

MUSIC THERAPY INTERVENTION FOR THE MOTHER-PRETERM INFANT DYAD: A PROPOSAL OF INTERVENTION IN THE NEONATAL INTENSIVE CARE UNIT¹

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ABSTRACT. This report of experience describes the *Music therapy intervention for the mother-preterm infant dyad – MUSIP*, that aims at sensitizing the mother to sing to her preterm infant, during the hospitalization in the Neonatal Intensive Unit Care. The MUSIP is organized in eight sessions, alternating individual sessions with the mother and sessions with the mother-infant dyad. During the implementation of the MUSIP, the music therapist carried out the intervention in a NICU of a public hospital with nine mothers and their preterm infants. Several challenges were found regarding the availability of the families and the demands of the hospital. Therefore, it was necessary to adapt the MUSIP, by making the number of sessions more flexible, the kind of activities that were proposed, as well as the alternation between the sessions with the mother and with mother-infant dyad. Evidences suggest that MUSIP contributed to the mother's and the infant's 'empowerment' and to their 'communicative musicality', enhancing the mother-preterm infant interaction. The MUSIP is a low-cost intervention with a big potential of long-term effects, since, besides supporting the dyad in the NICU, it guides the mother to sing autonomously for her infant during the hospitalization and after discharge. Future studies are needed to expand the MUSIP and to investigate its short and long-term effects for the mother, the preterm infant and mother-infant interaction.

Keywords: Prematurity, neonatal intensive unit care, music therapy.

INTERVENÇÃO MUSICOTERÁPICA PARA MÃE-BEBÊ PRÉ-TERMO: UMA PROPOSTA DE INTERVENÇÃO NA UTI NEONATAL

RESUMO. O presente relato de experiência descreve a *Intervenção musicoterápica para mãe-bebê pré-termo – IMUSP*, que visa sensibilizar a mãe a cantar para seu bebê pré-termo, durante a internação na Unidade de Terapia Intensiva Neonatal. A IMUSP está prevista para oito sessões, alternadas entre sessões individuais com a mãe e sessões com mãe-bebê. Na implementação da IMUSP, a musicoterapeuta realizou a intervenção na UTINeo de um hospital público com nove mães e bebês prematuros.

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Foram encontrados vários desafios relativos à disponibilidade das famílias atendidas e às exigências do hospital. Em função disso, foi necessário adaptar a IMUSP, flexibilizando o número de sessões, o tipo de atividades propostas, bem como a alternância entre sessões com a mãe e com mãe-bebê. Evidências sugerem que a IMUSP contribuiu para o 'empoderamento' da mãe e do bebê, e para a 'musicalidade comunicativa' da díade, fortalecendo a interação mãe-bebê pré-termo. A IMUSP é uma intervenção de baixo custo com grande potencial de impacto a longo prazo, uma vez que, além de oferecer apoio à díade na UTINeo, orienta a mãe para que possa cantar autonomamente para seu bebê durante a internação e após a alta hospitalar. Futuros estudos são necessários para ampliar a aplicação da IMUSP e verificar os seus benefícios a curto e longo prazo para a mãe, o bebê pré-termo e a interação mãe-bebê.

Palavras-chave: Prematuridade, unidade de terapia intensiva neonatal, musicoterapia.

INTERVENCIÓN MUSICOTERAPÉUTICA PARA MADRE-BEBÉ PREMATURO: UNA PROPUESTA DE INTERVENCIÓN EN LA UNIDAD DE CUIDADOS INTENSIVOS NEONATALES

RESUMEN. En este reporte de experiencia se describe la *Intervención musicoterapéutica para madre-bebé prematuro - IMUSP*, que tiene como objetivo sensibilizar a la madre a cantar a su bebé prematuro durante la hospitalización en la Unidad de Cuidados Intensivos Neonatales. La IMUSP está organizada en 8 sesiones, alternando entre sesiones individuales con la mamá, y sesiones con mamá-bebé. En la implementación de la IMUSP, la musicoterapeuta realizó la intervención en un hospital público con nueve mamás y sus bebés prematuros. Se encontraron varios retos relacionados a la disponibilidad de las familias atendidas y las exigencias del hospital. Por este motivo, fue necesario adaptar la IMUSP, flexibilizando el número de sesiones, el tipo de actividades propuestas, y la secuencia de las sesiones con mamá y mamá-bebé. Las evidencias sugirieron que la IMUSP contribuyó al 'empoderamiento' de la mamá y el bebé, y a la 'musicalidad comunicativa' de la diada, mejorando así la interacción mamá-bebé prematuro. La IMUSP es una intervención de bajo costo con un gran potencial de impacto a largo plazo, ya que, además de ofrecer apoyo a la diada en la UTINeo, orienta la mamá para que pueda cantar autónomamente a su bebé, durante la hospitalización y después de recibir el alta del hospital. Son necesarios estudios adicionales para ampliar la aplicación de la IMUSP y verificar sus beneficios a corto y largo plazo para la mamá, el bebé prematuro y la interacción mamá-bebé.

Palabras clave: Prematuridad, unidad de cuidados intensivos neonatales, musicoterapia.

Introduction

In the world, one in ten babies is born preterm, and the complications of prematurity are the leading causes of infant mortality (Howson, Kinney, & Lawn, 2012). Preterm birth affects child development and may pose risks to the mental health of mothers and to the mother-baby relationship (Korja, Latva, & Lehtonen, 2012; Howson et al., 2012; Shaw et al.,

2014). Therefore, public health policies, both international and national, provide a basis for economic and early interventions in premature birth situation, especially emphasizing the humanized, individualized and family-centered care (Als, 2009; Sutton & Darmstadt, 2013; White-Traut et al., 2013).

In particular, Cleveland (2008) emphasizes that interventions addressed to mothers and fathers of preterm infants need to provide: emotional support, a holding environment, and opportunities to develop new skills and competencies through participation with the premature infant. Early interventions in prematurity are even more necessary in vulnerable settings with multiple risk factors (White-Traut et al., 2013).

Among these interventions, music therapy and music stimulation have been prominent in recent decades for revealing benefits for preterm infants and their families. A broader definition of music therapy involves musical or auditory stimulation based on the intrauterine acoustic environment (e.g. uterus sounds, maternal voice and breathing sounds) used by a music therapist or other health care professionals in neonatal care (Haslbeck, 2012). However, a distinction can be made between music therapy, performed by a music therapist with specific training, and musical stimulation, performed by other health professionals. In particular, the therapist's work involves a therapeutic relationship with the mother-baby dyad through an individualized approach adapted to the demands and characteristics of each dyad, where live music is tuned to the baby's behavioral and physiological signs. On the other hand, other professionals who perform musical stimulation interventions usually employ recorded songs in a non-individualized approach (Palazzi, Nunes, & Piccinini, 2018).

In the last decades, music therapy and music stimulation have spread widely in NICUs, since hearing is one of the earliest skills to develop in the fetus (McMahon, Wintermark, & Lahav, 2012). Still, newborns prefer maternal singing to the maternal speaking, and singing is able to engage the baby's attention more, favors affective communication and strengthens the mother-baby bond (Nakata & Tehub, 2004; Trehub, Becker, & Morley, 2015). In fact, from the earliest days of the baby's life, the dyad communicates in a musical way, through a dialogue involving a reciprocal coordination of melodic, timbral and rhythmic elements, which was called 'communicative musicality' (Malloch & Trevarthen, 2009).

Evidence reveals that music therapy and musical stimulation bring a number of contributions to the baby, the mothers and the relationship between them. With respect to the baby, they may favor increased oxygen saturation, regulation of heart and respiratory rate, promotion of sleep, non-nutritive sucking, weight gain and reduction of hospitalization time (Bieleninik, Ghetti, & Gold, 2016; Haslbeck, 2012; Standley, 2012). With regard to the mother, they can reduce their stress and anxiety and favor breastfeeding (Ak, Lakshmanagowda, Pradipe, & Goturu, 2015; Arnon et al., 2014; Bieleninik et al., 2016). Finally, music-based interventions, in particular music therapy, showed benefits for attachment and mother-baby relationship (Ettenberger et al., 2014; Haslbeck, 2014).

Evidence suggests that live music therapy is more effective than recorded music by adapting to changes in infant's behavior (Garunkstiene, Buinauskiene, Uloziene, & Markuniene, 2014). In particular, music therapy interventions that use live singing with lullabies, song of kin or improvised vocalizations favor self-regulation, development, and 'communicative musicality' of the baby, and promote the well-being of mothers and the quality of mother-infant interactions (Haslbeck, 2014; Loewy, 2015; Malloch et al., 2012; Palazzi, Meschini, & Piccinini, 2017). In these interventions, the music therapist aims to

establish an interaction with the preterm baby, adjusting the singing based on the baby's signals.

It is important to especially include the mother in the interventions, valuing the maternal singing, which has shown positive effects for both the baby and the mother (Cevasco, 2008). In fact, maternal singing can favor the relaxation and stabilization of the baby, decrease the mother's anxiety and sense of helplessness, and enable her to participate in the infant's care and well-being (Arnon et al., 2014; Filippa, Devouche, Arioni, Imberty, & Gratier, 2013; Cevasco, 2008; Palazzi et al., 2017).

Considering the above, the following is a proposal for intervention in music therapy at the NICU, which aims to sensitize the mother to sing for her preterm baby. The *Music Therapy Intervention for the Mother-Preterm Infant Dyad – MUSIP* (Palazzi, Meschini, & Piccinini, 2014a) is presented and the specificities and challenges of its implementation in the NICU are described.

Music Therapy Intervention for the Mother-Preterm Infant Dyad - MUSIP

This section presents the protocol of the *Music Therapy Intervention for the Mother-Preterm Infant Dyad – MUSIP* (Palazzi et al., 2014a), and describes the theoretical and technical aspects that guided its implementation. MUSIP is a music therapy intervention intended for the mother-preterm infant dyad, which aims to sensitize and accompany each mother individually to sing for her baby during the hospitalization in the NICU. This intervention is inspired (1) in the evidences of music therapy research in the NICU (Haslbeck, 2012; Standley, 2012); (2) in studies on singing to the baby, 'communicative musicality' and its clinical applications with hospitalized infants (Haslbeck, 2014; Malloch et al., 2012; Nakata & Trehub, 2004); (3) in interventions that value the mother's favorite songs (song of kin) and maternal singing with the premature newborn (Filippa et al., 2013; Loewy, 2015).

The MUSIP protocol initially intends to guide the mother about the baby's early skills and the main benefits of maternal singing for the premature newborn. Next, the music therapy sessions involve activities of vocal production, singing of lullabies and/or songs selected by the mother during the *Interview about the mother's musical history* (Palazzi, Meschini, & Piccinini, 2014b), performed prior to the intervention. Still, the sessions involve activities of vocal and instrumental improvisation and composition of a lullaby for the baby. It is important to note that according to the original MUSIP protocol, from Session 2 the mother is encouraged to sing for the baby, for about 15-20 minutes a day, at times that are alternative to procedures and medical care, even without the presence of the music therapist.

The MUSIP protocol is organized in eight sessions one to two times a week, with four individual sessions with the mother, alternating with four meetings with the mother-preterm infant dyad in the NICU. The individual sessions with the mother have a duration of 60 minutes and are performed outside the NICU in a room of the Neonatology Unit. The sessions with the dyad last for 15 to 20 minutes and are performed in the NICU with the baby in the incubator or in kangaroo mother care. Each session is structured in three parts: (1) verbalization about the clinical state of the baby and the experiences of maternal singing performed previously; (2) musical production and interaction with the mother or the dyad in the NICU; and, (3) verbalization about the impressions generated during the session.

During the individual sessions with the mother, the lyrics and chords of the songs selected by her are used. In addition, the music therapist offers a repertoire of Brazilian songs of different styles (children's songs, lullabies, Brazilian popular music, gospel music), created on the basis of the research of the music therapist, the first author of this study, and complemented with the song preferences of each participating mother. In addition, the following musical instruments are used: a classical guitar with nylon and steel strings; a *glockenspiel* 29 cm long with a wooden box; an ocean drum 36 cm in diameter on leather, wood and cloth; a tambourine 26 cm of diameter in leather and wood. During the sessions with the mother-baby in the NICU, the lyrics and chords of the songs are also present, but mainly the song and voice of the music therapist and the mother are used, along with accompaniment to the guitar of the music therapist.

Figure 1 and Figure 2 show the MUSIP protocol, which presents objectives, activities, materials and instruments, and notes for the music therapist, for each session. It is important to point out that, although each session of MUSIP is focused on specific goals and activities, the music therapist always seeks to prioritize the initiative and preferences of the mother in the choice of activities, maintaining a constant listening and empathy. In the same way, although the musical focus of the sessions is more vocal (since it is through the voice and singing that the mother interacts with the baby in the NICU), the sessions performed with the mother always make available some musical instruments that can be used for accompanying the singing, and facilitating interaction with the music therapist.

Figure 1. Protocol of sessions 1-4 of the *Music Therapy Intervention for the Mother-Preterm Infant Dyad - MUSIP*

	Objectives	Activities	Notes for the music therapist
Session 1: The musical support of the mother Time (estimated): 60 min. Participant: Mother	Support the mother musically, enabling free exploration and musical expression in a non-verbal context.	Part I: initial verbal reception and conversation about infant's clinical state. Part II: breathing activities, humming and vocalizations aimed at promoting perception and the exploration of several musical elements (pitch, rhythm, dynamics, tempo and timbre). Singing lullabies or other songs selected by the mother. Part III: final conversation, aimed at helping the mother to reflect about how to apply the singing experience with the baby. Orientation about the principal stages of hearing development of the fetus, prenatal auditory skills and baby's musical perceptive and expressive competences. Material and musical instruments: lyrics and chords of songs, guitar, <i>glockenspiel</i> , ocean drum, tambourine.	Make the transition from the first verbal part to the second non-verbal one in a clear but delicate way, waiting and valuing the mother's initiative and her spontaneous musical production. If she starts exploring the musical instruments, accompany her and introduce the songs singing just in a second moment, as a continuation of the musical improvisation already established. Nevertheless, if she waits a more directive request, introduce the activities of breathing and vocal production, as a way to relax and warm up. Then, follow with the singing of songs. At the end, notify the mother that the next session will be performed with the baby and that she will be invited to interact with him/her by singing, as she experienced in this first session.
Session 2: The musical support of the infant Time (estimated): 15/20 min. Participant: mother-infant dyad	Accompany the mother during the first singing experience with the infant.	Part I: initial verbal reception, conversation about infant's clinical state and orientations about the singing experience for the baby, reminding activities and themes deepened in the first session. Part II: humming, vocalizations and lullaby singing in NICU with the baby. Part III: final conversation about the singing experience, aimed at focusing maternal perceptions and clarifying doubts. Material and musical instruments: lyrics and chords of songs, guitar.	The goal is for the mother to be able to sing autonomously for her baby. Nevertheless, since it could be the first singing experience with the baby, the mother might feel insecure, ashamed to sing in the NICU in front of other people or perceive the presence of the music therapist as intrusive. Thus, depending on maternal confidence with singing and her emotional availability, the music therapist can choose whether and to what extent participate in the vocal interaction between mother and infant. For example, if the mother is not able to sing autonomously for her baby, the music therapist can sing along, leaving her gradually more autonomous, or the music therapist and the mother can sing alternatively for the infant. If the mother starts singing, the music therapist can just observe the mother-infant musical interaction in a participatory way. At the end of the session, encourage the mother to sing for the baby, for about 15-20 minutes a day, at times that are alternative to procedures and medical care, even without the presence of the music therapist.
Session 3: The musical interaction Time (estimated): 60 min. Participant: mother	Focus on the interactional aspects of the musical production, emphasizing the exploration of several musical elements and music therapy techniques.	Part I: initial verbal reception, conversation about infant's clinical state and the experiences of maternal singing performed previously. Part II: singing lullabies or other songs selected by the mother, modifying several musical sounds; musical interaction between the mother and the music therapist, using voice and/or musical instruments, aimed at promoting perception and the exploration of several musical elements and techniques (imitation, simultaneous and dialogical synchrony). Part III: final conversation about the singing experience, aimed at clarifying doubts and focusing the principal themes; and activities experienced during the session. Reflection about the interactional and expressive competences of the infant. Material and musical instruments: lyrics and chords of songs, guitar, <i>glockenspiel</i> , ocean drum, tambourine.	In this session, it is important to help the mother reflecting about how to apply with the baby the music therapy techniques experienced during the session. Talk about the interactional competences of the baby (breathing patterns, skin color, visceral signs, movements and muscle tone, behavioral states of sleep and alert, signs of approximation and withdrawal) and reflect with the mother about opportunities of interaction with the infant through singing. Initially orient her to observe the baby and to synchronize to his/her clearer signs, such as breathing rhythm and movements of arms and legs.
Session 4: The vocal interaction with the infant Time (estimated): 15/20 min. Participant: mother-infant dyad	Accompany the mother during the singing experience with the infant, inviting her to apply the techniques experienced in the last session.	Part I: initial verbal reception, conversation about infant's clinical state and orientations about the singing experience for the baby, reminding the activities and themes deepened in the last session. Part II: singing lullabies or songs in the NICU with the baby, modifying musical elements adapted to the infant's signs, through imitation and simultaneous and dialogical synchrony. Part III: conversation about the singing experience, aimed at focusing on maternal impressions, clarifying doubts and making suggestions for the next experiences. Material and musical instruments: lyrics and chords of songs, guitar.	Initially suggest the mother to observe the infant's signs, in particular breathing patterns, and orient her to synchronize to this rhythm through singing. If the mother has difficulties, the music therapist might start humming the song that the mother selected, with a regular pulse based on three or four breaths of the infant. Despite the music therapist being a model for the mother, it is always important to value the maternal initiative and vocal production, in order to improve maternal skills.

Figure 2. Protocol of sessions 1-4 of the *Music Therapy Intervention for the Mother-Preterm Infant Dyad - MUSIP*

	Objectives	Activities	Notes for the music therapist
<p>Session 1: The musical support of the mother</p> <p>Time (estimated): 60 min.</p> <p>Participant: Mother</p>	<p>Support the mother musically, enabling free exploration and musical expression in a non-verbal context.</p>	<p>Part I: initial verbal reception and conversation about infant's clinical state.</p> <p>Part II: breathing activities, humming and vocalizations aimed at promoting perception and the exploration of several musical elements (pitch, rhythm, dynamics, tempo and timbre). Singing lullabies or other songs selected by the mother.</p> <p>Part III: final conversation, aimed at helping the mother to reflect about how to apply the singing experience with the baby. Orientation about the principal stages of hearing development of the fetus, prenatal auditory skills and baby's musical perceptive and expressive competences.</p> <p>Material and musical instruments: lyrics and chords of songs, guitar, <i>glockenspiel</i>, ocean drum, tambourine.</p>	<p>Make the transition from the first verbal part to the second non-verbal one in a clear but delicate way, valuing and valuing the mother's initiative and her spontaneous musical production. If she starts exploring the musical instruments, accompany her and introduce the songs singing just in a second moment, as a continuation of the musical improvisation already established. Nevertheless, if she waits a more directive request, introduce the activities of breathing and vocal production, as a way to relax and warm up. Then, follow with the singing of songs. At the end, notify the mother that the next session will be performed with the baby and that she will be invited to interact with him/her by singing, as she experienced in this first session.</p>
<p>Session 2: The musical support of the infant</p> <p>Time (estimated): 15/20 min.</p> <p>Participant: mother-infant dyad</p>	<p>Accompany the mother during the first singing experience with the infant.</p>	<p>Part I: initial verbal reception, conversation about infant's clinical state and orientations about the singing experience for the baby, reminding activities and themes deepened in the first session.</p> <p>Part II: humming, vocalizations and lullaby singing in NICU with the baby.</p> <p>Part III: final conversation about the singing experience, aimed at focusing maternal perceptions and clarifying doubts.</p> <p>Material and musical instruments: lyrics and chords of songs, guitar.</p>	<p>The goal is for the mother to be able to sing autonomously for her baby. Nevertheless, since it could be the first singing experience with the baby, the mother might feel insecure, ashamed to sing in the NICU in front of other people or perceive the presence of the music therapist as intrusive. Thus, depending on maternal confidence with singing and her emotional availability, the music therapist can choose whether and to what extent participates in the vocal interaction between mother and infant. For example, if the mother is not able to sing autonomously for her baby, the music therapist can sing along, leaving her gradually more autonomous, or the music therapist and the mother can sing alternatively for the infant. If the mother starts singing, the music therapist can just observe the mother-infant musical interaction in a participant way. At the end of the session, encourage the mother to sing for the baby, for about 15-20 minutes a day, at times that are alternative to procedures and medical care, even without the presence of the music therapist.</p>
<p>Session 3: The musical interaction</p> <p>Time (estimated): 60 min.</p> <p>Participant: mother</p>	<p>Focus on the interactional aspects of the musical production, emphasizing the exploration of several musical elements and music therapy techniques.</p>	<p>Part I: initial verbal reception, conversation about infant's clinical state and the experiences of maternal singing performed previously.</p> <p>Part II: singing lullabies or other songs selected by the mother, modifying several musical sound; musical interaction between the mother and the music therapist, using voice and/or musical instruments, aimed at promoting perception and the exploration of several musical elements and techniques (imitation, simultaneous and dialogical synchrony).</p> <p>Part III: final conversation about the singing experience, aimed at clarifying doubts and focusing the principal themes and activities experienced during the session. Reflection about the interactional and expressive competences of the infant.</p> <p>Material and musical instruments: lyrics and chords of songs, guitar, <i>glockenspiel</i>, ocean drum, tambourine.</p>	<p>In this session, it is important to help the mother reflecting about how to apply with the baby the music therapy techniques experienced during the session. Talk about the interactional competences of the baby (breathing patterns, skin color, visceral signs, movements and muscle tone, behavioral states of sleep and alert, signs of approximation and withdrawal) and reflect with the mother about opportunities of interaction with the infant through singing. Initially orient her to observe the baby and to synchronize to his/her clearer signs, such as breathing rhythm and movements of arms and legs.</p>
<p>Session 4: The vocal interaction with the infant</p> <p>Time (estimated): 15/20 min.</p> <p>Participant: mother-infant dyad</p>	<p>Accompany the mother during the singing experience with the infant, inviting her to apply the techniques experienced in the last session.</p>	<p>Part I: initial verbal reception, conversation about infant's clinical state and orientations about the singing experience for the baby, reminding the activities and themes deepened in the last session.</p> <p>Part II: singing lullabies or songs in the NICU with the baby, modifying musical elements adapted to the infant's signs, through imitation and simultaneous and dialogical synchrony.</p> <p>Part III: conversation about the singing experience, aimed at focusing on maternal impressions, clarifying doubts and making suggestions for the next experiences.</p> <p>Material and musical instruments: lyrics and chords of songs, guitar.</p>	<p>Initially suggest the mother to observe the infant's signs, in particular breathing patterns, and orient her to synchronize to this rhythm through singing. If the mother has difficulties, the music therapist might start humming the song that the mother selected, with a regular pulse based on three or four breaths of the infant. Despite the music therapist being a model for the mother, it is always important to value the maternal initiative and vocal production, in order to improve maternal skills.</p>

Implementation and adaptation of MUSIP in a NICU

This section reports the specificities and challenges of MUSIP implementation in the NICU of the Hospital Materno-Infantil Presidente Vargas (HMIPV), a public hospital in Porto Alegre, as well as the adaptations of the intervention for the participating dyads.

The Neonatal Unit of the hospital comprises 25 beds distributed in several rooms: two rooms of the NICU with four to six beds for intensive care; a room of the Intermediate ICU with semi-intensive care with 10 beds and intermediate care with five beds; and a room for the Kangaroo Unit with four beds. In the sector, the entrance is restricted, but the mothers and fathers are the only ones who can stay during all the day and night shifts, except the change shifts when only professionals can enter. However, entrance is allowed for grandparents and siblings of newborns at certain specific times. At the NICU, the medical and nursing team consists of five pediatricians, nurses, nursing technicians, two speech therapists, two physical therapists, a psychologist, a social worker, an occupational therapist, as well as several medical and multiprofessional residents. Also, it is emphasized that skin-to-skin contact between mother and baby through the kangaroo position is a standard care within the NICU.

The MUSIP was implemented at the hospital's NICU for nine months in 2015, by the first author of this study, a music therapist with a background in music and specialization in music therapy in Italy. The intervention had the clinical supervision of another music

therapist, the second author. The first two months were dedicated to the setting of the music therapist in the work and dynamics of the NICU team, as well as to the familiarization with the characteristics of the families attended at the hospital. The families of infants admitted to the NICU have generally low socioeconomic status and often have social vulnerability. Adolescents, drug users, HIV/AIDS, or psychiatric problems are very common. It is also possible to find ethnic heterogeneity in the hospital, which can sometimes become an additional challenge because of the cultural differences between the professionals and the mothers of the in-patients. Finally, many of these mothers have a limited support network, sometimes being the only ones responsible for the hospitalized baby, as well as for other children and family members at home. As for babies, in addition to premature birth, they may present other clinical complications, syndromes or malformations.

After the initial setting, the music therapist began to perform the intervention in the NICU, and the MUSIP protocol had to be adapted to take into account the conditions of the NICU, the babies, the mothers, the medical procedures and staff. In particular, nine mothers of preterm infants participated in three to nine sessions of MUSIP. Mothers were between 18 and 42 years old, had a heterogeneous education, from incomplete elementary school to incomplete higher education. The socioeconomic level of the families was classified as low (C1 and C2 income classes), according to the Brazilian Economic Classification Criterion (Associação Brasileira de empresas de Pesquisa [ABEP], 2015). The babies were born with a gestational age between 24 and 34 weeks and a weight between 380 g and 2,200 g. The study was approved by the Ethics Committees of the Institute of Psychology of the Universidade Federal do Rio Grande do Sul (UFRGS) (985.941) and the hospital (1.069.283).

The first phase of MUSIP application proved to be very complex, for different reasons: music therapy is still an unusual therapy in the area of neonatology in Porto Alegre and it was a totally new therapy in the hospital; the music therapist was a professional outside the team, and has another nationality, although she has little accent when speaking and singing; mothers were often not available at the times previously set to hold the individual sessions, since that time was the only one where many of them could rest; the only free room to hold individual sessions with the mother was the Kangaroo Unit which, after the first few months, was no longer available, and no other room was available for individual attendance; the mothers were often uncertain or distrustful of music therapy and were very resistant to the idea of singing for babies inside the NICU in front of other people.

All of these initial difficulties greatly limited the possibility for mothers to fully adhere to the study and to link to the therapist and intervention, reflecting the desistance of several of them. In addition, due to the mothers' availability of time and the space constraints of the Neonatal Unit, it was difficult to perform the individual sessions with them. On the other hand, the importance of valuing and increasing the sessions with the mother-preterm infant dyad, both in the incubator and in the kangaroo position, was also highlighted. In fact, the sessions with the baby were more feasible to perform, according to the organization of the mothers and the medical team, and were also indispensable to link the mothers to the music therapist and to the intervention itself.

Thus, these initial challenges, analyzed and deepened by the music therapist, led to the adaptation of the MUSIP protocol to the NICU of the HMIPV. According to the difficulties encountered and the observations of the music therapist, it was decided to make the number and frequency of the sessions more flexible. In general, depending on the time and emotional availability of the mother, the conditions of the baby and the length of

hospitalization, three to nine sessions were performed, with a frequency of one to two times a week or, in some cases, each two weeks. Also, it was decided to make flexible the alternation between sessions with the mother and mother-preterm infant, according to the demands of the mother, the baby and the hospital.

For example, one of the first accompanied mothers performed nine sessions, the first four individual, while the others with the baby. This was due to the conditions of the baby who, being born extremely premature and extremely low weight, for a long time did not present sufficient stability to participate in MUSIP. On the other hand, the mother spent every day in the hospital, in a state of great concern and anxiety. Therefore, after discussing the case with the medical team, it was decided to begin the sessions with the mother and include the baby later. In a different way, one of the last attended cases was followed during nine sessions, all performed with the mother-preterm infant dyad next to the incubator or in kangaroo position. This decision occurred due to the lack of time availability of the mother and the space restrictions of the Neonatal Unit. Still, in cases of moderate preterm infants (32- <37 weeks), whose hospitalization was shorter, it was possible to perform only three or four MUSIP sessions with the dyad.

Because of the smaller number of individual sessions with some mothers, it was also necessary to adapt some activities initially planned in MUSIP. For example, vocal and instrumental improvisation with the mother was limited, thus in the sessions with the baby we used more songs of the mothers (song of kin) than improvised singing. In the first sessions, if the mother did not feel comfortable singing to the baby, the music therapist sang to the dyad, with or without accompaniment to the guitar. Still, the activities of infant-contingent singing were simplified, instructing the mother to observe only the infant's breathing, before singing, and then adapting the singing pulse to the rhythm of the infant's breathing. Because of the greater number of sessions with the dyad, it was possible to focus more on the mother-baby relationship, using singing as a way to calm the baby and as an interaction resource. Finally, the structure of each session was relaxed, and often the final verbalizations occurred outside the NICU room and sometimes on a day different from the day of the session.

Regarding the use of instruments in the NICU, the guitar was important, since it belongs to the Cultural Sound Identity (ISO) (Benenzon, Gainza, & Wagner, 2008) of Brazilian mothers. However, its use depended on a number of factors, including the baby's condition, the team's organization, and the space in the room. In general, in the first three or four encounters, the music therapist chose to use only the voice in the dyad sessions, while, as the babies became more stable and could be placed in kangaroo position, she introduced the guitar to accompany the singing and tuning to the behaviors of the mother and the baby.

Preliminary evidence of MUSIP

Despite the challenges of implementing MUSIP in the NICU of the referred hospital, we can highlight some preliminary evidence from the intervention, based on the results of a case study, presented in the master's thesis of the first author of this article (Palazzi, 2016; Palazzi et al., 2017). For purposes of analysis, three categories, based on Haslbeck (2014), were used: 'empowerment of the infant, empowerment of the mother' and 'communicative musicality'. According to Haslbeck's (2014) definition, the 'empowerment of the infant' refers to its ability to relax, calm down, increase self-regulation, orientation, and interaction.

Similarly, the 'empowerment of the mother' refers to her ability to relax, calm down, interact with the baby, and increase its competencies. Finally, 'communicative musicality' refers to the musical communication that characterizes dyad communication and involves the synchrony between the mother's singing/speech and the baby's behavior (Haslbeck, 2014). The results showed that MUSIP contributed to: the 'empowerment of the infant' through relaxation, stabilization of oxygen saturation, presentation of new competencies and involvement in singing; the 'empowerment of the mother' through relaxation, overcoming shame and the fear of interacting with the baby, strengthening maternal skills and autonomy in singing; and the 'communicative musicality' of the dyad, through the synchronicity between the mother's singing and the baby's behavior, as well as the reciprocal imitation between the mother's singing and the baby's vocalizations. Moreover, the findings emphasized that MUSIP contributed to mother-preterm infant interaction, since maternal singing favored longer face-to-face contacts and more diversified affective behaviors (Palazzi et al., 2017).

Besides these preliminary results, it was also possible to highlight the potentialities and benefits of MUSIP that had not previously been predicted. For example, mothers or the music therapist were able to record an audio or video of the lullaby composed to the baby in the last sessions. This allowed a continuity between the work carried out during hospitalization and the post-discharge period, as well as offering the opportunity for the mothers to share this experience with the other relatives. Still, one of the mothers chose to sing the same song she sang at home with her eldest son, the hospitalized baby's brother. She asked her older son what he 'wanted to tell the little brother' and he asked her to sing 'our song' to the hospitalized brother. This shows the potential of music therapy in the NICU as a therapy with possible impacts on the family, capable of strengthening both maternal skills, the mother-preterm infant bond, but also of facilitating interaction among all family members, relieving stress and the anxiety of the hospitalization of the preterm infant.

Also, it should be noted that all mothers who participated in MUSIP, whose data are under analysis, reported that it was a positive experience and that they would recommend music therapy to other mothers. Some of them even talked spontaneously to other mothers of hospitalized babies, suggesting that they also sing to their children. This shows that music therapy had a multiplier effect, allowing other mothers, who did not participate directly in the intervention, to be sensitized and stimulated to sing for their babies in the NICU.

Finally, music therapy showed benefits for health professionals and the NICU environment. After nine months of work by the music therapist, medical and nursing professionals were more aware of the risks of excessive or inadequate acoustic stimulation for infants, commonly present in the NICU, and were more sensitive about the potential of singing for the mother-preterm infant dyad. Also, nurses and nursing technicians reported positive effects of music therapy on their own well-being, reporting that when they listened to the music therapist and the mothers singing at the NICU, they also felt good, calmed down and thrilled.

For example, a nursing technician reported: "We end up singing along, listening to the music together and this is very cool because of this work that we have, which is stressful, then at that moment you also participate". The same professional said that "[...] even when we're working, we end up getting emotional because there are lyrics that touches us deeply". In a similar way, a nurse reported, "I always cry. Because it's exciting, these babies are mostly babies who have been very bad, very bad, and now see the mother well, with the baby on her lap, singing the music [...] calm, quiet melodies, so I always get emotional

looking, and I cry". She pointed out that music and singing can become "[...] an additional subsidy for us to have a bond with this family, something else that people can get their hands on it". Still this nurse reported that music therapy "[...] humanizes, makes the NICU's environment more cheerful, more interactive, more playful".

Final considerations

The present report of experience aimed to present the *Music therapy intervention for the mother-preterm infant dyad – MUSIP* describing the specificities and the challenges of its implementation in the NICU. After nine months of MUSIP application, evidence suggests that the intervention had positive effects on preterm infants, mothers and their interaction. In addition, it brought benefits to the medical and nursing staff and to mothers who did not participate directly in the intervention (Palazzi et al., 2017). The literature shows the importance of performing brief, early and inexpensive interventions in this context, aimed at the well-being of preterm infants and their families (Als, 2009; Sutton & Darmstadt, 2013; White-Traut et al., 2013). In particular, studies show that early interventions are even more necessary in vulnerable contexts (White-Traut et al., 2013), as in the present study, and the literature emphasizes the importance of humanized, individualized and family-centered care (Als, 2009; White-Traut et al., 2013).

MUSIP is an early and brief intervention, since it is performed in approximately eight sessions during the baby's hospitalization and aims to sensitize and accompany each mother individually to sing for her infant during the NICU stay (Palazzi et al., 2017). Being an intervention of music therapy with singing and live music, MUSIP singing activities are able to adapt better to the characteristics of the baby, the mother and the environment, contributing more to the relaxation and self-regulation of the baby (Garunkstiene et al., 2014). Still, by enhancing mother's singing and mother's musical preferences, MUSIP also offers emotional support to the mother, favors her relaxation and the empowerment of maternal skills, and helps her to participate in the child's well-being (Cevasco, 2008; Halsbeck, 2014; Loewy, 2015; Palazzi et al., 2017). Finally, as an intervention with potential impact for the whole family, MUSIP can promote the well-being and prevent the emotional health of family members, contributing to public health.

In general, research in this area involves very brief and timely interventions of up to six sessions, which may not always be able to set a therapeutic relationship between music therapist and mother (Ettenberger et al., 2014; Palazzi et al., 2017). Despite being a relatively brief intervention, MUSIP offers a follow-up of the dyad over approximately one to two months. In this context, it is fundamental the sensitivity of the music therapist to adapt to the demands of the mother, the baby and the hospital. Meeting the mother, strengthening her attachment to the therapist and intervention, is even more important in a vulnerable context such as HMIPV, where biological risks add to various psychosocial risks.

Finally, the greatest potential of MUSIP is to be an intervention that offers support and follow-up to the dyad in the NICU, but also guides the mother so that she can sing independently for her baby in the NICU, even without the presence of the music therapist, and particularly after hospital discharge. Thus, this is a low-cost intervention, with great potential for long-term impact, in particular to strengthen the mother-baby relationship, especially after the stressful preterm birth and hospitalization process, which leave marks for a long time in the lives of families.

Further studies are required to extend the application of MUSIP to other NICUs and to verify its short- and long-term benefits for the mother, the preterm baby and the mother-infant interaction. Moreover, recent interventions aimed at the quality of the mother-preterm infant interaction are being performed in the transition from baby's hospitalization to hospital discharge, with home follow-up after discharge (White-Traut et al., 2013). Future studies could also investigate the adjustment of MUSIP after discharge to ensure continuity in follow-up to the mother-preterm infant dyad at home.

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