



Effects of music therapy in the neonatal intensive care unit

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1 INTRODUCTION

Humanization practices have increasingly stood out in the healthcare field, especially when present in situations in which the environment is a stressful factor for the patient, directly impacting his treatment. These humanization practices include non-pharmacological treatments, non-invasive procedures that can alleviate pain, anxiety, or even fear, providing well-being and even improvement in the patient's clinical condition (MANGAT *et al.*, 2018; BERTSCH *et al.*, 2020).

The environment inside Neonatal Intensive Care Units (NICU) is characterized by being highly stressful due to different factors such as: mechanical noises from equipment, movement of people, parallel and loud conversations, and handling of neonates. Therefore, the more premature the baby is, the more he/she will be harmed, because the sounds that exist there, without a melody pattern and adequate frequency, directly affect his/her brain development, which, due to prematurity, is already compromised. Because of this, the Units have been seeking ways to improve the environment of these NICUs, creating a more humanized place and reducing the stressful factors (KOBUS *et al.*, 2022).

Among the humanization practices that have been inserted within a NICU, *the* following stand out: music therapy, kangaroo method, cradle hammock, therapeutic massage, exposure to the familiar smell, and *swaddling* (MANGAT *et al.*, 2018; LEAL *et al.*, 2021;) Music therapy can be presented in two ways: live or recorded, and both forms directly affect brain tissue, as it interacts with dopaminergic neurons, which will subsequently secrete dopamine. This hormone, known as the pleasure hormone, influences the baby's development (physiological parameters, motor and cognitive function) and the parent-baby relationship (dyad) (FERRERI *et al.*, 2019; LORDIER *et al.*, 2019)

Thus, the National Humanization Policy brings the necessary support so that in any healthcare environment, not only in NICUs, it is possible to insert humanization practices, considering the individualities of each patient and their environment, to ensure quality care.



2 OBJECTIVE

To evaluate the insertion of these practices and the influence of music therapy on the development of infants within the NICU environment.

3 METHODOLOGY

This is a literature review, of the descriptive-exploratory type, to investigate the role of music therapy as a method of humanization within the NICUs and its contribution in the treatment of neonates inserted into this environment. Thus, a guiding question was developed: "*What is the influence of music therapy on the physiological, behavioral and neurodevelopment parameters of infants in the Neonatal Intensive Care Unit?*" To answer this questioning, a search was conducted on articles published from 2013 to 2023 in the electronic bases: Pubmed (NCBI), Regional Portal of the Virtual Health Library (VHL) and *Proceedings of the National of Sciences (PNAS)*, employing the descriptors: *music, intensive care and neonatal*, joining them by means of the Boolean operator "*and*". Full articles that were available *online* were selected, which contained the descriptors in the title or abstract, in Portuguese, Spanish, English and French.

4 DEVELOPMENT

A historical evaluation of the use of music for therapeutic purposes shows that it was first used in 1859, by the nurse *Florence Nightingale*, in the health care of the population at the time. In her experience, she observed that wind, string and human voice instruments were capable of conducting continuous sounds and beneficial effects, reducing pain or agitation (SILVA, 1995). Thus, it is known that the art of music therapy is in organizing the sounds so that they can generate positive sensations aligned with the clinical picture of each patient.

Highly stressful environments, disrupt the functions of brain networks and can cause neurological deficits, as brain networks provide information about the integrity of the brain PINEDA et al., 2017; LEAL *et al.*, 2021). Although the networks of sensory and salience functions are initially developed in utero, they continue to be developed after birth and are directly related to environmental stimuli received by the different sensory organs (LORDIER *et al.*, 2019; PARTANEN *et al.*, 2022).

Recent studies have shown that newborns (NB) who are exposed to some kind of music during the final period of gestation (29 to 37 weeks) react better, because although the cortex of the NB is immature, at birth, it is capable of processing music (LOUKAS et al., 2022; ORMSTON et al., 2022). However, long periods of hospitalization, can lead to changes linked to neurodevelopment, generating excessive stress, increased sensitivity to pain, insomnia, and increased serum B-endorphins. (ANDERSON; PATEL, 2018). However, when these neonates, hospitalized, are exposed to periods of music therapy, the physiological parameters (respiratory and heart rate, temperature, oxygen



saturation and pain), behavioral parameters (sleep, crying and feeding) and neurodevelopment (sucking and speech), showed significant improvement, with greater stability and clinical evolution (MANGAT *et al.*, 2018; RIBEIRO *et al.*, 2018; SANTOS *et al.*, 2021; ORMSTON *et al.*, 2022). In parallel, direct relationships have been observed between observed clinical benefits and music type, waves, logarithmic sweep (chirp) in the frequency band, broadband noise, frequency and time, thus evidencing that some music types may be more effective within music therapy (ALAY; ESENAY, 2019; HASLBECK *et al.*, 2020; LEAL *et al.*, 2021; KOBUS *et al.*, 2022).

In this way, studies have found the "*Mozart Effect*", in which music from the Austrian composer *Wolfgang Amadeus Mozart's Sonata for two pianos in D, K. 448*, is used, showing that these melodies can produce an organizational effect in the cerebral cortex, following the same timing of circadian cycles and brain waves (LAHMA, 2021)

5 CONCLUDING REMARKS

The RNs who need hospitalization in NICUs suffer several negative effects on their bodies due to pathologies and highly stressful environment, which can compromise their development or hinder or slow their evolution, generating significant stress, which causes even more deregulation in physiological parameters. It is observed then, that the insertion of integrative practices, such as music therapy, brings significant benefits for NBs, such as stabilization of vital signs, less painful stimuli to invasive procedures, more mature wakefulness cycles, improved suction and consequently a weight gain and cessation of crying. Thus, we conclude that music therapy produces positive and satisfactory results, and because it is a low-cost therapy, easy to use and available, it can be easily inserted into the daily routine of NICUs, contributing to a more humane treatment for these patients.



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