



AN INTERVENTIONAL OBSERVATION STUDY TO ASSESS THE TACTILE SENSITIVITY AMONG PRETERM, EARLY TERM AND AT TERM NEONATES IN SELECTED HOSPITAL AT NAVI MUMBAI

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ABSTRACT

Background & Aim of the work: Neonates, especially high-risk neonates, have been considered lack of sensory perception. In spite of a growing body of research on perinatal sensory abilities, data on the degree of tactile sensitivity and more particularly tactile stimulation (i.e., sensitivity to a stimulation imposed on the skin) are still scarce. As a result, it is still unclear how the tactile sensitivity interferes in the physiological and neurobehavioral activity of neonates. The present study was aimed to evaluate tactile sensitivity among preterm, early term and at term neonates.

Materials and Methods: The Quantitative evaluatory approach with One-group pretest and post-test design was used in this study. The sample size was 90 (preterm babies: 30, early term: 30 and at term: 30) neonates at NICU unit. The samples were selected by using non probability purposive sampling method. The observational tool (Physiological parameters and Modified Neonatal Brazelton Neuro Behavioural Assessment Scale) was used in this study. Content validity and reliability of the tool was assessed. The data was analyzed and tabulated by using descriptive (frequency percentage distribution, Mean, median and standard deviation) and inferential statistics (Wilcoxon Signed rank test).

Results: The present study revealed that tactile sensitivity with physiological parameters the majority of the preterm (before: 56.7%; after: 63.3%), early term (before: 66.7%; after: 40%) and at term babies (before: 93.3%; after: 16.7%) had moderate tactile sensitivity before and after tactile stimulation. But in Neuro-behavioral Parameters the majority of the preterm (before: 93.3%; after: 63.3%) had moderate tactile sensitivity; whereas in early term (before: 60%; after: 83.3%) and at term baby's (before: 50%; after: 93.3%) majority of them showed high tactile sensitivity after tactile stimulation. The statistically significant difference ($p < 0.05$) of the physiological parameter such as temperature in preterm and early term whereas, oxygen saturation in all three neonates and tactile sensitivity was seen only in preterm babies. The

statistically significant difference ($p < 0.05$) of the behavioral parameter such as passive movements of legs and tactile sensitivity was seen in preterm and at term babies whereas, feeding pattern was seen in early term and at term babies. The statistically significant difference ($p < 0.05$) of the Neuro item such as sucking reflex and rooting reflex only was seen at term babies.

Conclusion/Implication for Practice: This study findings suggest that nurses who work in NICU should provide appropriate tactile stimulations (neither more; nor less) for the development of the neonates.

Keywords: Tactile sensitivity, tactile stimulation, preterm, early term and at term, Physiological parameters, Neonatal Neuro Behavioral items.

INTRODUCTION & NEED OF THE STUDY

The tactile (touch) sense is a result of skin receptors that receive and transmit information about pressure, vibration, texture, temperature, pain, and limb position. A certain shirt's fabric, for instance, could be soft to some people but harsh and uncomfortable to individuals who have tactile (touch) discrimination.

The word “tactile” refers to the sense of touch, and tactile dysfunction also known as tactile sensitivity. It is a form of sensory dysfunction that causes that sense to be heightened to the point of discomfort or even pain. Preterm with tactile dysfunction feel certain sensations stronger than others. Children constitute the most important and vulnerable segment of our population; they are truly the foundation of our nation. Hence the focus of every citizen should be to promote their health and safeguard their interests. So, every unborn child should be allowed to achieve his /her optimal growth and development potential, so that they can effectively contribute towards nation's productivity the future of our nation depends on the way in which we nurture our children today¹.

There are many circumstances imposed on the usual course of events surrounding birth and extra uterine existence, the physiological parameters show a higher deviation from normal findings in infants who are low birth weight and other higher risk, babies have a greater than average chance of morbidity and mortality, which can occasionally result in a lifetime of disability².

Preterm birth rates are currently around 21% in India, where they are on the rise. The major cause of infant deaths and the second-leading cause of death in children under the age of five, behind pneumonia, is preterm. With roughly 36 million premature births accounting for 23.6% of the approximately 15 million preterm births reported globally each year, 13% of which are live preterm births, India is the country with the highest preterm burden. CSSM., (2010) In 2010, India accounted for over 24%, or one in every four preterm births worldwide. Preterm birth rates were greatest in India. Almost 13% of all Indian babies were delivered prematurely³.

Low birth weight preterm neonates are more vulnerable to sepsis, Retinopathy of Prematurity (ROP), Necrotizing Enterocolitis (NEC), Apnoea, and Bradycardia, as well as Chronic Lung Disease, Pneumonia, Jaundice, Intraventricular Haemorrhage (IVH), inability to

regulate body temperature, immature gastrointestinal and digestive systems, Anaemia , and Patent Ductus Arteriosus (PDA). The most frequent issue with preterm neonates who were born with low birth weight is weight loss. An individual's physical and mental health depends on the proper handling of prenatal events. To increase newborns' weight, a variety of therapeutic techniques are available. One of the complementary treatments for weight gain is massage⁴

All babies, even the tiniest and sickest, require loving human contact. Research has shown that when premature or low birth weight babies receive routine care in the hospital, their pulse rate increases and their oxygen levels decrease, indicating distress. On the other hand, when these same babies receive massage therapy, the opposite occurs: their pulse rate comes down to stable and their oxygen levels rise, suggesting that they find massage to be calming and soothing⁵.

Infancy is a time when learning about the world is primarily done through touch. The nurturing qualities of touch and massage are especially beneficial for infants who have undergone numerous medical interventions. Beginning with hand containment, therapy is followed by massaging any parts of the body that may have experienced unpleasant stimuli. The implications of low-intervention Touch Therapy should not be disregarded in a setting where health care protocols and costs are closely examined and preventative care is more strongly stressed. The average newborn sleeps for 21 to 22 hours per day, and preterm infants sleep for 22 to 23 hours per day within a 24-hour period. Because they are less awake and active than regular babies, preterm babies sleep more⁶

RESEARCH METHODOLOGY

The research design used for this study was One-group pretest and post-test design. The research approach was Quantitative evaluatory approach which was conducted at D Y Patil Hospital Nerul, Mumbai, focusing in NICU. Conceptual framework adopted in the present study was Modified J.W. Kenny's Open System Model (1990). The sample size was 90 (preterm babies: 30, early term: 30 and at term: 30) neonates. The samples were selected by using non probability purposive sampling method. The observational tool (Physiological parameters: Temperature, Pulse, Respiration and Oxygen Saturation and Modified Neonatal Brazelton Neuro Behavioural Assessment Scale) was used in this study before and after tactile stimulation. Content validity and reliability of the tool was assessed. The reliability score for Brazelton Neonatal Neuro Behavioural Assessment Scale $r = 0.98$, and the Physiological parameters $r = 0.86$ was determined by inter rated method. Nine samples were used in a pilot study to determine the feasibility of the study and the positive result were seen. The data was analyzed and tabulated by using descriptive (frequency percentage distribution, Mean, median and standard deviation) and inferential statistics (Wilcoxon Signed rank test).

RESULTS

Demographic Variables of the Respondents

Table 1: Frequency and Percentage Distribution of the Demographic Variables of the Respondents

(N=90)

Demographic Variables	Pre-Term		Early Term		At term		Total		Mean Average (\bar{X})
	F	%	F	%	f	%	F	%	
Gender									
Female	14	46.7	15	50.0	15	50.0	44	48.9	
Male	16	53.3	15	50.0	15	50.0	46	51.1	
Total	30	100.0	30	100.0	30	100.0	90	100.0	
Gestational Age (weeks)									
32 – 34	12	40.0	0	0.0	0	0.0	12	13.3	34.5
35 – 37	18	60.0	22	73.3	1	3.3	41	45.6	37.3
≥38	0	0.0	8	26.7	29	96.7	37	41.1	38.8
Types of Delivery									
LSCS	21	70.0	23	76.7	11	36.7	55	61.1	
Normal	9	30.0	7	23.3	19	63.3	35	38.9	
Weight (grams) of Babies									
<1500	4	13.3	0	0.0	0	0.0	4	4.4	2100.7
1500 – 2499	18	60.0	12	40.0	8	26.7	38	42.2	
2500 – 3499	8	26.7	16	53.3	22	73.3	46	51.1	2584.2 & 2686.2
≥3500	0	0.0	2	6.7	0	0.0	2	2.2	

Types of Feeding									
Breast Feeding	13	43.3	15	50.0	18	60.0	46	51.1	
EBM with Wati Feeding	10	33.3	9	30.0	4	13.3	23	25.6	
Formula Feed	7	23.3	6	20.0	8	26.7	21	23.3	

Table 1 deals with the frequency and percentage distribution of the demographic variables of the respondents who took part in the upcoming study “An interventional observational study to assess the tactile sensitivity among preterm, early term, and at-term in selected Hospitals at Navi Mumbai”.

Under the category “Gender”,

Among Preterm babies, out of 30 samples, majority of the babies were male 16 (53.3%) and 14 (46.7%) of them were female. In Early Term babies, out of 30 sample, 15 (50%) of them females and 15 (50%) of them are male. At Term babies, out of 30 sample, 15 (50%) of them females and 15 (50%) of them are male. From this study findings the researcher found that the ratio of the male neonates is higher than female in preterm babies.

Under the category “Gestational Age (in weeks)”,

Among Preterm, Majority [18 (60%)] of the respondents belonged to the gestational age of 35 - 37 weeks and the mean average is 34.5 weeks, whereas in Early Term [22 (73.3%)] belonged to the gestational age of 35 - 37 weeks and the mean average is 37.3 weeks. At Term babies, Majority of the babies belonged to the gestational age of ≥ 38 weeks and the mean average is 38.8 weeks.

Under the category “Types of Delivery”,

It was observed that huge number of high-risk neonates were delivered by cesarean section than normal delivery (Preterm: 70% & Early term: 76.7%). Whereas, 19 term babies (63.3%) were born through Normal Delivery.

Under the category “Weight (gram) of Babies”,

Among Preterm babies, majority of the babies 18 (60.0%) were born with a weight between 1500 – 2499 grams and the mean average is 2100.7gms. Early Term [16(53.3%); \bar{X} : 2584.2gms] & At Term babies [46(51.1%); \bar{X} : 2686.2 gms] were born with a weight between 2500 – 3499 grams.

Under the category “Types of Feeding”,

13 (43.3%) Preterm babies were breastfed, 10 (33.3%) were fed with Expressed Breast milk with Wati – spoon and 7 (23.3%) were fed with formula feeds. Among Early Term babies, 15 (50%) were breastfed, 9 (30%) were fed with EBM with Wati – spoon and 6 (20%) were fed with formula feeds and, among At Term babies, 15 (50% A) were breastfed, 9 (30%) were fed with EBM with Wati – spoon and 6 (20%) were fed with formula feeds,

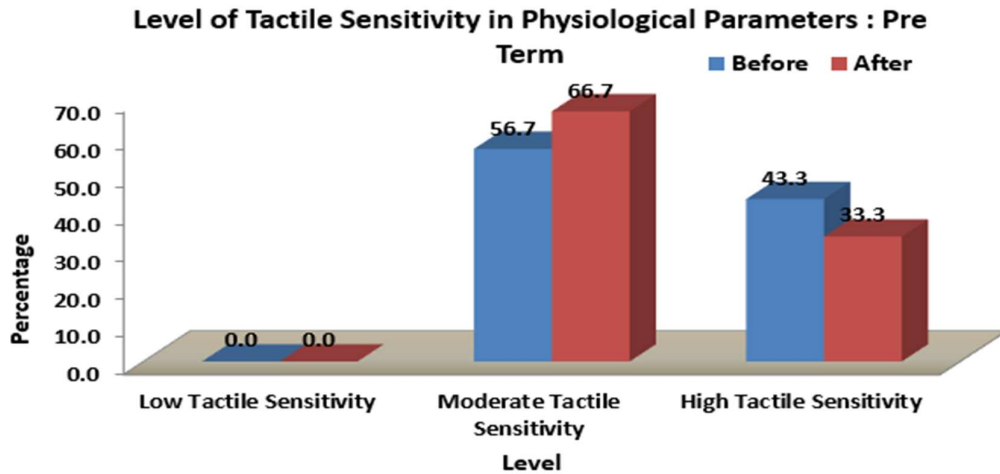


Figure 1: Comparison of Tactile Sensitivity with Physiological Parameters among Preterm Babies Before and After Tactile Stimulation

Figure 1 depicts the percentage wise comparison of tactile sensitivity with physiological parameters among preterm babies before and after tactile stimulation. Majority of the babies showed moderate tactile sensitivity 56.7% and 43.3% showed high tactile sensitivity before the intervention. Whereas, 66.7% of the babies showed moderate tactile sensitive and 33.3% showed high tactile sensitivity after the intervention.

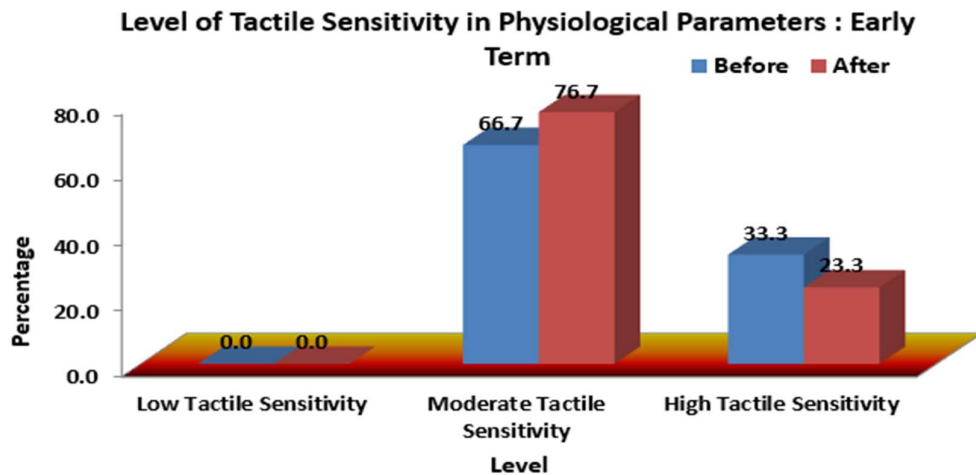


Figure 2: Comparison of Tactile Sensitivity with Physiological Parameters among Early Term Babies Before and After Tactile Stimulation.

Figure 2 depicts the percentage wise comparison of tactile sensitivity with physiological parameters among early term before and after tactile stimulation. Majority of the babies showed moderate tactile sensitivity 66.7% and 33.3% showed high tactile sensitivity before the intervention. Whereas, 76.7% of the babies showed moderate tactile sensitive and 23.3% showed high tactile sensitivity after the intervention.

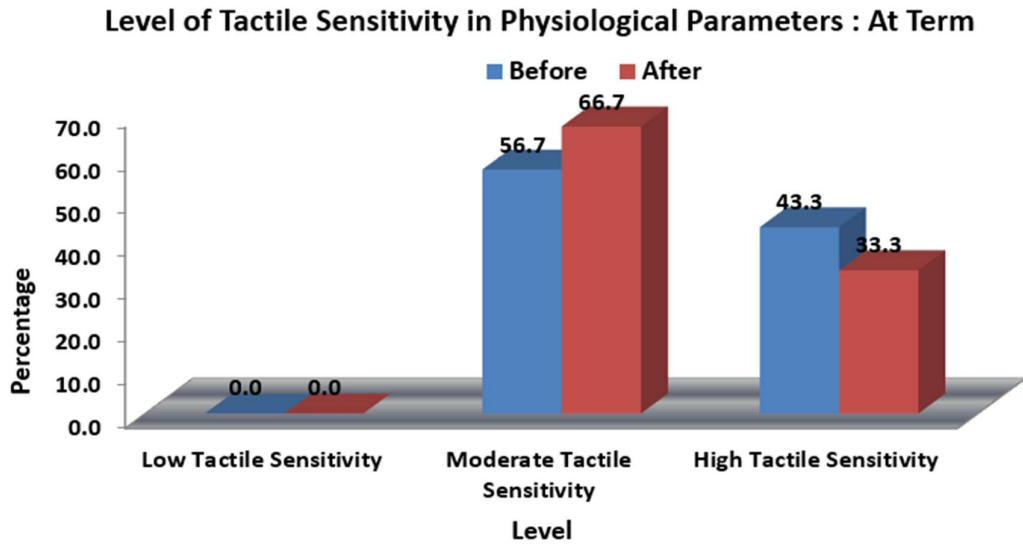


Figure 3: Comparison of Tactile Sensitivity with Physiological Parameters among At Term Babies Before and After Tactile Stimulation

Figure 3 depicts the percentage wise comparison of tactile sensitivity with physiological parameters among at term babies before and after tactile stimulation. Majority of the babies showed moderate tactile sensitivity 56.7% and 43.3% showed high tactile sensitivity before the intervention. Whereas, 66.7% of the babies showed moderate tactile sensitive and 33.3% showed high tactile sensitivity after the intervention.

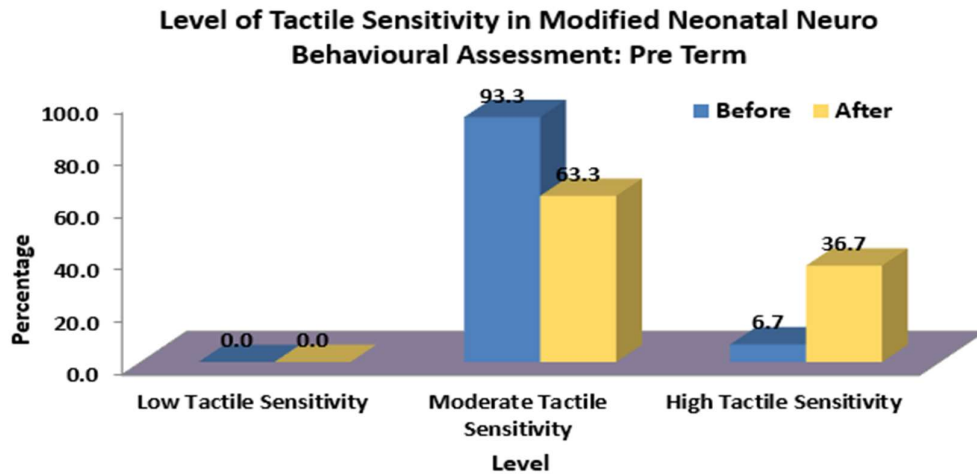


Figure 4: Comparison of Tactile Sensitivity with Neuro Behavioural Parameters among Preterm Babies Before and After Tactile Stimulation

Figure 4 depicts the percentage wise comparison of tactile sensitivity with neuro behavioural parameters among preterm babies before and after tactile stimulation. Majority of the babies showed moderate tactile sensitivity 93.3% and 6.7% showed high tactile sensitivity before the intervention. Whereas, 63.3% of the babies showed moderate tactile sensitive and 36.7% showed high tactile sensitivity after the intervention.

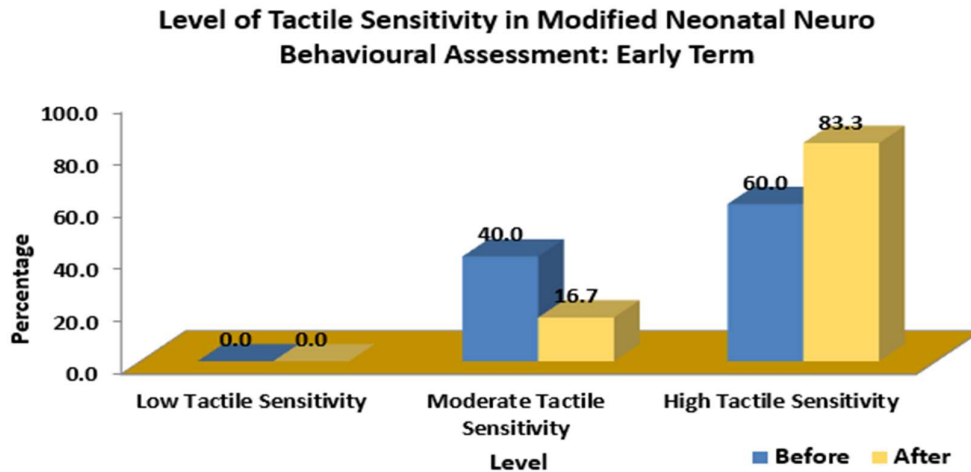


Figure 5: Comparison of Tactile Sensitivity with Neuro Behavioural Parameters among Early Term Babies Before and After Tactile Stimulation.

Figure 5 depicts the percentage wise comparison of tactile sensitivity with neuro behavioural parameters among early term babies before and after tactile stimulation. Majority of the babies showed moderate tactile sensitivity 40% and 60% showed high tactile sensitivity before the intervention. Whereas, 16.7% of the babies showed moderate tactile sensitive and 83.3% showed high tactile sensitivity after the intervention.

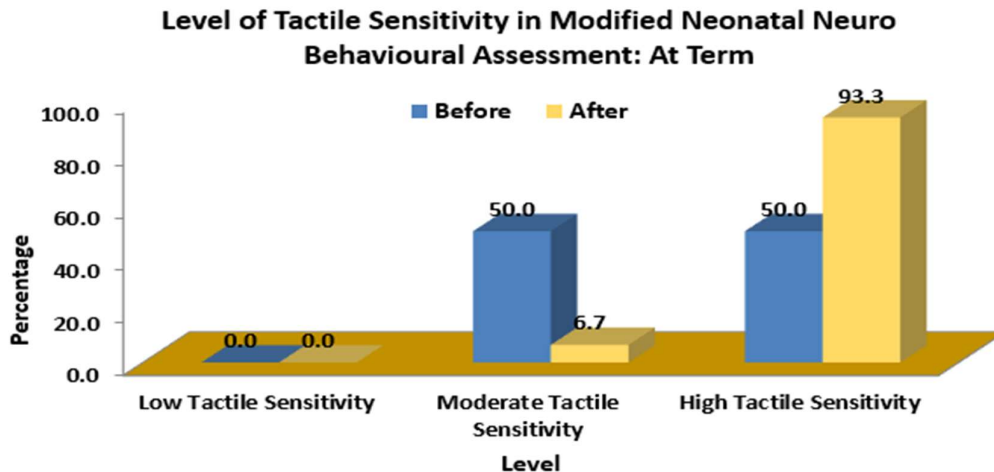


Figure 6: Comparison of Tactile Sensitivity with Neuro Behavioural Parameters among At Term Babies Before and After Tactile Stimulation

Figure 6 depicts the percentage wise comparison of tactile sensitivity with neuro behavioural parameters among at term babies before and after tactile stimulation. Majority of the babies showed moderate tactile sensitivity 50% and 50% showed high tactile sensitivity before the intervention. Whereas, 6.7% of the babies showed moderate tactile sensitive and 93.3% showed high tactile sensitivity after the intervention.

DISCUSSION

Despite a growing body of research on neonatal sensory abilities, data on the extent of tactile sensitivity and more particularly passive touch (i.e., sensitivity to a stimulation imposed on the skin) are relatively limited, and the development and processing of tactile function are still thus little known. This question is particularly of high importance for those born prematurely who are exposed to many sensory especially tactile stimulations being in a hospital setting during a critical period of brain development.

The present study revealed that tactile sensitivity with physiological parameters the majority of the preterm, early term and at term babies had moderate tactile sensitivity. But in Neuro-behavioral Parameters the majority of the preterm babies had moderate tactile sensitivity; whereas in early term and at term baby's majority of them showed high tactile sensitivity before and after tactile stimulation. The statistically significant difference ($p < 0.05$) of the physiological parameter such as temperature in preterm and early term whereas, oxygen saturation in all three neonates and tactile sensitivity was seen only in preterm babies. This study findings supported by another pilot study was conducted by Vanessa Andre et.al, in their study hypothesized that preterm and early term infants may show altered tactile sensitivity. These results contribute the understanding of the development and processing of tactile function. They open new lines of thought about tactile sensitivity and may be significant importance for obstetricians, midwives and child psychiatrist.

The statistically significant difference ($p < 0.05$) of the behavioral parameter such as passive movements of legs and tactile sensitivity was seen in preterm and at term babies whereas, feeding pattern was seen in early term and at term babies. The statistically significant difference ($p < 0.05$) of the Neuro item such as sucking reflex and rooting reflex only was seen at term babies. These findings suggest that the babies admitted in NICU are already sensitive to tactile stimulation even before providing the stimulation. However, all the neonates are exposed to moderate to high tactile sensitivity. Henceforth the NICU atmosphere has to be favourable for the development of the neonate by practicing appropriate tactile stimulation, clustering of care & quiet time.

Implication for Nursing Practice: The study findings are significant for nursing practice, research, education and administration in a variety of context.

- The findings of the study can motivate or initiate nurse administrator to develop integrative neonatal care model for appropriate tactile stimulation (neither more or nor less) in neonates especially preterm babies or high-risk neonates.
- Nurses can incorporate appropriate tactile stimulation with routine NICU care of the neonates. Cluster care as tolerated to provide long periods of undisturbed rest. Recognize signs of stress and sensory overload. Respond to stress cues during handling with containment holds and time-outs. Appropriate touch and cluster of care can be utilized to minimize the sensitivity in newborn. Therefore, quiet time is recommended.
- And also, to provide in-service education for neonatal nurse to make them to understand the tactile process for neurodevelopment of the neonates.

- With this baseline data there should be more studies to be carried out for better understanding of the impact of tactile sensitivity for the development of the neonates.

LIMITATION

The present study has some limitations:

- The researcher was unable to control the extraneous variables of other stimuli which may also interfere with the study findings. This may be control by selecting appropriate design.

RECOMMENDATION

Based on the present study, the investigator suggests the following recommendations for further studies.

- A factorial study can be performed between various stimulations like auditory, visual, tactile room temperature, etc.
- A similar study can be conducted to evaluate neonatal sensitivity levels with other stimulation like auditory, visual, room temperature, etc.
- For generalization, the current study can be repeated with more participants.

CONCLUSION

The researcher concluded that majority of the preterm babies had high tactile sensitivity after tactile stimulation than before; while in early term and at term babies showed moderate tactile sensitivity was observed before and after tactile stimulation, which suggest that the babies admitted in NICU are already sensitive to tactile stimulation even before providing the stimulation. However, the preterms are more sensitive than early term and at term neonates. Henceforth the NICU atmosphere has to be favourable for the development of the neonate by practicing cluster care & quiet time. This study findings suggest that nurses who work in NICU should provide appropriate tactile stimulations (neither more; nor less) for the development of the neonates.

Conflict of Interest: There are no conflicts of interest

Author's Contributions: For the research concepts, design, data collecting, and analysis, Miss Anuja Deepak Saraf, Dr. Deepa Reddy and Ms. Nimi Susan Thomas.

Acknowledgement: The researcher gratefully acknowledges the assistance of Dr. (Prof.) Deepa Reddy and Ms. Nimi Susan Thomas for their prompt assistance and a stute direction incompleting the project. Sincere appreciation to NICU Intensivist Dr Sheetal Kolhe, Medical Superintendent Dr. Sachin Gadkari, Nursing Superintendent Ms. Surekha Madhave and NICU team of D.Y. Patil Hospital and study participants for their participation and cooperation.

References:

1. Behrman RE, Butler AS, Institute of Medicine (US) Committee on Understanding Premature Birth and Assuring Healthy Outcomes. Mortality and acute complications in preterm infants. Washington, DC, DC: National Academies Press; 2007. References.
2. Griffin OT; 2018 [cited Sep 14 2023]. Available from: <https://www.griffinot.com/what-is-tactile-defensiveness/References>.
3. Preterm birth [internet]. Who.int [cited Sep 14 2023]. Available from: <https://www.who.int/news-room/fact-sheets/detail/preterm-birth>.
4. Institute of Medicine (US) Committee on Understanding Premature Birth and Assuring Healthy Outcomes. Preterm birth: causes, consequences, and prevention. Washington, (DC): National Academies Press. US; 2007. 10, Mortality and Acute Complications in Preterm Infants Behrman RE, Butler AS, editors. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK11385/>.
5. Cheng CD, Volk AA, Marini ZA. Supporting fathering through infant massage. *J Perinat Educ*. 2011;20(4):200-9. doi: 10.1891/1058-1243.20.4.200, PMID 22942622.
6. Every [cited Sep 14 2023]. Available from: [preemie.org](https://www.everypreemie.org/wp-content/uploads/2015/04/Profiles.png). Available from: <https://www.everypreemie.org/wp-content/uploads/2015/04/Profiles.png>.
7. Guinsburg R, de Almeida MFB, Finan E, Perlman JM, Wyllie J, Liley HG et al. Tactile stimulation in newborn; 2022.
8. Guinsburg R, de Almeida MFB, Finan E, Perlman JM, Wyllie J, Liley HG et al. Tactile Stimulation in Newborn Infants with inadequate respiration at birth: A systematic review. *Pediatrics*. 2022; 149(4):e2021055067. doi: 10.1542/peds.2021-055067, PMID 35257181.
9. André V, Durier V, Beuchée A, Roué JM, Lemasson A, Hausberger M et al. Higher tactile sensitivity in preterm infants at term-equivalent age: A pilot study. *PLOS ONE*. 2020; 15(3):e0229270. doi: 10.1371/journal.pone.0229270, PMID 32134950.
10. Pepino VC, Mezzacappa MA. Application of tactile/kinesthetic stimulation in preterm infants: a systematic review. *J Pediatr (Rio J)*. 2015;91(3):213-33. doi: 10.1016/j.jpeds.2014.10.005, PMID 25677214