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INTERVENTIONAL PACKAGE ON PHYSIOLOGICAL, NEUROBEHAVIORAL PARAMETERS AMONG PRETERM BABIES - A MAPPING REVIEW

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INTRODUCTION

India contributes the highest number to the prematurity burden of the world., Each year about 3.6 million premature births occurs in India.Premature newborns or infants who are recovering from traumatic births are kept in the NICU in order to help them to grow and Thrive.

High-risk neonates are newborn babies who are likely to face the threats of health problems than any normal babies of their age. Also, they may have the hazard of suffering from co-morbidity and possibly fatal complications because of prenatal, natal, or postnatal conditions. The high-risk period starts from the time when the gestational age is 23 weeks up to 28 days after birth and interferes with normal development and threats to life and health.

Prematurity causes many neurobehavioral disabilities such as cerebral palsy, attention deficit hyperactivity disorder, autism, deafness and blindness occurring in up to 15% of preterm children. The rates of milder neurobehavioral disabilities occurred in areas including language, attention, social–emotional development and executive function, and developmental coordination disorder additionally occurs in higher rates in children born preterm.

The risk of neurobehavioral disabilities not only increases with decreased gestational age, but also with issues related to perinatal (e.g. brain injury and infection) and the environment (e.g. lower financial status and parenting) impacts. Both the neurological and

the medical factors play a vital role, and so the environmental and social factors become progressively critical.

Preterm neonates offers less time of growth or development in the uterus of mother the internal organs are not matured fully. Due to this, it will take few more weeks to the preterm neonates for further maturation of organs to lead a life without medical care .So the infant needs special care , until the organs have developed enough to keep the baby alive without medical support. This may take weeks to months.

Early intervention consists of AKTS that are given to newborn from birth to the early years of life. Interventions are mirroring the intrauterine environment that may have an advantageous impact on the development of preterm infants and help them to cope up better with the unfavourable environment .

AKTS is considered to be an interventional package that is closely related to the principles of sensory stimulation therapy, which is characterized by the arrangement of developmentally appropriate sensory inputs including auditory tactile and kinesthetic stimulation to preserve and encourage the development of existing simple abilities and to avoid or minimize the deleterious effects of the environment.

REVIEW OF LITERATURE Reviews related to auditory stimulation

Manuela Filippa (2019) conducted a study on negative effects of the recorded female voice on the tactile memory and discrimination of preterm infants with a postconceptional age of 28–35 weeks. During their stay in the neonatal intensive care unit (NICU), the infants had to discriminate between a familiar and unfamiliar object while 26 were simultaneously exposed to silence and two groups of 24 were exposed to a recorded female voice played at two different volumes, +5 and +15 decibels, inside their incubator. The major findings were that being exposed to the recorded female voice had a negative impact on their tactile sensory learning and these negative effects were not linked to the volume of the recording. Future research is needed so that we can understand whether live parental voices, directed and in careful interaction with the preterm infant, can facilitate this recognition task and in general,
can impact on preterm infants' cognitive and language development.

While vast changes in the neonatal intensive care unit (NICU) have occurred over the last two decades, little research has addressed the loss of exposure to maternal voice for the preterm infant. To address this gap, the researcher compared studies that directly investigated effects of exposure to maternal voice on preterm infants. All presented recordings of maternal voice at sound levels above current recommendations, and few of the findings reached statistical significance. Some potentially positive developmental effects were indicated. Future study of the effects of exposure to maternal voice on preterm infants using recommended sound levels is needed **(Charlene Krueger, 2010)**

Reviews related to Kinesthetic & Tactile stimulation

In a study forty preterm infants were subjected to tactile/ kinaesthetic stimulation of 45 minutes per day (three sessions of 15 minutes each) for 10 days. It was observed that infants who received massage had 21% greater weight gain. Most of the studies have enrolled medically stable infants>30 weeks of gestation. Infants who receive massage therapy appear more alert and spend less time in sleep **(Scafidi, et al., 2014).**

Vanessa C Pepino, (2015) verified the methods used by the clinical trials that assessed the effect of tactile/kinesthetic stimulation on weight gain in preterm infants and highlight the similarities and differences among such studies. There were many differences in the application of tactile/kinesthetic stimulation techniques among studies, which hindered the accurate reproduction of the procedure. Also,

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. Nevertheless, there was no standard for application among them. Future studies should raise the level of methodological rigor and describe the adverse events. This may permit other researchers to be more aware of expected outcomes, and a standard technique could be established.

Farouk El-Sayed Hassanein, (2015) conducted a study to assess impact of tactile stimulation on neurobehavioral development of premature infants in Assiut City. The study subjects included a convenient sample of 50 premature infants divided into study or control groups and they were matched with gestational age and birth weight. Brazelton Neonatal Behavioral Assessment Scale is used to assess neurobehavioral development of infants from birth to two months of age. Neurobehavioral development using Brazelton's Neonatal Behavior Assessment Scale (NBAS) was assessed at initial contact and after 5 days of intervention and on discharge. Results showed that the premature infants of the study had better neurobehavioral development than those in the control group with statistical significant differences were found between the study and the control groups. It was concluded from the findings of the current study that premature infants who received tactile stimulation had better neurobehavioral development than those who didn't receive it and had only the hospital routine care.

In the present study, we hypothesized that preterm and early-term infants may show altered tactile sensitivity. We compared the behavioral responses around termequivalent age of infants born either pre-term, early-term or at term to the application of a light (0.008 grams) mechanical stimulus. We found that almost all preterm infants perceive this tactile stimulus, contrarily to the two other groups of infants. This extreme tactile sensitivity may be due to experiential, maturational or more likely both processes. This finding opens not only new insights in understanding development of tactile processing, but also new lines of thought about the particular sensory world of premature and early-term infants and hence about the potential impact of early care practices **(Andre V, Durier V, 2020).**

A V.Kale,Kalikivaya aveenakumar et.al.,(2016) conduted a study on effect of oil massage therapy (tactile and kinesthetic stimulation) in low birth weight preterm neonates . The aim to determine whether massage therapy promotes weight gain in preterm low birth weight neonates . Randomized control trial was conducted on randomly selected 28-36 weeks neonates at NICU of MGM Hospital ,Aurangabad among 216 preterm **low birth** weight neonates and study showed that daily weight changes among massage group compare to control group.

Nariae Balik - Schneditz et.al.,(2018) conducted a study to analyzed tactile stimulation during neonatal transition and resuscitation in preterm and term neonates born by Caesarean delivery .It examined the frequency ,location and body region, duration and possible effects of stimulation on heart rate and arterial stimulation . Term infants received tactile stimulation more than once and it tend to start later last longer and be applied in more locations than in preterm infants . Only preterm infants showed a significant increase in SpO2 after stimulation

Andreia M Ferreira , Nielsy HP Bergamasco (2010) has conducted a study to evaluate the effect of tactile and kinesthetic stimulation on behavioural and clinical development in preterm neonates . 23 clinically stable preterm infants weighing < 2500 grams with no significant perinatal asphyxia , were allocated to two groups. Data on the infants clinical progress were collected from medical charts and behavioral evaluations by means of a series of weekly ,eight minute films recorded from the time of inclusion in to the study . The study showed increased daily weight gain and a predominance of self -regulated behavior (regular breathing , state of alertness, balanced tonus , a range of postures , coordinated movements , hand - to - face movement control, suction . grip, support)in infants . In the hospital , tactile and kinesthetic stimulation was shown to have positive effect, contributing towards adjustment and self regulation of behavior in the preterm newborn infant.

Umarani J(2019) .,This study aimed to assess the effectiveness of tactile and Kinesthetic stimulation on physio behavioural parameters of preterm neonates admitted in the Neonatal Intensive Care Unit. Intervention group neonates were given 30 minute tactile and Kinesthetic stimulation per day for seven

days along with the routine care of the NICU. The control group babies were given the routine care. Pre and post-test assessment of physio-behavioral parameters were recorded for both the groups. At the end of the 7th day the mothers of the control group babies were demonstrated about the tactile and Kinesthetic stimulation.Results: There was a significant difference in the weight on 7th day and in all the days significant difference found in the temperature, heart rate, and oxygen saturation between the intervention and control group at Plt0.05 level. It was also found there was a significant difference found in the behavioural parameters between the intervention and control group at Plt 0.05 level.

Majella Livingston L M (2014)., the study was conducted to evaluate the effect of tactile and auditory stimulation among preterm neonates and those who received it will experiences more significant weight gain, stable temperature, stable heart rate, stable respiratory rate, oxygen saturation, improved feeding pattern, increased sleeping time, decreased crying spells and increased urination compared to control group.The results found that the preterm neonates, who received tactile and auditory stimulation achieved weight gain (t = 35.368), stable temperature (t = 55.865), stable heart rate (t = 40.948), stable respiratory rate (t = 41.078), stable oxygen saturation (t
=43.937), increased feeding pattern (X2 = 26.612), increased sucking pattern (X2 =
30.572), increased duration per sleep (X2 = 43.364), increased sleeping pattern (X2 =
56.885), decreased crying pattern (X2 = 48.553) and increased urination pattern (X2 = 58.989) than control group preterm neonates. These results were statistically significant at 0.05 level.

Eman k Mohamad (2018) ., The aim of this study was to investigate the effect of multisensory stimulation programme on neurobehavioral development in high-risk neonates. A prospective randomized controlled trial was conducted on 40 high-risk neonates, who were selected from NICUs, with mean gestational age of33±1.03 weeks according to new Ballard score and mean weight 1442±228.5 g. They were allocated into either the control group or the study group. The control group received routine medical and nursery care in the NICU, whereas the study group received the same programme given to the control group in addition to the multisensory stimulation programme given daily for 2 successive weeks. The outcomes were measured before and after the intervention by Morgan neonatal neurobehavioral examination and Brazelton neonatal behavioural assessment scale. There was a significant improvement in all measured variables in the study group after the intervention programme (P<0.05) except in the state regulation and autonomic system, whereas the control group showed no significant difference in all measured variables except in weight gain.Multisensory stimulation improved neurobehavioral development in high-risk neonates. This could be a vital part of the routine neonatal physiotherapy for preterm and high-risk neonates.

Conclusion:

Tactile and Kinesthetic stimulation is a safe therapy, it can be implemented to the preterm neonates admitted in the Neonatal Intensive Care Unit. AKTS that are accompanied by positive outcomes in physiological and neurobehaviuoral responses. As a result AKTS have been recommended as strategies in the NICU to promote growth and development .

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