

MUSIC THERAPY AND TRAUMA IN THE NICU: FAMILY CENTERED MULTIMODAL INTERVENTION



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Abstract

The following intervention proposal in Music Therapy is aimed at parents or caregivers of babies admitted to the Neonatal Intensive Care Unit (NICU). Its objective is to offer them a framework of containment in the face of the traumatic event experienced, favor their psychological well-being and consequently strengthen the bond with the newborn. This multimodal intervention is a complementary support to the RBL method used at the NICU, includes also a group intervention with the GIM method and the creation of a new environmental music model called Birthing Harp. It is an easy-to-implement intervention and a valuable contribution to the humanization of the hospital system.

Keywords: neonatal intensive care unit (NICU), family centered approach, multimodal intervention, Birthing harp, trauma.

BACKGROUND

There are numerous publications currently on intervention for premature infants in the NICU (Standley, 2001; Haslbech, 2014; Gooding, 2010; Loewy, 2013), but not about the trauma experienced by parents I during the time spent in it (Loewy, 2021). The present intervention proposal offers a multimodal response to the trauma experienced at the somatic and neurophysiological level by parents in the NICU.

Authors such as Levine (2010), Van der Kolk (2014) and Porges (2011) refer to trauma as a loss of connection with oneself, with one's own body and with the surrounding world. Porges, in his Polyvagal Theory (2011), alludes to the vagus nerve as a fundamental regulator of a large number of functions of the organism. Porges has observed that music and voice prosody can provide direct vagal stimulation that can reduce the sympathetic activity of the Autonomic Nervous System (ANS), leading to the states of overwhelm and disconnection that trauma produces. The Polyvagal Theory is based on the premise that using prosodic vocalizations to activate the muscles of the middle ear contributes to changing the physiological state of the individual by making him spontaneously more sociable. This system of social connection is activated by listening to an extremely modulated and prosodic voice with great variation in pitch, such as when a mother talks or sings to her baby to relax him. It is a model that consists of providing the ANS with acoustic cues that cause safety neurocep-

I. By linguistic economy, in this paper, the term "parents" is understood to refer to both parents, whether the same-sex or heterosexual couple, as well as their caregivers.

tion. This theory confirms neurophysiologically that singing

A preterm clinic is not only a means of mutual communication but also functions as a non-pharmacological emotional regulator that can modify the traumatic experience of the parent-baby dyad in the NICU.

Early Care Models

The experience of having a premature baby can be overwhelming or, as Stacey et al. point out. (2015) a real "roller coaster". Currently, in the NICU, there are two models of an educational and support nature that contribute to reducing psychological distress in parents and establishing the bond of the dyad: the NIDCAP (Newborn Individualized Developmental Care and Assessment Program) and the Kangaroo Mother Method (MMC).

In terms of music therapy, three models are applied in the NICU: Joanne Loewy's RBL (Rhythm Breath Lullaby), Friederike Haslbeck's CMT (Creative Music Therapy), and Jayne Standley's Multimodal Neurological Enhancement (MNE). This proposal will use, among others, the RBL model.

Dr. Loewy's (2021) model is the most comprehensive and up-to-date study of music therapy and trauma in the NICU. Dr. Loewy created an assessment to determine the emotional state of parents, paying special attention to how they perceive emotions in their body and using the so-called Kinship Song (Loewy, 2015) or SOK (Song of Kin). This song refers to the creation of a lullaby from a song of any musical style that the parents prefer. In other words, it is about transforming a favorite and meaningful song into a lullaby by changing the rhythm (from a binary to a ternary rhythm). In addition, in a second instance, a vowel will be chosen to hum the melody, and then a part of the song will be selected to be repeated to be used with the baby eventually. Once the a cappella phrase is entrenched, it is used as a strengthening of the bond with the baby and as a predictable neurological support effect for parents.

After the kinship song, parents are asked to record the baby's heartbeat and this song, known as the Heart Song, is offered with the rhythmic base of the baby's heart modified for this purpose. A stethoscope with a built-in microphone and Garage Band is used for further editing (Schreck et al., 2018). This proposal is very motivating because you can share your baby's heartbeat with family members who do not have access to the NICU, and with relatives who live far away. It is also a tangible memory for life (Van Dokkum et al., 2023), even in the face of the unexpected loss of a baby.

GIM Method

One of the methods of receptive music therapy that has addressed trauma and the body is known as GIM, which stands for Guided Imagery and Music, created by violinist Helen Bonny. This method is based on humanistic psychology and is based on Jung's analytical psychology and Groff's transpersonal psychology (Vilá, 2022).

Through studies with PET scanners, it has been possible to verify that people with post-traumatic stress who have undergo-

ne GIM sessions are sensitive to psychophysical musical qualities such as transience and dynamic or rhythmic changes (Bruscia, 2002). They are also sensitive to finely processed elements such as dissonances, harmonic changes, and any element with evocative potential. Consequently, the therapist should minimize the evocation of images, selecting the pieces of music carefully, as well as making the sessions shorter.

To this end, Bruscia (2002) recommends some pieces such as Bach's Air, Vaughan-Williams Rhapsody Prelude, "Pied en la air" from Warlock's Capriol Suite, Pachelbel's Canon, Vivaldi's Gloria: Et in Terra Pax, Faure's Requiem (In Paradisum) and the second movement Adagio un poco mosso from Beethoven's Piano Concerto No. 5 in E-flat (Op. 73 "Emperor;").

Through music, the therapist connects the patient with their inner world, with their images, offering tools that connect them with their own body, thus processing the trauma through direct memories or metaphors (Story, 2018).

In this method, the creation of a mandala from a circle is used as a mechanism for projection, integration, and emotional expression, which allows the internal experience with music to be consolidated and a bridge between internal experiences and daily functioning is established (Koniczna-Nowak, 2016).

It was precisely Carl Jung (Fincher, 1991) who used the Sanskrit term mandala (etym.: "sacred center or circle") to describe the drawings his patients made. Jung associated it with the Self. For Jung, the mandala circle reflected the containment character of the Self for the psyche's longing for self-realization.

Environmental Music Therapy (EMT)

A TMS intervention is characterized by the intentional use of music or sound in order to modulate a harmful sound environment and turn it into a more conducive one so that it can contribute to the well-being and healing of the listener and even reduce the perception of pain (Rosetti & Canga, 2013), thus creating a kind of containment soundtrack that allows the mood to be modulated. It is a type of non-invasive mind-body intervention (Canga et al., 2012) that takes into account the physical, psychological, and cultural needs of patients, parents, and staff.

The music therapist must be trained to read the body language of the people present, notice facial expressions, perceive "the energy" of the environment, and improvise from the noise present in the environment, for example, the beeping sounds produced by monitors, the noise of fans, a door being knocked on or the footsteps of a doctor.

The Harp in the NICU: The Birthing Harp Model

Back in 2000, Steve Schneider used the percussion dulcimer in his first EMT pilot study with Kristen Stewart in the NICU. Friederike Haslbeck (2020), in her CMT model, currently uses another plucked string instrument, the monochord, in her interventions. McLeod (2018), on the other hand, has used the Reverie Harp with important results in the relaxation of parents and contact with their babies.

Birthing Harp is a model of Harptherapy based on the improvisation method with the Greek modes of Christina Tourin (2006), the creation of environmental sounds by Marianne Gubri (2023), the pilot study by Stewart and Scheineider (2000), previous studies of TMS, and symbolic studies of Jungian psychology. Birthing Harp proposes the use of the 26 to 34-string harp for the intervention of environmental music therapy in the NICU.

This type of harp is small, lightweight, and easy to carry. This model was created with the intention of functioning as a "sound container" for the trauma experienced by parents in the NICU.

The dulcimer, monochord, Reverie Harp, and harp are plucked string instruments (the dulcimer can also be struck) that are archetypally associated with an angelic sound (Archive for Research in Archetypal Symbolism, 2010). In mythology, the harp (or its sisters, the scepter, and the lyre) was considered an earthly object but a divine creation that closely linked the realm of the material and the immaterial.

From mythology, we know that when Orpheus played the harp, his anguish was appeased. Likewise, angels, like poets, played the harp to express states of beatitude or stormy conflicts. The fluid sound of the harp announces the restoration of the soul and rebirth (Op.cit. 2010). Stewart and Scheineider (2000) also argue how much dulcimer produces an archetypal melody ideal for the NICU environment.

A relevant aspect of the use of the harp in EMT that Stewart, Scheineider, Rosetti, and Tourin highlight is the intention. The energy of intention in the music therapist is very subtle and, at the same time, very powerful (Tourin, op. cit). On the other hand, Rosetti argues for the importance of intentional purpose (op.cit., 2020). Finally, Stewart and Scheineider (op. cit) argue that music and its intention to soften the environment seem to provide a foundation or basis for musical nourishment.

The harp is a very ductile instrument for incorporating new sounds by taking those present in the environment. Using only the palm of our hand on the low strings, it is possible to have the sound of the wind, simulating a NICU fan (Gubri, 2022). By playing a descending second major (A/G), we will have the beep of the monitor that marks the heart rate. From this sound, it is possible to create a melody as a leitmotif following the Mixolydian mode (Tourin, 2016).

To do this, we will put the harp in the key of D Major. If the harp is in C major (with E, A, and B keys raised), the red and blue keys, C and F, respectively, must also be raised (see Figure 1). Then, a melody starting from the A will be improvised with the right hand (fifth note of the Mixolydian mode in the key D Major). In the left hand, the notes of the A chord will be gradually incorporated and then go down to G as an alternate note, also following the G chord with the left hand (see Figure 2). It is important to start with a few notes in the left hand, for example, the tonic and fifth, and then move on to the tonic, third, and fifth arpeggiated notes, as seen below (see Figure 3).

Figure 1.

Harp keys in D Major



Note. Source: Authors' own creation

Figure 2.

Simple Pattern Models for the Left Hand



Note. Taken from Gubri, 2022

Another very common sound in the NICU is that of the monitor in B natural at approximately 55 bpm. Based on this sound, it is possible to improvise in G major or E minor, depending on whether one wants to create an animated atmosphere or a more intimate and reflective one (Tourin, op. cit). If, for a moment, the predominant noise is the footsteps of the medical staff, we can recreate these footsteps by tapping on the box gently with our fingertips. It is also possible to produce an oceanic sound.

As if from the womb, simply going up and down the soundboard with both hands. To all these ambient sounds, it is possible to incorporate sounds of nature, such as birds, by pressing the high notes D and F; the rain, with the harmonics of the middle notes C and G, without forgetting small high-pitched glissandos reminiscent of the sound of a waterfall or a fountain (Gubri, 2022).

Schneider (2000) and McLeod (2018) mention the use of the pentatonic scale for improvisation. On the harp, it is possible to raise the keys D and G and thus obtain what is known as "Angelic Mode" (Tourin, 2016). It is simply a major pentatonic scale

that removes the fourth and seventh degrees of the Ionian mode (see Figure 3). You can create a melody freely by always following the tonic with the left hand and favoring attention to the environment rather than to the instrument since it will not generate any kind of dissonance. Another Greek mode of improvisation with the harp is the Ionian mode. The sweet, light, and reassuring quality of this mode is ideal for the NICU (Tourin, op. cit). To improvise in this mode, you need to use the three related major chords: I, IV, and V. If we use the C clef, the base chord (I) will be C, then the IV chord in F, and the V chord in G, and so on with the other keys you want to play on.

Figure 3.

Harp Keys in Angelic Mode



Note. Source: Authors' own creation

Finally, a relevant aspect is the pulsation. As Schlez et al. (2011) point out, in order for harp music to have a relaxing effect in the NICU, the heart rate should continue to be 60 to 70 bpm. As for TMS, the rhythm of the environment will always be taken and modulated in order to be beneficial for the parents present at the time of the intervention.

The use of the harp in the NICU is very favorable because of its sweet timbre, its ductility, and the sound and harmonic possibilities it offers, and also because its presence brings with it a very strong symbolism that can offer the possibility of channeling traumatic emotions through a solid, predictable and stable auditory container. Thus, as in all mythological subjects, there is an invisible plane underpinning the visible plane (Campbell, 1991). As this author argues, the mind can go astray in strange ways and want things that the body does not want. Myths were a means of putting the mind according to the body. Birthing Harp tries to foster that means of reconnection.

INTERVENTION PROPOSAL

The following intervention proposal is designed to be carried out within the hospital environment of the NICU and in an adjacent room set up for group meetings. The transversal intervention will be carried out in three different spheres: the neonatal sphere, the physical-emotional sphere of parents, and the environmental sphere. A specific type of session will be designed for each sphere.

Objectives of the intervention

General Objective:

Reducing Parent's Stress and Anxiety Symptoms in the NICU

Specific objectives:

- Promote body self-awareness through guided imagery and comment on one's own experience.
- Generate a space for containment, expression, and social connection.
- Promote positive emotions.
- Create and share the Song of King itself among the members of the group.
- Share and comment on the mandala itself among the participants of the group.
- End the session with the perception of serenity and with a smile.
- Promote bonding with the baby.
- Incorporate the sounds of the NICU into the proposed ambient melody.

Beneficiaries

The recipients are mainly the parents of the babies admitted to the NICU and, consequently, their babies. The institution's staff will also benefit from the EMT internship.

Activities & Tasks

I- Neonatal Sphere Development of the Individual Session

- Creating the Kinship Song
- Recording of heartbeats
- Post-session editing work and delivery of the material by email to the parents.
- Informed Consent

For this type of intervention, the music therapist will need a guitar, a stethoscope with a microphone, and a computer with a Garage Band. Permission will also be needed for recordings of both the baby's heartbeat and the sessions. This will be agreed in advance with the parents and the hospital.

The individual session will consist of the creation of the kinship song or Song of King. In a second instance, the baby's heartbeat will be recorded² and the Heart Song will be offered, with the

2. You can see this process and the necessary elements at the following link: <https://www.youtube.com/watch?v=82WXPqEpsYM>

rhythmic base of the baby's heart modified. A stethoscope with a built-in microphone and Garage Band will be used for this purpose.

It will be vitally important during the creation of the kinship song to promote the singing of the caregiver who is at that moment next to the baby, to promote direct vagal stimulation, and to begin the process of stress reduction.

2- Physical-emotional sphere of parents or caregivers

Development of the group sessions

The group intervention proposal will be developed over four consecutive weeks. The sessions aim to create a space of containment, emotional and bodily self-awareness, group identity, and artistic expression.

The design of the group sessions follows the sequencing of Mateos-Hernández (2004). An example of the structure of the session is presented, and the music for the three successive meetings is suggested.

Table I.

Session distribution

Warm-up	5 min.
Motivation	5 min.
Conscious body	5 min.
Perceptual Development	15 min.
Activity of relationship	10 min
Representation and symbolization	10 min.
Actividad de despedida	10 min.

Note: times spent in each phase of the session

Outline of the first meeting:

1. Warm-up (5')

The welcome song is played. Parents will be arranged around a table. On it you will find the instruments and materials for the rest of the session: photocopies and crayons.

2. Motivation for the session (5')

A song is performed, and the lyrics are provided in photocopies. Participants are invited to pick up an instrument and accompany the music therapist if desired.

1st encounter: Coldplay's Fix You (Spanish version): It is a bridge to introspection and an omen to better times to come.

2nd encounter: On the Other Side of the River by Jorge Drexler favors the awareness of personal strength to face the difficulties that arise in life, providing hope beyond the great effort.

3rd meeting: The Force of Life, by Paolo Vallesi: It is a reflection of the experience lived in the hospital, and, at the same time, it brings confidence to one's inner strength.

4th meeting: Color Hope, by Diego Torres, brings an air of hope to one's own lived experience.

3. Conscious body activity (5')

A body scan is proposed through a brief induction that allows connecting with the body itself and the accumulated tensions.

4. Perceptual Development Activity (15')

Guided imagery is introduced with the chosen piece³:

1st encounter: Bach Air: it favors opening up to the introspective imagination by gently touching the soul (Bush, 1995).

2nd encounter: Fantasia on Greensleeves, by Vaughan Williams, evokes deep reflections touching very sensitive fibers (Bush, 1995).

3rd encounter: Symphony No. 5: Romance, by Vaughan Williams, evokes depth and provides a confident inner exploration (Bush, 1995). 4th meeting: Green Room, by Wayne Gratz: It can evoke moments of childhood and nature in a very safe way (Vilá, 2022).

5. Activity of relationship with the other (10')

It will be proposed to share the personal experience of guided imagery verbally.

6. Representation and symbolization (10')

Sheets of 32cm x 47cm of paper with a circle in the center (figure 5) and oil crayons were distributed in order to symbolize what was experienced during the session. It can be accompanied by ambient music improvised by the music therapist.

7. Farewell activity (10')

3 Suggested versions:

- 1) <https://open.spotify.com/track/3QOEWKNSNTQK98F8jIwTXU?si=79683496b2034240>;
- 2) <https://open.spotify.com/track/7rIH9VtwdbdxugrI-F3IZxz?si=f1d9192c8f0f4f43>
- 3) <https://open.spotify.com/track/2Qd7guepelYtabXLeaT-x53?si=c540a48db6224633>
- 4) <https://open.spotify.com/track/IYDchzoNk8pD86S6Si5-ruE?si=3ee826cf34df4b84>

Figure 5

Sheet of paper for the mandala



Note. Taken from Vilá, 2022

It is proposed to share the mandala, and the farewell song is sung.

3- Environmental sphere

Development of the session

The development of the EMT session will be within the NICU in the space agreed in advance with the hospital managers. Intervention in environmental music therapy is complex to evaluate. The observation skills of the music therapist are key to intervening in EMT. The variables to be considered will be the following:

- Ambient noises (monitors, fans, staff footsteps)
- Faces and body attitudes of the people present and the emotions they reflect
- Interaction between people present (Rosetti, 2020)
- "Feeling" of the atmosphere (oppressive, tense, relaxed, etc.) (Rosetti, op.cit.)
- Staff working speed
- Any unplanned emergent situation

For the evaluation of emotions, Paul Ekman's (2016) analysis of basic emotions has been followed, extending it with other possible emotions, such as stress and despair (Appendix).

The repertoire will be based on popular lullabies or contemporary/classical melodies transformed into lullabies and improvisations in angelic or Mixolydian mode. These improvisations will begin by recreating

the sounds of the environment and incorporating them into the improvised melody. Likewise, the fundamental focus will not be what is touched but how it is touched and making sure to keep the intentional purpose in mind. The music therapist will

mark on the record sheet the melodic motifs and the sources that generate them. Finally, the responses of those present will be noted.

Resources

Sessions will be conducted by a music therapist, preferably specialized in trauma, familiar with hospital contexts, and at least the first level of GIM.

Material resources will depend on the area to be addressed.

- Neonatal sphere: a guitar, a stethoscope with a microphone, and a computer with Garage Band.
- Physical and emotional sphere of parents and caregivers: room adjacent to the NICU, a guitar, instruments of the RBL method (ocean drum and cat box), wooden maracas, oil cakes, sheets of paper, and, if possible, a video camera for the recording of the session.
- Environmental sphere: a harp with 26 to 34 strings.

Evaluation methods

- Neonatal sphere: The emotional and stress state of the parents will be evaluated following Loewy's evaluation (2013). After the session and after the creation of SOK and the recording of the Heart Song, the performance of the session and the necessary observations will be noted on the log sheet.
- Physical-emotional sphere of parents or caregivers: Before the group session, the questionnaire adapted from Loewy (2013) will be delivered and at the end of the session a survey will be provided that reflects the opinion of the group music therapy session.
- Environmental sphere: The events of the session will be recorded in the registration form designed for this purpose.

Registration form

Intervention with the Birthing Harp Model

Date:

Session n°:

Personas presentes durante la intervención:

- father mother caregiver doctors nurses
 cleaning staff others

Environmental noises from the environment:

- monitors fans persons others

Present emotional, bodily and/or facial attitudes:

- sadness happiness fear anger dislike
 despair stress others

Present social interaction:

- high half low null

Ambience:

- tense relax oppressive with tears
 others

Working speed:

- slow half fast

Unplanned emerging situation:

- yes no

Intervention objectives:

- relax activation motivation others

Musical area:Repertoire:

- lullabies mixolydian mode angelical mode
 ionic mode others

Rhythm:

- slow moderate

Accent:

- binary ternary

Dinamic:

- pianissimo piano mf

Breaks:

- yes no

Psychological response of the people present

- smile cry look socialization others
 other observations:

DISCUSSION

In the first place, the present proposal for multimodal intervention is framed within the variables of time and context that are in permanent change within the NICU; therefore, given the circumstances of the hospital context, the flexibility of the music therapist to carry them out will be of vital importance.

Second, it is likely that during the creation of the kinship song, the parents do not want to sing or do not feel able to do so. Remember that what is intended is direct vagal stimulation, which can also be given through humming. The proposal during

the individual session will always be an invitation and not an obligation.

Another limitation encountered is the same option of participation in a group music therapy session in the NICU. Faced with the particular situation of parents who have a premature or fragile baby, many parents prefer to spend as much time as possible with their babies and avoid music therapy sessions for them, as it would take time away from their babies.

Also, the presence of the parents will vary depending on the length of the baby's stay in the hospital, which can be days, weeks, or months. Therefore, the participation of the parents in the sessions will depend on the variables of the baby's permanence, the parents' wishes, as well as the relationship of trust and respect established with them during the creation of the kinship song.

Thirdly, the practice of EMT has the potential to bring harmony. However, it also runs the risk of generating chaos (Rosetti and Canga, op. cit). Although the music therapist will work intuitively, he or she must do so systematically and with the appropriate training to avoid chaos.

Finally, the new EMT model presented by Birthing Harp lacks, at the time of writing this proposal, data to support it. Likewise, the author promotes its dissemination and research with the certainty that both a psychological paradigm and the same practices of TMS with other similar instruments support it, and trusting that the need for innovation in Music Therapy brings with it its challenges as well as its opportunities.

CONCLUSIONS

The therapeutic use of music aimed at parents or caregivers of babies hospitalized in the NICU aims to promote psychological well-being in the face of the traumatic event experienced. Moments of body self-awareness, physical relaxation, verbal and non-verbal expression, and the creation of mandalas, as well as the shared experience with peers in similar traumatic situations, are designed to facilitate the appearance of positive emotions, reduce stress and anxiety (Van Der Kolk, 2014), and consequently favor the bond with the baby. Social involvement moderates defensive systems, allowing physiology to be calmed and health, growth, and restoration to be supported (Porges, 2011).

The receptive musical and expressive activities proposed in the group intervention are designed to generate a space of containment, stability, and introspection necessary for the integration of the situation that is being experienced. Such integration promotes the desired psychological well-being, facilitating a better relationship with the baby itself.

The creation of the kinship song, together with the recording of the heartbeat, are two musical activities that, in addition to

promoting a positive emotional state, offer parents the possibility of having a tangible sound memory of their time in the NICU and an intimate and cathartic psychotherapeutic moment with the music therapist that is sometimes not easy to generate within the hospital environment. The use of the modulated and prosodic voice of parents singing to their babies promotes direct vagal stimulation, reducing the state of stress in which they find themselves and causing a sense of security (Porges, 2011) in themselves and the baby himself.

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