


Music Therapy in Perinatal Psychiatry: Use of Lullabies for Pregnant and Postpartum Women with Mental Illness

Music and Medicine
2(4) 219-225
© The Author(s) 2010
Reprints and permission:
sagepub.com/journalsPermissions.nav
DOI: 10.1177/1943862110379584
http://mmd.sagepub.com


Susan Hatters Friedman, MD¹,
Ronna S. Kaplan, MA, MT-BC, NMT²,
Miriam B. Rosenthal, MD^{1,2}, and Patty Console, MT-BC²

Abstract

Lullabies are a universal and ancient song form that play an important role in both comforting infants and providing a critical bonding experience, which has been borne out by research. An innovative lullaby program at an urban community music school was transferred to a Perinatal Mental Health Program at a community mental health center. Participants in the music therapy group include those with depression, bipolar disorder, or psychosis who were pregnant or postpartum, their infants, and various treatment team members. Goals of this cross-disciplinary novel program include mothers learning to use music to enhance self-expression, coping, inspiration, and relaxation. In particular, the program addresses how music might calm infants and respond to their distress. Barriers to such a program include funding issues, transportation, and recruitment. A lullaby music therapy program is a feasible component in the treatment of mental illness during pregnancy and the postpartum period.

Keywords

community psychiatry, music therapy, postpartum, postpartum depression, pregnancy

The postpartum period is the time in a woman's life when she is most likely to experience symptoms of mental illness or depression.¹ Schizophrenia, bipolar disorder, and major depression are all serious mental illnesses that can either first appear, or have an exacerbation during this time. Symptoms of schizophrenia or other psychosis may include hallucinations (such as hearing voices or seeing visions), delusions (fixed false beliefs), and so-called "negative symptoms" such as withdrawing from others and activities.^{2,3} In bipolar disorder, women may experience "lows" consistent with depression, in which they may be suicidal, not enjoy life, not care for themselves properly with abnormal sleep and eating patterns. They may also experience "highs" consistent with manias, during which they may not sleep, may talk quickly, and engage in dangerous behaviors with poor judgment.⁴ Postpartum depression strikes approximately 15% of women—rates vary depending on the population studied.⁵ Depending on the severity of the depression, the mother's ability to care for herself and for her child may be adversely affected.

Many mothers are concerned about taking medication during pregnancy or during breastfeeding because of concerns about potential harm to the baby, though the occurrence of this is relatively rare.⁵ Parents may seek nontraditional therapies for mental illness during these vulnerable times. If left untreated, maternal mental illness cannot only lead to morbidity for the mother, but potentially for an entire family.

Effective treatments for postpartum depression traditionally include medications, psychotherapy, and support and psychoeducational group therapies.⁵ Women with support are less likely to remain depressed.⁵ Some may not seek psychiatric treatment because of stigma or lack of knowledge. Symptoms of mental illness may limit the bonding between the mother and baby with inadequate sensitivity to the infant's cues, insecure attachments, signs of chronic stress, and the infant's difficulty with cognitive and language development.⁵

Music Therapy and Mental Illness

Music therapy is effective in the treatment of severe mental disorders, of both psychotic and nonpsychotic natures.⁶ A recent Cochrane review found that 4 of 5 existent randomized studies reported a greater improvement of depressive symptoms among those randomized to music therapy than to those in standard care conditions.⁷ As noted in a quantitative

¹ Case Western Reserve University School of Medicine, Cleveland, Ohio

² The Music Settlement, Cleveland, Ohio

Corresponding Author:

Susan Hatters Friedman, Connections, 24200 Chagrin Blvd, Beachwood, Ohio 44122

Email: susanhfmd@hotmail.com

comparison of cognitive behavioral therapy and music therapy research,⁸ De l'Etoile⁹ found positive changes in symptoms, curative factors, and attitudes toward seeking professional psychological help following music therapy for 8 adult outpatients with chronic mental illnesses. Music therapy interventions included music listening, lyric analysis, music with other arts media, improvisation, songwriting, singing, and music for relaxation. Tang et al¹⁰ reported a statistically significant difference in negative psychiatric symptoms for 76 inpatients with residual schizophrenia after participation in a randomly assigned music therapy group including both passive listening and active singing, and positive social changes such as decreased isolation and increased interests compared to those individuals in the control group. Talwar et al¹¹ noted trends toward improved symptoms of schizophrenia among 81 subjects in a randomly assigned music therapy group compared to controls. Even within a single music therapy session, researchers have noted that positive mood changes and positive treatment continuity changes occurred significantly more frequently than negative or no changes for participants in an intensive outpatient psychiatric treatment program including music games, songwriting, lyric analysis, music drama, group improvisation, music and art, music listening, and music and relaxation.¹² The majority of participants indicated that they thought music therapy interventions were beneficial and that they would incorporate music into their daily lives.¹²

Music therapy is often accepted by those diagnosed with depression.⁷ In 1 study (N = 116), pregnant music therapy group participants showed a significant decrease in Edinburgh Postnatal Depression Scale scores at 2 weeks, compared to those with regular prenatal care.¹³ Women who are hesitant to accept medication treatment of mental illness in pregnancy and during lactation may be more willing to participate in music therapy.

The Lullaby

Lullabies are a universal and ancient song form that play an important role in comforting infants and providing a critical bonding experience. Experts have defined characteristics of a lullaby, such as having a slow, steady tempo with little change (about 60-80 beats per minute, similar to a normal, resting adult heartbeat), rhythmically simple, regular and repetitive, predictable, with just a few notes (a narrow pitch range), fewer contour changes, and a higher median pitch than other songs.¹⁴⁻¹⁷ "Songs of kin," which might be viewed as a special type of lullaby that is culturally-sensitive music based on honoring caretaker preference, intentions, and ancestry, have been used to calm infants and young children prior to electroencephalography (EEG) testing.¹⁸

In general, why should we sing lullabies? Singing to infants is considered a universal caregiving behavior in every known culture.^{17,19-23} However, Baker and Mackinlay²⁴ share their perception that the daily practice of singing lullabies within the home environment is declining and being replaced by prerecorded commercially available music. Wigram et al²⁵ report

that making music is a social event that brings people together and allows for the communication of feelings that might change very subtly within 1 or more participants. Much research has been conducted on using lullabies to calm and sedate babies.^{18,26-32} Furthermore, the usage of lullabies is reported to stimulate early language development,^{15,33} an occurrence that is important particularly because infants of mothers who are depressed may have difficulty meeting the cognitive and physical milestones of infancy.³⁴⁻³⁶ Singing lullabies facilitates a relaxation response in mothers and can assist in their ability to cope with the many demands of motherhood.³⁷ Lullaby usage in music therapy for mothers with or without diagnoses serves a dual purpose—the lullaby and its accompanying gentle, repetitive multimodal interactions, such as patting, rocking, stroking, walking, and swaying to the tempo of the music, simultaneously soothe the baby and allow the singer to release her emotions. Often, lullaby lyrics can reflect social and musical themes of particular interest to mothers. These might include their fears, hopes, and dreams for their babies and their families, how they gain inspiration, from whence comes their support, and more.

Infant behavior shapes caregiver behavior and vice versa. In what is called infant-directed (ID) singing, the mother/caregiver responds to a baby's behaviors, and the baby "directs" the type of songs the adult sings.^{38,39,57} For example, if the baby is crying, the adult sings a lullaby, but if the baby is cheerful and alert, the adult might sing a "play song."³⁸ The baby thereby learns basic strategies to effectively interact with the environment.³³ Hanson-Abromeit, Shoemark, and Loewy⁴⁰ state that infants can discriminate singing that is directed intentionally to them. Rock et al⁴¹ postulate that it is possible that changes occurring in infant-directed singing may function as a way to attract a baby's attention and communicate emotional messages based on songs context. They further observe that infants notice stylistic changes in the music, for example, infants become more inwardly focused, turning their attention to their bodies, their clothing or objects they were holding, when listening to infant-directed lullabies, and more attentive to the external world, their mothers or other caregivers, during infant-directed play songs. Newborn infants are dependent on others to regulate their sensitivity and babies learn to adapt to the world through experiencing consistency and repetition in their daily lives. Without a mother's help to learn to regulate him or herself, a child may be "left to his own devices."⁴² Music therapists model and guide mothers to effectively utilize ID singing and choose soothing activities to do in conjunction with singing lullabies.³⁹

Recently, Australians Baker and Mackinlay²⁴ offered an educational program for first-time mothers. They reasoned that personal singing is in the decline in the age of recorded music being easily available, but that lullabies are effective in calming babies and promoting maternal relaxation. Thus, they asked 20 mothers to sing to their babies 4 times per week for 6 weeks and to keep a diary detailing what they sang and how often. Mothers were required to be part of 2-parent families, who were not suffering mental illness to take part in the study.

Mothers sang 5 to 7 lullabies on average, often choosing which one based on calming, relaxing, or quieting their babies as well as comfort level and singing confidence. Additional factors in lullaby choice included the soothing effect the song had on the mother or the enjoyment she felt through singing, prior response of the infant to that lullaby, and cues provided in the lyrics settling down and preparing to sleep. Several participants noted that they had improvised or adapted the lullabies to create more intimacy with their babies, supporting the findings of Custodero et al⁴³ that many mothers tend to add improvised songs into their repertoire. Few lullabies were known by the mothers, suggesting a loss in lullaby repertoire over generations. On a positive note, all participants said they planned to continue using singing with their babies, and for many, the education program drew attention to the importance of and need for attending to infants' continually changing responses. The authors determined that to preserve mother-infant bonding and the repertoire of lullabies, mothers needed to be educated about which lullabies might be appropriate to sing with their babies. This program used music therapy techniques and principles.

Music therapy in other settings with fragile babies, in the Neonatal Intensive Care Unit (NICU), for example, benefits parents, infants, and caregivers, strengthens bonding and improves mood.⁴⁴ Two premises are involved, that of the developmental primacy of synchronicity of mother and infant, and that of sound awareness beginning prior to birth.⁴⁵ Cevasco⁴⁶ recorded mothers singing and played these recordings for their preterm and full-term infants at times when they were not able to visit the NICU. Mothers reported they valued the music. Cassidy and Standley⁴⁷ suggested that providing opportunities for parents of premature babies to choose music to play for their infants while in the NICU could be a means for parents to feel a sense of control in a situation where they may feel unable to make many choices. According to Nocker-Ribaupierre,⁴⁸ the mother's voice in the NICU is able to build a bridge in the following ways: (1) for the baby, from the intrauterine life to the extra-uterine life; (2) for the baby, from the intrauterine life through the technical life in the NICU to home life; (3) for the mother, from the pregnancy experience to suddenly not be pregnant anymore; and (4) for the emotional connection and bonding process of both the mother and infant. Shoemark and Dearn⁴⁹ described themes within music therapy in the NICU. These themes included the importance of professionalism and poise in the music therapist, the triadic relationship between baby/mother/therapist, endurance for the length of the treatment, the experiences of joy, and the development of the whole child. Such themes are pertinent for music therapy in the perinatal psychiatric clinic as well. Music therapy is helpful for infants and for the mother-infant attachment. Infants in the NICU and infants of mentally ill mothers are both at elevated risk for difficulty with bonding, and music therapy could benefit both groups.

Music therapy may be helpful to others in the medical setting, as it may assist them in achieving their goals for infants and in doing their jobs. Music therapy outcomes related to the Newborn Individualized Developmental Care and Assessment

Program (NIDCAP) include: decreased length of stay, promotion of intimacy between parent and infant, improved behavior state, increased oxygen saturation levels, increased mean weight gain, and improved nonnutritive sucking.^{40,50} Furthermore, research has shown that babies respond positively to the use of music in relation to painful medical procedures such as heel sticks.^{32,51}

The Perinatal Mental Health Program

The Perinatal Mental Health Program at Connections began in 2002, as a response to a dearth of community services for women suffering from mental illness during pregnancy and the postpartum period. In 2004, the Perinatal Mental Health Program at Connections was awarded the Helping Hands Award by the Cuyahoga County Mental Health Board. Over time, the treatment team has evolved to include perinatal psychiatrists, resident and fellow level psychiatric trainees, nursing, case management, counseling, and the most recent addition, a music therapist.

Women referred to the perinatal program are pregnant or have delivered babies in the previous 3 years. They may have become pregnant in the context of a long-standing mental illness or experience new-onset illness, usually in the postpartum period. Program participants have a range of mental illness, most often including depression, but also schizophrenia, bipolar, and anxiety disorders. Many also suffer from multiple social stressors (eg, relationships, employment stress) in addition to being socioeconomically disadvantaged.

The Lullaby 101 Program: A Treatment Model

An innovative lullaby program at The Music Settlement, a community music school in Cleveland, Ohio, has been available to parents for a fee for the past few years. It has also been transferred to several area social service agencies, which serve expectant and parenting teenagers. Ideally the program is to last between 6 and 8 weeks, depending on the needs of the collaborating agency and its clientele. In this curriculum-based music therapy service model, each week a different topic is discussed. The curriculum was devised by the Music Settlement Director of Music Therapy, to be consistent. Topics include the following: how the parents currently use music in their lives, definition of a lullaby, brainstorming about lullabies participants know, identifying signs of babies' distress or overstimulation, writing a lullaby, choosing soothing activities to do while singing lullabies, and choosing calming music for babies.

The Lullaby 101 program was transferred to the community mental health center at no cost to the participants. The music therapist provided an hour-long weekly lullaby group for mothers and their infants. Goals of this novel addition included mothers using music for improved self-expression, coping and inspiration, as well as mothers learning to use calming music for their babies. Mothers as well learned the importance of eye contact and direct response to their infants' distress. These were existing goals of the Lullaby 101 program in the general

population. In addition, in the work with mentally ill mothers, we sought for mothers to increasingly identify their feelings and to increase their awareness of feelings through infant directed singing. Finally, we sought to decrease mothers' senses of personal anxiety.

Candidates for the group included mothers and mothers-to-be diagnosed with depression, bipolar disorder, schizophrenia, or schizoaffective disorder. We offered the group only to those with anticipated custody of their infants (based on past history, severity of illness, plans for adoption, and sobriety status). Importantly, we did not include those with acute suicidality or violence risk. We recruited mothers and mothers-to-be to attend the group who met these criteria, who were patients of the perinatal program. They were recruited to attend during mental health care visits with their psychiatrist, nurse, counselor, or case manager.

The board certified music therapist who was supervised by the director of music therapy, remained in communication with the treatment team, some members of whom attended each group session, which was held in a group room at the community mental health center. Lullabies were the main vehicle employed in the sessions. At the start and end of each session, mothers were asked to rate their relaxation using the Rogers Faces Scale.⁵² The scale was administered by the music therapist and it brought the concept of being aware of one's level of relaxation and stress to the participants' attention. It was chosen for its ease of administration and to minimize problems with literacy in terms of reading a scale with verbal descriptors. The scale is utilized by other music therapists in a variety of settings. For example, Gallagher et al⁵³ presented the scale for self-reports of symptoms such as pain, anxiety, depression, shortness of breath, and mood for 200 patients seen in the palliative medicine unit of a large metropolitan hospital.

In the lullaby sessions, mothers participated with the music both interactively, responding with a musical behavior such as playing an instrument, singing, or humming, and receptively, responding with a nonmusical behavior such as breathing or talking. Similarly, involvement was either active, requiring some physical action, or passive, requiring little or no physical action.⁵⁴ Sessions included music therapy interventions⁵⁴⁻⁵⁶ such as:

- Music-assisted relaxation (the use of relaxation techniques with background music) with or without infants being held, including deep breathing, progressive muscle relaxation to music, with instrumental music chosen from selections provided by the music therapist.
- Music listening (both recorded and live) with music being selected by the participants from therapist-provided options.
- Lyric analysis/interpretation (techniques involving discussion of song lyrics, their content, and their significance) based on relevant themes, such as support, coping, hopes and dreams for the future, and so on.
- Selecting song choices (an opportunity for the client to select desired music), learning, and interactive singing (use

of singing to promote social interaction or communication between the therapist and client or between clients and/or peers) of lullaby repertoire from a wide variety of songs reflecting numerous cultures and backgrounds (see the Appendix for included lullabies).

- Interactive instrument playing (use of playing of various musical instruments to promote social interaction or communication between the therapist and client or between clients and/or peers) with varied instruments from a chime tree that the infants could bat at or manipulate, to "chiquita" maracas the infants could easily grasp, or choir chimes the moms could play for the specified chord roots of a song or tone bells for simple melodies.
- Simple song writing (techniques whereby the client contributes ideas for original lyrics or music to express feelings or enhance communication), for example, using a "fill-in-the-blank" technique.
- Personalization of precomposed lullabies to their own babies and families (made up versions of "piggy back" songs by changing the words to familiar tunes), blues progression improvisation.
- Planning recordings (an opportunity for the client to prepare various components necessary in a musical performance/recording with assistance and direction from the music therapist) of lullabies for their babies.

Similar to the Australian study,²⁴ the music therapist addressed the importance of multimodal interaction and encouraged using other soothing activities while singing (swaddling, rocking, stroking, helping the infant move his/her hand to mouth), as well as highlighting signs of infants' overstimulation. Additionally, the music therapist explained that babies are very perceptive and can tell if their mothers are not "present" for them. Infant-directed singing was briefly explained as well. Opportunities for customizing the lullabies to their own babies were similar to what a number of participants in the Australian study reported as well. During our sessions, the music therapist provided the opportunity for role modeling and also guided mothers as they practiced. All group participants were also regularly treated by the perinatal psychiatrist, and many also participated in individual counseling. The majority of the participants were also prescribed psychotropic medication for their mental illness.

The Lullaby 101 Program: Early Observations

A total of 48 mothers and mothers-to-be attended the group during the program. Although fathers were not the primary focus of the program, 3 fathers also attended. Mothers referred to the group had diagnoses of major depressive disorder, bipolar disorder, schizoaffective disorder, and schizophrenia. They all had sought care at the community mental health center, which serves a population of those of low socioeconomic status. Participants were primarily of African-American (81%) ethnicity, with the remainder being Caucasian. The group was not limited to first-time mothers. While mothers may have

attended the group up to 8 times, they attended for a mode of 1 session. Slightly more than half brought their infant; many were still expecting when they attended. In the short term, participants reported an average change in relaxation rating on the Rogers Faces Scale⁵² of +0.8 (5 faces on the scale, with a range from -2 to +2), indicating that on average, they themselves were more relaxed after the sessions. Positive changes were noted for the first, second, and third visits.

Anecdotally, 1 session proceeded thusly: “May I?” the music therapist said to the mother of an inconsolable baby. She continued, “My first born was nicknamed Buddha, had a very calm nature, still does. The second one? Her nickname was ‘fusser,’ had colic, we didn’t sleep the first 6 months of her life. Today, she is graduating with honors and has big plans to major in music performance.” The music therapist continued to talk and sway with the crying baby as she transitioned into a quiet hum and then a spontaneous version of the blues. “My baby’s a cryin’” she sang. “My baby’s a crying and I can’t sleep. Hush my love. No need to weep. Hush my love. Your troubles I’ll keep.” As the mother and other team members watched, the baby responded to the music therapist and by the end of the session was sound asleep. “How can I thank you?” said the mother. “You make it look so easy.” “I’ve had lots of practice but honestly, your baby will learn to respond to your voice, your breathing, your love. That’s how music builds the bond between mother and child.”

The reader should note that this program was also conducted with expectant and parenting teens at various community social service locations. The teens’ attendance was somewhat more consistent and thus other outcomes were noted, including 68% reporting the group helped them feel more able to care for their babies, 84% reporting that the group helped them feel less anxious, and 86% saying they would use some of the activities/songs done in group at home. Follow-up was achieved with some of these participants, something that was not possible with the participants at the community mental health center.

Barriers and Further Recommendations

Multiple barriers to such a program have emerged despite our efforts. Funding for a board certified music therapist in the current health care climate compounded by the lack of psychiatric parity is an issue. In this setting, nonmusic therapy staff members often lacked time to effectively recruit consumers according to specified criteria and to also complete pre-and postprogram surveys with the participants. Recruitment to any program for mothers and infants can be difficult as there are inevitable constraints to a mother’s time, and child-care for older children may be at issue. Maternal depression and fatigue are both considerable confounding factors, as depressed mothers may find it challenging to awaken, dress, and leave the house in a timely fashion, particularly if babies are also involved. Transportation is an issue for low-income mothers, not only for the therapy groups, but for their psychiatric appointments as well. Finally, another issue has been finding culturally relevant material for a group mixing various races

and cultures, although the music therapists have utilized vast arrays of lullabies and other music from many countries and cultures. In sum, though barriers exist, a lullaby music therapy program may be a feasible additional component in the treatment armamentarium for mental illness in pregnancy and the postpartum period. Research with this population and with other at-risk populations such as teen parents is recommended to ascertain further benefits of lullabies for both parents and babies.

Summary

The use of lullabies for mothers with mental illness and their infants integrates music therapy with mental health disciplines. Though there is a need for further research, the experience with moving the Lullaby 101 program to the community mental health center has been positive. While stand-alone music therapy as a treatment for maternal mental illness is unrealistic because of significant evidence supporting the benefits of psychotherapy and medication treatment, it is a potentially helpful component of the treatment armamentarium.

The quality of the mother-infant relationship has critical implications for a child’s development and later competence as an independent being. This lullaby group included music-assisted relaxation, listening, lyric interpretation, choosing lullabies, interactive instrument playing, simple song writing, improvisation and personalization of lullabies, as well as planned individual recordings. Infant-directed singing and culturally sensitive songs of kin¹⁸ were employed. This specific music therapy intervention may help improve bonding, as well as decreasing maternal distress and therefore also decreasing babies’ physiological signs of chronic stress. These are common concerns in maternal mental illness. Overall, participants have reported that sessions have increased their relaxation. We plan to further evaluate efficacy in this setting, but issues such as increased attendance and appropriate but noninvasive measures of improvement should be addressed.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interests with respect to the authorship and/or publication of this article.

Funding

The authors received no financial support for the research and/or authorship of this article.

Appendix

Lullabies Used in Lullaby 101 Groups

- Talk to the Angels
- All Night All Day
- All the Pretty Little Horses
- Go to Sleep (Spanish folk song)
- Hush Little Baby

- All Through the Night
- Amazing Grace
- Swing Low Sweet Chariot
- Lavender's Blue
- Turn Around
- Twinkle Twinkle Little Star
- Bye Bye Bunting
- Coventry Carol

References

1. Wisner KL, Gracious BL, Piontek CM, Peindl K, Perel JM. Postpartum disorders: phenomenology, treatment approaches, and relationship to infanticide. In: Spinelli MG, ed. *Infanticide: Psychosocial and Legal Perspectives on Mothers Who Kill*. Washington, DC: APPI; 2003.
2. American Psychiatric Association. *DSM-IV-TR*. Washington DC: American Psychiatric Association Press; 2000.
3. Friedman SH. Schizophrenia in Women. In: Loue S, Sajatovic M, eds. *The Encyclopedia of Women's Health*. New York: Kluwer Academic/Plenum Publishers; 2004:573-575.
4. Friedman SH, Stankowski JE, Sajatovic M. Bipolar disorder in women. *Female Patient*. 2007;32:15-24.
5. Friedman SH, Resnick PJ. Postpartum depression: an update. *Women's Health*. 2009;5:287-295.
6. Gold C, Solli HP, Kreger V, Li SA. Dose-response relationship in music therapy for people with serious mental disorders: systematic review and meta-analysis. *Clin Psychol Rev*. 2009;29:193-207.
7. Maratos AS, Gold C, Wang X, Crawford MJ. Music therapy for depression. *Cochrane Database Syst Rev*. 2008;23:CD004517.
8. Silverman M. Quantitative comparison of cognitive behavioral therapy and music therapy research: A methodological best-practices analysis to guide future investigation for adult psychiatric patients. *J Music Ther*. 2008;45:457-506.
9. De l'Etoile SK. The effectiveness of music therapy in group psychotherapy for adults with mental illness. *Arts Psychother*. 2002;29:69-78.
10. Tang W, Yao X, Zheng Z. Rehabilitation effect of music therapy for residual schizophrenia: A 1-month randomized controlled trial in Shanghai. *Br J Psychiatry*. 1994;165:38-44.
11. Talwar N, Crawford MJ, Maratos A, Nur U, McDermott O, Procter S. Music therapy for in-patients with schizophrenia: exploratory randomized controlled trial. *Br J Psychiatry*. 2006;189:405-409.
12. Davis C, Silverman MJ. Immediate effects of music therapy interventions on persons in an intensive outpatient psychiatric treatment program: analysis of mean changes within a single session. Paper presented at: Annual Conference of the American Music Therapy Association; November 2008; St. Louis, MO.
13. Chang MY, Chen CH, Huang KF. Effects of music therapy on psychological health of women during pregnancy. *J Clinical Nursing*. 2008;17:2580-2587.
14. Schwartz F, Ritchie R. Music listening in neonatal intensive care units. In: Dileo C, ed. *Music Therapy and Medicine: Theoretical and Clinical Applications*. Silver Spring, MD: American Music Therapy Association, Inc; 1999:13-22.
15. Standley JM. *Music Therapy with Premature Infants: Research and Developmental Interventions*. Silver Spring, MD: The American Music Therapy Association; 2003.
16. Unyk AM, Trehub SE, Trainor LJ, Schellenberg G. Lullabies and simplicity: a cross-cultural perspective. *Psychol Music*. 1992;20:15-28.
17. Trehub S, Trainor LJ, Unyk AM. Music and speech processing in the first year of life. In: Reese HW, ed. *Advances in Child Development and Behavior*. San Diego, CA: Academic Press; 1993:1-35.
18. Loewy J, Hallan C, Friedman E, Matrinez C. Sleep/sedation in children undergoing EEG testing: a comparison of chloral hydrate and music therapy. *J Perianesth Nurs*. 2005;30:323-331.
19. Gilad E, Arnon S. The role of live music and singing as a stress-reducing modality in the NICU environment. *Music Med*. 2010;2:18-22.
20. Trehub S, Shellenberg G, Hill D. The origins of music perception and cognition: a developmental perspective. In: Deliege I, Sloboda J, eds. *Perception and Cognition of Music*. Hove, UK: Psychology Press; 1997:103-108.
21. Lewkowicz DJ. Infants' response to the audible and visible properties of the human face: II. Discrimination of differences between singing and adult-directed speech. *Dev Psychobiol*. 1998;32:261-274.
22. Trehub S, Trainor LJ. Singing to infants: lullabies and play songs. In: Rovee-Collier C, Lipsitt LP, Hayne H, eds. *Advances in Infancy Research*. Norwood, NJ: Ablex; 1998:43-77.
23. Trehub SE. Musical predispositions in infancy. In: Zatorre RJ, Peretz I, eds. *Annals of the New York Academy of Sciences: The Biological Foundations of Music*. Vol. 93. New York: the New York Academy of Sciences; 2001:1-16.
24. Baker F, Mackinlay E. Sing, soothe, and sleep: a lullaby education programme for first-time mothers. *B J Music Ed*. 2006;23:147-160.
25. Wigram T, Bonde LO, Pederson IN. *A Comprehensive Guide to Music Therapy*. London: Jessica Kingsley; 2002.
26. Caine J. The effects of music on the selected stress behaviors, weight, caloric and formula intake, and length of hospital stay of premature and low birth-weight neonates in a newborn intensive care unit. *J Music Ther*. 1991;18:88-100.
27. Collins SK, Kuck K. Music therapy in the neonatal intensive care unit. *Neonatal Network*. 1991;9:23-26.
28. Standley JM. The role of music in pacification/stimulation of premature infants with low birthweights. *Music Ther Perspect*. 1991;9:19-25.
29. Coleman JM, Pratt RR, Stoddard RA, Gerstmann DR, Abel H. The effects of male and female singing and speaking voices on selected physiological and behavioral measures of premature infants in the neonatal intensive care unit. *Int J Arts Med*. 1997;5:4-11.
30. Flowers AL, McCain AP, Hilker KA. The effects of music listening on premature infants. Paper presented at: the Biennial Meetings, Society for Research in Child Development; April 1999; Albuquerque, NM.
31. Arnon S, Shapsa A, Forman L, et al. Live music is beneficial to preterm infants in the neonatal intensive care unit environment. *Birth*. 2006;33:131-136.

32. Whipple J. The effect of music-reinforced nonnutritive sucking on state of preterm, low birthweight infants experiencing heelstick. *J Music Ther.* 2008;45:227-272.
33. Loewy J. Integrating music, language and the voice in music therapy. *Voices: a world forum for music therapy*, 2004. <http://www.voices.no/mainissues/mi40004000140.html>. Accessed May 11, 2010.
34. Lyons-Ruth K, Zoll D, Connell D, Grunebaum HU. The depressed mother and her 1-year-old infant: environment, interaction, attachment, and infant development. In: Tronick EZ, Fields T, eds. *Maternal Depression and Infant Disturbance*. San Francisco, CA: Jossey-Bass, Inc; 1986:61-82.
35. Lyons-Ruth K, Connell DB, Grunebaum HU, Botein S. Infants at social risk: maternal depression and family support services as mediators of infant development and security of attachment. *Child Dev.* 1990;61:85-98.
36. Murray L. The impact of postnatal depression on infant development. *J Child Psychol Psychiatry.* 1992;33:43-56.
37. Mackinlay E, Baker F. Nurturing herself and nurturing her baby: creating positive experiences for first time mothers through lullaby singing. *Women Music.* 2005;9:193-196.
38. De l'Etoile SK. Infant-directed singing: a theory for clinical intervention. *Music Ther Perspect.* 2006;24:22-29.
39. Courtneage A, Chawla H, Loewy J, Nolan P. Effects of live, infant-directed singing on oxygen saturation, heart rates and respiratory rates of infants in the neonatal intensive care unit. Abstract 2346. *Pediatr Res.* 2002;51:403A.
40. Hanson-Abromeit D, Shoemark H, Loewy J. Neonatal intensive care units. In: Hanson-Abromeit D, Colwell C, eds. *Medical Music Therapy for Pediatrics in Hospital Settings*. Silver Spring, MD: The American Music Therapy Association; 2008:15-69.
41. Rock AML, Trainor LJ, Addison TL. Distinctive messages in infant-directed lullabies and play songs. *Dev Psychol.* 1999; 35:527-534.
42. Lenz GM, von Moreau D. Coming together—resonance and synchronization as a regulating factor in relationships. In: Nocker-Ribaupierre M, ed. *Music Therapy for Premature and Newborn Infants*. Gilsum, NH: Barcelona Publishers; 2004:67-81.
43. Custodero LA, Britto PR, Xin T. From Mozart to Motown, lullabies to love songs: a preliminary report on the parents' use of music with infants survey (PUMIS). *Zero to Three: National Center for Infants Toddlers and Families.* 2002;23:41-46.
44. Stewart K. PATTERNS—a model for evaluating trauma in NICU music therapy: part 1—theory and design. *Music Med.* 2009;1:29-40.
45. Loewy JV. A clinical model of music therapy in the NICU. In: Nocker-Ribaupierre M, ed. *Music Therapy for Premature and Newborn Infants*. Gilsum, NH: Barcelona Publishers; 2004:159-175.
46. Cevasco A. The effects of mothers' singing on full-term and preterm infants and maternal emotional responses. *J Music Ther.* 2008;45:273-306.
47. Cassidy J, Standley J. The effect of music listening on physiological responses of premature infants in the neonatal intensive care unit. *J Music Ther.* 1995;32:208-227.
48. Nocker-Ribaupierre M. The mother's voice—a bridge between two worlds: short- and long-term effects of auditive stimulation on premature infants and their mothers. In: Nocker-Ribaupierre M, ed. *Music Therapy for Premature and Newborn Infants*. Gilsum, NH: Barcelona Publishers; 2004:97-111.
49. Shoemark H, Dearn T. Keeping parents at the centre of family centred music therapy with hospitalized infants. *J Music Ther.* 2008;19:3-26.
50. Abromeit DH. The newborn individualized developmental care and assessment program (NIDCAP) as a model for clinical music therapy interventions with premature infants. *Music Ther Perspect.* 2003;21:60-68.
51. Bo L, Callaghan P. Soothing pain-elicited distress in Chinese neonates. *Pediatrics.* 2000;105:E49.
52. Rogers A. Third world congress on pain of the international association for the study of pain, Edinburgh, Scotland, September 4-11, 1981, Abstracts. *Pain.* 1981;S1:S1-S319.
53. Gallagher LM, Lagman R, Walsh D, Davis M, LeGrand S. The clinical effects of music therapy in palliative medicine. *Support Care Cancer.* 2006;14:859-866.
54. Robb SL, Carpenter JS. A review of music-based intervention reporting in pediatrics. *J Health Psychol.* 2009;14:490-501.
55. Kaplan RS, Steele AL. An analysis of music therapy program goals and outcomes for clients with diagnoses on the autism spectrum. *J Music Ther.* 2005;42:2-19.
56. Kaplan RS, Smith LL, Gallagher LM, Reed AM, Steele AL. *Outcomes Based Measurement Handbook, Revised*. Cleveland, OH: The Music Settlement; 2006.
57. Trehub SE, Hill DS, Kamensky SB. Parents sung performances for infants. *Can J Exp Psychol.* 1997;51:385-396.

Bios

Susan Hatters Friedman, MD, is a perinatal and forensic psychiatrist on faculty at Case Western Reserve University School of Medicine, in the Departments of Psychiatry and Pediatrics in Cleveland, Ohio.

Ronna S. Kaplan, MA, MT-BC, NMT, is President of the American Music Therapy Association, and Director of the Department of Music Therapy at The Music Settlement in Cleveland, Ohio.

Miriam B. Rosenthal, MD, is a psychiatrist who is Associate Professor Emeritis at Case Western Reserve University School of Medicine, in the Departments of Obstetrics and Gynecology and Psychiatry in Cleveland, Ohio.

Patty Console, MT-BC, is a board certified music therapist at The Music Settlement, who has led the Lullaby 101 groups in Cleveland, Ohio.