

Tactile and Kinesthetic Stimulation for the Babies Born Too Soon: A Review

Umarani J^{1*}, Sharadha Ramesh², Prakash Saldanha³, Rohan Dilip Mendonsa⁴, Kayalvizhi⁵

¹Dept of Paediatric Nursing, ²Dept of Community Health Nursing, ³Dept of Paediatrics, ⁴Dept of Psychiatry, ⁵Dept of Physiology
¹Yenepoya Nursing Colleg, Yenepoya University, Mangalore, ²Indira College of Nursing, Pandur, Thiruvallur, ^{3,4}Yenepoya Medical College,
 Yenepoya University, Mangalore, ⁵Meenakshi Medical College, Kanchipuram

*Corresponding Author's e-mail: umasrmc1@gmail.com

Abstract: Premature infants face many challenges which are not faced by the full-term babies. As they are born prematurely they are not exposed to the same cuddling, holding, and feeding patterns as of the full-term, healthy newborns. They are often isolated in incubators and deprived of much of the mechano sensory stimulation they would otherwise receive. In the Neonatal Intensive Care Units the infants are exposed to continuous, noise and bright lights and also lacking the human touch they would otherwise experience in the hands of the mother. The advent technologies in the medical field save the lives of many infants born prematurely. Tactile stimulation is a form of massage which improves the well being of the neonates by activating the nerve signals under the skin. Studies showed that preterm neonates who were massaged cried less, slept better, gained weight and had lower levels of stress hormones and also the intervention improved the interaction between mother and infant compared to the infants who were not given massage. This article reveals the methods and the research studies evidenced the benefits of tactile and kinesthetic stimulation.

Conclusion

As the tactile and kinesthetic stimulation incorporates all the elements of parent-child bonding, it can be provided to the preterm infants admitted in the NICU in order to improve the overall wellbeing.

Key Words: Tactile, Kinesthetic, Stimulation, Preterm Neonates

Introduction

Tactile stimulation is the activation of the receptor by touch. It includes activating the nerve signals beneath the skin's surface that inform the body of texture, temperature and other touch-sensations. They are separated prematurely from the womb and are not exposed to the same cuddling, holding, and feeding patterns as of full-term, healthy newborns. They are often isolated in incubators and not receiving adequate sensory stimulation. They are even more vulnerable than full-term babies and need to be treated with special care.

Even though most of the preterm babies survive, they are at increased risk of neuro developmental impairments and respiratory and gastrointestinal complications.^[1] Early stimulation given to neonates will change the growth of the brain cells, improve adaptive behavior, and finally cause the achievement of the optimal development of their age.^[2] A number of studies have demonstrated that early intervention can facilitate early mother - infant relationship and results in beneficial developmental outcomes in non-brain-injured low birth weight neonates.^[3,4] The typical massage used in

neonates is a gentle stroking with moderate pressure of parts of the body combined with kinesthetic stimulation that consists of passive motion of the limbs.^[5]

China introduced Infant massage first in 2nd century BC. The newborn massage has been a tradition in India and other Asian countries since long time. Variety of oil-based preparations used for massage. Research evidence are supporting the benefits of touch and massage therapy. Many studies are suggesting that infant massage has several positive effects on weight gain, better sleep-wake pattern, neuro motor development, better emotional bonding and reduces the rates of nosocomial infections. It also reduces the mortality in the hospitalized patients. Massage was found to be more useful when some kind of lubricant oil was used. when it is performed inappropriately Harmful effects like physical injury and increased risk of infection were encountered.^[6]

A Brief Epidemiology of Preterm

Preterm birth is defined as childbirth occurring at less than 37 completed weeks or 259 days of gestation.^[7] Most mortality and morbidity affects "very preterm" infants (those born before 32 weeks' gestation), and especially "extremely preterm" infants those born before 28 weeks of gestation.^[8] Preterm births account for 75% of perinatal mortality and more than half the long-term morbidity.^[9]

Every year, an estimated 15 million babies are born preterm (before 37 completed weeks of gestation), and this number is rising. Preterm birth complications are the leading cause of death among children under 5 years of age, responsible for nearly 1 million deaths in 2015. Three-quarters of them could be saved with current, cost-effective interventions. Across 184 countries, the rate of preterm birth ranges from 5% to 18% of babies born.^[10]

The frequency of preterm births is about 12-13% in the USA and 5-9% in many other developed countries; however, the rate of preterm birth has increased in many locations, predominantly because of increasing indicated preterm births and preterm delivery of artificially conceived multiple pregnancies. Common reasons for indicated preterm births include pre-eclampsia or eclampsia, and intrauterine growth restriction.^[11] India and China are the countries having the greatest number (3 519 100 & 1 172 300 respectively) of

preterm births and the highest rates of preterm birth per 100 live births.^[10]

Methods

Tactile stimulation: Make sure that the therapy started one hour after feeding the infants. Clean the hands before starting the procedure. Keep the infant in prone position with head turned to the side. Massage each area of the body with moderate pressure using the flats of the fingers from top of the head, down to back of the head, neck, across the shoulders and from shoulders to the hands. Then from the upper back down to the buttocks. Press on either side of the spine, not on the spine (Fig.1).



Fig.1 Tactile Stimulation

Kinesthetic stimulation: Place infant in supine position. Move each area of the body with flexion and extension movements with slow bicycling-like motion of Left arm, Right arm, Both arms, Left leg, Right leg and Both legs respectively (Fig.2).



Fig.2 Kinesthetic Stimulation

Studies evidenced the Benefits of tactile and kinesthetic stimulation

Tactile/kinesthetic stimulation was given to 20 preterm neonates (mean gestational age, 31 weeks; mean birth weight, 1,280 g; mean time in neonatal intensive care unit, 20 days) during transitional ("grower") nursery care, and their growth, sleep-wake behavior, and Brazelton scale performance was compared with a group of 20 control neonates. The tactile/kinesthetic stimulation consisted of body stroking and passive movements of the limbs for three, 15-minute periods per day for a 10 days. The stimulated neonates averaged a 47% greater weight gain per day (mean 25 g v 17 g), were

more active and alert during sleep/wake behavior observations, and showed more mature habituation, orientation, motor, and range of state behavior on the Brazelton scale than control infants. Finally, their hospital stay was 6 days shorter, yielding a cost savings of approximately \$3,000 per infant. These data suggest that tactile/kinesthetic stimulation may be a cost effective way of facilitating growth and behavioral organization even in very small preterm neonates.^[12]

A study conducted to determine the effects of tactile-kinesthetic stimulation to preterms on physiologic parameters, physical growth and behavioral development. 48 well preterms with birth weights between 1000-2000 grams were systematically allocated into test and control groups. Test babies received tactile-kinesthetic stimulation in the form of a structured baby massage from day 3 to term corrected age. They were observed for changes in vital parameters (heart rate, respiration, temperature and oxygen saturation) during the first few days of stimulation in hospital. Thereafter, massage was continued at home. Changes in weight, length and head circumference and neuro-behavior were assessed in both groups before, during and after the study period. Results revealed that an increase in heart rate (within physiologic range) was seen in the test group during stimulation. This group also showed a weight gain of 4.24 g/day more than controls, which was statistically significant. On the Brazelton Scale the test group showed statistically significant improved scores on the 'orientation', 'range of state', 'regulation of state' and 'autonomic stability' clusters at follow-up. No significant complications were noted. A positive correlation was found between the duration of stimulation in days and the weight gain in grams but this did not reach statistical significance. Tactile-kinesthetic stimulation when administered to well, preterm infants has a beneficial effect on growth and behavioral development with no adverse effects on physiologic parameters.^[13]

A randomized controlled trial with equal randomization (1:1 for two groups) and parallel group design was chosen to assess the effectiveness of tactile and kinesthetic stimulation (TKS) among low birth weight (LBW) neonates. Forty LBW neonates were randomly allocated into test (n = 20) and control (n = 20) groups. Tactile and kinesthetic stimulation was provided for three 15 minute periods per day for 10 consecutive days to the test group. There was a trend towards increased daily weight gain, but without statistical significance. Tactile and kinesthetic stimulation has no adverse effects on physiologic parameters and gives better adaptive behavior of LBW neonates compared to those without Tactile and kinesthetic stimulation.^[14]

Low Birth Weight neonates need complementary interventions like tactile kinesthetic stimulation to promote their development. With this objective a study was conducted to determine the effect of Tactile Kinesthetic Stimulation (TKS) on motor development of Low Birth Weight neonates.

In this clinical trial study, sample was made out of 40 inborn LBW neonates who were divided into two groups randomly. TKS was provided for three 15-minute periods per day for 10 consecutive days to the test group, with the massages consisting of moderate of pressure strokes in prone position and kinesthetic exercises consisting of flexion and extension of limbs in supine position. All measurements were taken before and after completion of the study with the same equipment and by the same person. Results indicated that motor behavior in the intervention group was significantly higher than the control group after the 10 days TKS (P-Value ≤ 0.0001). Tactile Kinesthetic Stimulation could be an effective intervention in development of motor behavior of LBW neonates. Because very little is known about neonate's behavior, it seems to need more studies in other aspects of behavior in LBW neonates.^[15]

A systematic review on Tactile Kinesthetic Stimulation collected studies from two databases, PEDro and PubMed, in July of 2014, in addition to bibliographies. Clinical trials that studied tactile stimulation or massage therapy whether or not associated with kinesthetic stimulation of preterm infants; that assessed weight gain after the intervention; that had a control group and were composed in English, Portuguese, or Spanish were included. A total of 520 titles were found and 108 were selected for manuscript reading. Repeated studies were excluded, resulting in 40 different studies. Of these, 31 met all the inclusion criteria. Many studies did not describe the adverse events that occurred during stimulation, the course of action taken when such events occurred, and their effect on the outcome. These studies made a relevant contribution towards indicating tactile/kinesthetic stimulation as a promising tool.^[16]

Conclusion

Tactile and kinesthetic stimulation is “non-invasive, does not require specialized equipment and can be implemented without undue disruption to routine care procedures. Though somewhat time consuming, massage can be undertaken by those without extensive training, including parents.” As it incorporates all the elements of parent-child bonding, it can be provided by the health professionals to the preterm infants admitted in the NICU in order to improve the overall wellbeing.

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