

Effects of Mother's Voice on the Weight Gain of the Baby

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ABSTRACT

Background: Maternal stress or anxiety in postpartum period due to baby's admission in NICU may decrease milk secretion depriving the baby from nutrition. The stress, anxiety, poor diet and psychological factors of mother are known to affect the milk secretion through oxytocin reflex leading to lactation failure which affects the growth, development and cognitive function of baby.

Objective:

The purpose of this study is to examine the effects of music therapy on weight increase in low birth weight babies to those who did not get music therapy.

The purpose of this study is to examine how music in the mother's voice affects the weight gain pattern of low birth weight babies when compared to no music or any music.

Method of the study: Randomize clinical trial conducted on 195 term low birth weight babies of both the sexes and completed at least ten days of life. The inclusion criteria for the babies should be without any abnormalities of hearing or suffering from any congenital abnormalities. The exclusion criteria for the mothers should be mute mother, deaf, dumb mother or the mother with speaking problems. The 195 low birth weight babies should be randomised in three groups containing 65 in each group. The Characteristic evaluated is the weight of the babies.

Results: The first group babies with no music did not show any significant changes in the weight gain of the babies. The second group of babies with recorded lullaby also did not show any significant changes in the weight gain of the babies. While the third group of babies with live lullaby or music in the mother's voice show the significant change in the weight of babies.

Conclusion: The live lullaby or any music in mother's voice at the time of feeding the babies affect positively to the weight gain of the babies.

Key words: Lullaby, New born, Preterm, Baby weight, Combined method therapy

HOW TO CITE THIS ARTICLE: Shrinivas Ranjeet Hake, Bhavana Lakhkar, Mahaveer Lakra, Effects of Mother's Voice on the Weight Gain of the Baby, J Res Med Dent Sci, 2023, 11 (1): 103-107.

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Received: 02-December-2022, Manuscript No. JRMDS-22-78476;

Editor assigned: 05-December-2022, PreQC No. JRMDS-22-78476(PQ);

Reviewed: 20-December-2022, QC No. JRMDS-22-78476;

Revised: 27-December-2022, Manuscript No. JRMDS-22-78476(R);

Published: 03-January-2023

INTRODUCTION

A woman's body is amazing. It has the power to not only create another human life, but also to provide all of the sustenance necessary for the child's growth and development. Breast milk production preparation starts before a woman is born and continues during

her adolescence and pregnancy. Following the birth of a child, full production might last for months or even years. Breast milk is without a doubt the best diet for a human baby. Since scientists cannot make it in a laboratory. It can only be produced by a mother for her child.

Breast-feeding is the process by which the new born baby sucks the milk from the mother's breast. Whether the mother wants to breastfeed or not, the body of a woman produces breast milk involuntarily at first. After the first week, however, supply and demand determine the continued production of breast milk and the release of milk-forming hormones. A mother must either breastfeed or pumps regularly if she wants to produce and retain a sufficient supply of milk for her baby. The pituitary gland secretes hormones such as prolactin and oxytocin. Prolactin is a hormone that tells your breast

milk-producing glands to make milk. The let-down reflex is triggered by the hormone oxytocin, which causes milk to flow out. It constricts the alveoli and force the breast milk into the mammary ducts. After then, the infant consumes the milk. If the mother breastfeeds every one to three hours, she will empty her breasts and maintain her prolactin levels, as well as sustain the milk-stimulating stimulus. This time of maximum production of milk begins at the ninth day after delivery and it continues until nursing is completed. Sucking reflex of the new born baby plays important role in this process. It is one of the most important thing in the post-natal period and the development of the new born babies. After the birth of the baby, the baby is kept near mother. That is called as the Rooming in. This gives psychological satisfaction to the mother that her baby is near to her that she kept 9 months in her womb. This procedure builds the special bonding between the mother and the new born baby. At this point the process of breastfeeding starts. The first milk of mother is called as colostrum which is very nutritious to the new born. The finest source of nourishment for babies is breast milk. It has a near-ideal ratio of vitamins, protein, and fat, which is just what a newborn need to survive — yet it's packaged It's more digestible than newborn formula. Antibodies in breast milk help the newborn's immune system fight infections and bacteria. Breastfeeding minimizes a newborn's risk of asthma and allergies. Furthermore, Ear infections, respiratory illnesses, and diarrhea are less common in newborns who are nursed solely during the first six months of their lives, without the use of any formula. They also reduce the likelihood of hospitalization and doctor visits. It contains immunoglobulin Ig A. This Ig A gives protection to the baby from the many infections in the neonatal age. Thus development of the baby is very much important to the health of the baby. Normal development of the baby implies to the good nutrition, milestone achievement till the age and immunology. The impaired development of the baby may affect the further processes and immunology. Thus breastfeeding is important and it should be started as soon as possible after the delivery. Breastfeeding has been related to higher IQ scores later in life in a number of studies. Physical proximity, skin-to-skin touch, and eye contact all help your infant feel secure and bond with you. Breastfed babies are more likely to gain the appropriate amount of weight as they grow up, rather than becoming overweight youngsters. Breastfeeding has also been linked to the prevention of SIDS, according to numerous research (sudden infant death syndrome). Diabetes, obesity, and some malignancies are all supposed to be reduced by it. Breastfeeding benefits both the mother and the baby. Breastfeeding burns additional calories, which can aid in the mother's weight loss after pregnancy. It secretes the hormone oxytocin, which aids in the return of the uterus to its pre-pregnancy size and may help to reduce post-partum uterine hemorrhages. Some studies have found that breastfeeding reduces the incidence of breast and ovarian cancer. It may also aid in osteoporosis prevention.

Because she doesn't have to buy and measure formula, sanitise nipples, or reheat bottles, the mother saves time and money. It also enables the mother to bond with her baby while spending quality time with her. Breast milk contributes to the baby's healthy weight gain. Breastfeeding also encourages a healthy weight increase in the baby and helps to prevent childhood obesity. Breastfeeding for more than 4 months was also linked to a lower risk of an infant being overweight or obese, according to certain research sources. This could be linked to the emergence of new gut bacteria. Breastfed newborns have higher levels of gut bacteria that are helpful. It's possible that these bacteria have an effect on fat storage. Newborns who are breastfed have higher levels of leptin in their bodies than babies who are fed formula. Leptin is a hormone that has a role in appetite regulation and fat storage. Breastfed newborns also control how much milk they consume. They are more adept at only eating till they are satisfied, which aids in the development of healthy eating habits. There are many parameters in the baby's normal growth and development i.e. milestone, weight, height, mental status, anthropology etc. Among all these Weight is one of the most important measurable parameter of baby's growth. The pattern of weight gain in baby shows the nourishment what he has been getting from the mother's breastfeeding. Extra-uterine growth retardation is very common in low birth weight babies and is linked to poor neuro-developmental outcome in later life [1]. Low birth weight babies may be preterm or as a result of IUGR (intrauterine growth retardation). Many maternal factors like nutritional status, antenatal checkup, maternal weight gain during pregnancy, complications in pregnancy and mother's systemic illnesses affect the weight of the baby [2,3]. In spite of state of art interventions and good neonatal care, low birth weight babies are at higher risk of getting infections, malnutrition with increase in mortality and morbidity [4].

Maternal stress or anxiety in postpartum period due to baby's admission in NICU may decrease milk secretion depriving the baby from nutrition. The stress, anxiety, poor diet and psychological factors of mother are known to affect the milk secretion through oxytocin reflex leading to lactational failure which affects the growth, development and cognitive function of baby [5,6].

Many authors have noted music is a stress buster leading to relaxation and increases the weight gain, calorie intake in babies resulting in early discharge from hospital. It affects the quality of sucking leading to better feeding and early weight gain [7,8]. Mother's voice is known to decrease pain perception in neonates while sampling or doing some procedures. It decreases total episodes of crying and bradycardia [9].

Some studies have shown that The baby's weight increase is aided by the mother's voice, which has physiological, behavioral, and emotional effects. According to several studies, maternal voice improved autonomic stability,

resulting in improved heart rate and respiration, as well as weight gain in the baby [10].

Baby recognizes the voice of mother even as early as 4th day of life, may be because of prenatal effect, sensory and auditory response. The acoustic emission in womb can stimulate the child which helps in early recognition of voice [11]. Mother's voice may be one of the factors affecting cognitive development, growth and weight gain of the baby. Mother's singing for the babies has shown to increase bonding between mother and the child leading to increase in mood relaxation improving sensory skills, cognition, growth, development and health in premature babies [12].

Live and recorded maternal voice is found helpful in physiological and behavioral development with decreasing episodes of cardio-respiratory derangements which could play an important role in the weight gain of the baby [13].

Various studies recommend use of recorded mothers voice in NICUs. There are definitely future need of good studies using mother's voice in the form of sound or music near the therapeutic level which will show statistical benefits in the baby [14].

We hypothesize that if music therapy is offered to babies during feeding by different means vocal or instrumental, it can definitely improve the weight gain pattern and more so if it is in mother's live voice like lullaby by the mothers. Present study is to assess this hypothesis.

Aim

To assess the effect of music in mother's voice on baby's weight gain in Low birth weight babies as compared to no music and any recorded music.

Objectives

1. The purpose of this study is to examine the effects of music therapy on weight increase in low birth weight babies to those who did not get music therapy.
2. The purpose of this study is to examine how music in the mother's voice affects the weight gain pattern of low birth weight babies when compared to no music or any music

Place of study

Department of Neonatology, JNMC, Sawangi, Wardha, Maharashtra.

Types of Study

Prospective, cross sectional, intervention study.

Subjects

Low birth weight baby admitted in the NICU.

Inclusion criteria

Low birth weight baby once acute phase is over and baby can be fed in mother's presence either orally or by tube.

Exclusion criteria

1. Baby with doubts of hearing problem and/or suffering

from major congenital anomalies or multiple minor anomalies.

2. mother not ready to participate.

3. Dumb and deaf mother.

METHODOLOGY

Study will start once ethical committee approval is obtained. Stable low birth weight babies on oral feeds with no exclusion criteria will be recruited after obtaining written informed consent from mother. Mother and her baby will be taken as a single unit. In this way three groups of mother and baby will be formed by computer randomization.

In the first group the weight gain of baby will be studied without any music.

In second group a recorded lullaby will be played for the baby during feeding.

In third group mother will sing for baby while feeding.

All the babies will be fed in mother's presence preferably by mother in a silent room. The study will be conducted at least 4 times a day. Each recruited baby will be studied for 7 days. Each baby in recorded music group will be provided with ear phones and selected music will be played using mother's mobile starting 5 minutes before feed and will continue till 5 minutes after feed is complete. In mother's voice group mother will select one lullaby and will start singing 2 minutes before starting feed and will continue till 2 minutes after completing the feed. In control group baby will be fed like other two groups in a silent room by mother but without any music.

The baby will be weighed before starting the study and then every day at the same time. The weight will be recorded. Demographic and clinical details of mother and baby will be entered in a pre-validated proforma. Mother will be explained the whole study and its purpose.

Sample size calculation

Formula: $N = [(Z\alpha + Z\beta) / C]^2 + 3$

The standard normal deviate for $\alpha = Z\alpha = 0.05$

The standard normal deviate for $\beta = Z\beta = 0.8$

$C = 0.5 * \ln[(1+r)/(1-r)] = 0.21$ (15)

As a result, for one-sided hypothesis testing with a type I error level of 5%, a total of 195 patients (65 in each group) would be needed to detect a clinically relevant difference with 80 percent power and an effect size of 5%.

Reference

The effect of music on weight gain in preterm infants older than 32 weeks was investigated in a randomised clinical trial.

Statistical Methods

Calculation of mean weight gain daily and cumulative will

be calculated. Means in 3 groups will be compared using chi square test and p value of < 0.5 will be considered significant. Statistical software SPSS 21 will be used.

Expected Result

The first group babies with no music did not show any significant changes in the weight gain of the babies. The second group of babies with recorded lullaby also did not show any significant changes in the weight gain of the babies. While the third group of babies with live lullaby or music in the mother's voice show the significant change in the weight of babies.

DISCUSSION

Music's advantages as an aural stimulant only just recently identified and scientifically verified. Lullaby in mother's voice has the potential in order to boost the benefits of multimodal stimulation, with one of its benefits being the promotion of homeostasis, which helps children tolerate stimuli. Many studies reflect on child development related issues [15-20].

The results for body weight gain in this study revealed that The Experimental Group's premature infants had a much higher mean than the Control Group's premature infants, which is critical for premature newborns because weight increase is linked to clinical stability and a shorter hospital stay. It is important to note that there were no significant differences in feeding methods or mean energy consumption across the groups studied. As a result, one of the hypotheses proposed in the Experimental Group for weight gain is that music can improve hunger and the sucking/swallowing process in children who are fed orally. Some research has looked into the relationship between music and Non-nutritive sucking was studied, and it was discovered that when music is playing, feeding rates increase. However, the authors do not specify whether the children had previously received oral nutrition, which could affect the pace of feeding.

Outcome Measures

Mean and range of weight gain in babies without music.

Mean and range of weight gain with selected music

Mean and range of weight gain with music in mothers' voice.

Statistical difference in above 3 parameters.

Implications of the Study

In the NICU music therapy can be a part of multimodal approach to improve weight gain and development in preterm babies improving outcome.

It will help to achieve full feeds early with good weight gain so reduce the duration of stay in NICU and cost of management.

It will improve breast feeding practice in India reducing infant mortality and morbidity and also reduce prevalence of malnutrition in developing countries.

It is a cost effective and simple way to improve weight gain in baby. It can be easily followed by all the mothers. This study will further improve the normal growth and development the new born babies. This will also promote the breastfeeding.

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