Table 5).

Overall, the authors determined that the improvements in the intervention group were much higher than those of the control group for all measures ($p < 0.01$)(Table 6); thereby supporting the fact that music therapy was effective in reducing anxiety among high-risk pregnant women.

Table 5. Comparison for Each Group Pre/post Therapy^a

Variables	Intervention				Control			
	Mean pre/post intervention	Differences pre/post therapy	Statistic	<i>p</i> -value	Mean pre/post intervention	Differences pre/post therapy	Statistic	<i>p</i> -value
Anxiety Scores	40.65/26.58	14.1 ± 5.83	<i>t</i> =18.44	<i>p</i> <0.01	41.93/41.85	0.12±2.76	<i>t</i> =0.24	<i>p</i> =0.81

^aData derived directly from Yang et al⁹

Table 6. Comparison between Intervention Group and Control Group Prepost Therapy^a

Dependent Variables	Differences of Intervention Group (Pre vs. Post)	Differences of Control Group (Pre vs. Post)	Wilcoxon Rank Sum Test	
			χ^2	<i>p</i>
Anxiety Scores	14.12 ± 5.8	0.12 ± 2.76	86.01	<0.01

^aData derived directly from Yang et al⁹

DISCUSSION

As the results indicate above, two of the three studies validated that music therapy was effective at reducing perinatal stress, anxiety, and/or depression. Although one of the studies has contradicting findings, it is reasonable to suggest that a clinician recommend music therapy as a trial primary treatment regimen or as an adjunct to traditional pharmoco- or psychotherapy. In a time where mental health issues can be stigmatizing, music therapy is a feasible and cost effective option. Unborn babies or breastfeeding newborns are not without risk to harmful side

effects that may emerge with conventional pharmacotherapy. It can also provide mothers with an opportunity to bond with their baby in a comfortable environment, as it can be done in the home setting. Additionally, natural alternative treatments like music therapy, can offer women a sense of control over their stress and anxiety, while at the same time allowing them to learn new strategies to coping with their illness on their own.⁸

There are a few limitations within the studies worth mentioning. Chang et al asked intervention participants to record in a daily diary their listening habits; however, participants of the control group were not. It is unknown whether control group participants had listened to music during that two week experimental period and the effects it may have had, if any. Moreover, women were only asked to listen to at least 30 minutes, but the authors did not disclose whether intervention participants listened beyond that time limit frame and if the effects of longer listening had a greater impact on psychological outcome scores. Similar limitations can be said for the study conducted by Tseng et al. As for the study created by Yang et al, the authors mention that Chinese social norms may be a factor influencing S-STAI scores, as women may feel the need to “save face”.⁹

Lastly, in terms of external validity, given that the populations of the three studies were homogenous in nature, i.e. Taiwanese and Chinese; it is difficult to say whether music therapy would be effective among other population groups. However, it is important to point out the authors utilized different risk stratifications and phases during pregnancy; for example Chang et al enrolled pregnant women with expected uncomplicated deliveries, Tseng et al utilized postpartum women who delivered mature and healthy newborns and Yang et al enrolled high-risk hospitalized pregnant women.

CONCLUSION

The reviewed studies established that music therapy may be a complementary way to treat perinatal stress, anxiety and depressive symptoms, as it is cost effective and non-invasive. It is also an intervention that can be largely tailored to meet the needs of the patient.

Future studies would benefit from a longer intervention period. Chang et al and Tseng et al limited their intervention to two weeks, whereas Yang et al only had a three day intervention.

Moreover, given that the long-term effects of music therapy on perinatal stress and anxiety are limited, further research developed around these effects may help promote acceptance and use of alternative complementary therapies.

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