



Effect of Semi-Structured Sensory Program in Premature Infants: Experimental Study

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Abstract

The aim of the study is to find out the efficacy of developed semi structured sensory enrichment intervention over premature infants an early first year of life for the sensory development and to evaluate the difference between semi structured sensory enrichment intervention and conventional occupational therapy intervention on premature Indian infants. This study was carried out as a quasi-experimental study where the participants were divided into an experimental group (n=23) who were subjected to the intervention program and the second control group (n=23) were subjected to conventional occupational therapy which was conducted for a period of 3 months and the outcomes were measured using Infant/Toddler Sensory Profile (ITSP). The results obtained indicate that there are significant differences from the baseline and post-intervention for all categories indicating notable enhancements in sensory processing abilities after the intervention in the experimental group. These findings suggest that while both the Experimental and Control groups exhibited significant improvements in sensory processing abilities post-intervention, there were no significant differences in sensory profile outcomes between the two groups. The findings of this study contribute valuable insights into the efficacy of interventions targeting sensory processing in toddlers. The results underscore the importance of early intervention programs in promoting healthy sensory development in young children.

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INTRODUCTION:

Preterm infants are defined by the World Health Organisation as newborns born before 37 weeks of pregnancy. Due to their early birth, these babies may experience a variety of perinatal health problems. These problems can include difficulties with attention, behaviour, and sensory processing as well as difficulties with social-emotional development, thinking abilities, movement, brain function, speech, and language acquisition. When it comes to the structure of sensory information processing, preterm newborns are more vulnerable to difficulties during the CNS organizational stage. Touch, taste, smell, hearing, and eventually vision are the sequence in which the sense organs develop(3,4).When an infant is born very preterm, at

around 23 weeks, they often have greater problems with their sensory processing than when they are born at 33 weeks, which is closer to full term. Numerous behaviours are indicative of Sensory Processing Disorder, such as constant weeping and uncontrollably fussy behaviour, difficulties soothing themselves, trouble falling asleep, trouble accepting food, heightened anxiety about being away from parents, conspicuously prolonged shyness around strangers, resistance to routine changes, and a general lack of interest or passivity in social situations. These people may still struggle with issues from their early years as adults. The Early Intervention Sensorimotor Development Intervention provides a framework for clinical decision-making.

AIM AND OBJECTIVES:

To find out the difference between semi-structured sensory enrichment intervention and conventional occupational therapy intervention on premature Indian infants and To evaluate the difference between semi structured sensory enrichment intervention and conventional occupational therapy intervention on premature Indian infants.

METHODS AND MATERIALS:

Participants: The study was conducted at Apollo and Santhosh Hospitals over a period of 3 months and the participants were included based on the criteria: (a) The study includes birth weight of 800gm to 2500 gm population, (b) gestational age of 28 to 34 weeks and corrected age of birth to 12 months, (c) both male and female children, (d) medically stable Population while the inclusion criteria includes: (a) participants with previous occupational therapy or Sensory intervention population, (b) participants with functional hearing and vision impairment, (c) more than 1 year of age. Parental consent and information were provided to the parents as well. At the start of the study, 128 participants were included and then due to unwillingness to participate and due to the exclusion criteria, 74 participants were excluded from the study and were divided into experimental group (n=64) and control group

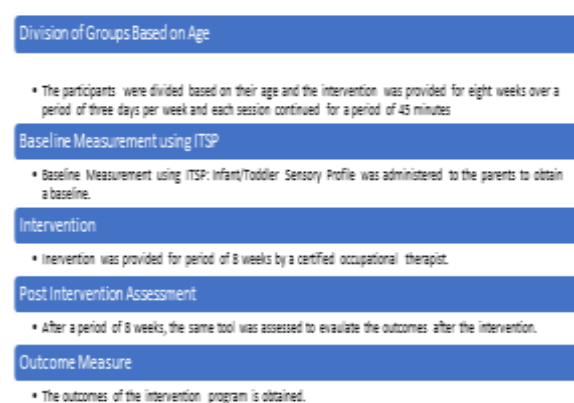


Table 1. Treatment protocol of Semi-Structured Sensory Program

Materials: The Infant / Toddler Sensory Profile (ITSP) was developed to evaluate sensory processing patterns in the very young the results provide understanding of how sensory processing affects the daily functioning performance. The Infant/Toddler Sensory Profile consists of 36 items for children birth to 6 months and 48 items. the caregiver questionnaire contains items divided into sensory systems. Below are the groups and exercises are given below.

RESULTS:

Table 2.1 provides an overview of the demographic details of the Infant Group, including both the Experimental and Control groups. The mean age of infants in the Experimental group was 4.15 months, slightly higher than the Control group's mean age of 4.07 months. The Experimental group comprised 18 males and 9 females, while the Control group had 15 males and 12 females.

Group	Mean Age (months)	No. of Males	No. of Females	Mean Mother's Age	Mother's Occupation					
					Doctor	Housewife	Teacher	IT	Business	Healthcare
Experimental	4.15	11	9	29.11	4	7	5	7	4	0
Control	4.07	15	12	29.25	4	7	4	8	3	0

Table 2.1 Demographic Details of Infant Group

Table 2.2 illustrates the pre-test and post-test comparison of the Infant/Toddler Sensory Profile (ITSP) scores within the Experimental Infant group and the Control Infant group. In the Experimental group, the pre-test mean score was 61.96 (SD = 2.85), which significantly decreased to 56.04 (SD = 2.85) in the post-test assessment ($t = 16.24$, $p < 0.001$), indicating a significant improvement in sensory processing abilities following the intervention. Similarly, in the Control group, the pre-test mean score was 61.88 (SD = 2.64), and it decreased to 59.74 (SD = 2.64) in the post-test assessment ($t = -4.95$, $p < 0.001$), also demonstrating a significant improvement in sensory processing abilities over time. These results suggest that both the Experimental and Control groups experienced notable improvements in sensory processing abilities, as evidenced by the significant changes in ITSP scores from pre-test to post-test assessments.

Group	Pre-test Mean \pm SD	Post-test Mean \pm SD	t-value	p-value	Result
Experimental	61.96 \pm 2.85	56.04 \pm 2.85	16.24	<0.001	Significant
Control	61.88 \pm 2.64	59.74 \pm 2.64	-4.95	<0.001	Significant

Table 2.2 Pre-test and Post test comparison of ITSP in Experimental Infant group in both graphs and values

In Table 2.3, presents the pre-test comparisons between the Experimental Infant group and the Control Infant group in terms of their mean ITSP scores. The Experimental group had a pre-test mean score of 61.96 (SD = 2.85), while the Control group had a slightly lower pre-test mean score of 61.88 (SD = 2.64). The t-value for the comparison was 0.107, with a p-value of less than 0.001, indicating that the difference between the two groups was not statistically significant. Thus, there were no significant differences in sensory processing abilities between the Experimental and Control Infant groups at the baseline assessment.

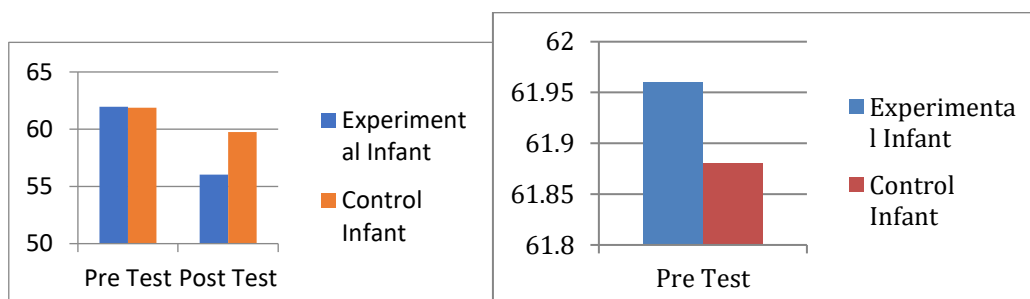


Table 2.3 Pre-test comparisons of Experimental Infant group and Control Infant group

Table 2.4 illustrates the post-test comparisons between the Experimental Infant group and the Control Infant group regarding their mean ITSP scores. The Experimental group exhibited a post-test mean score of 56.04 (SD = 2.85), while the Control group had a higher post-test mean score of 59.74 (SD = 2.64). The t-value for the comparison was 0.107, with a p-value of less than 0.001, indicating that the difference between the two

groups was statistically significant. Thus, there were notable differences in sensory processing abilities between the Experimental and Control Infant groups following the intervention.

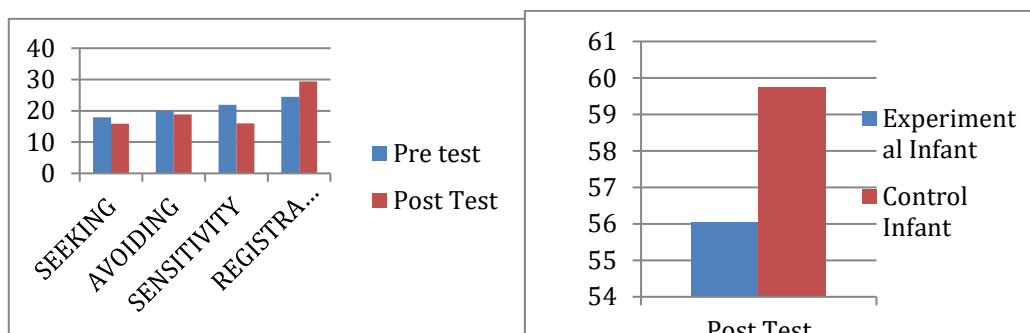


Table 2.4 Post test comparisons of Experimental Infant group and Control Infant group

Table 2.5 presents the pre-test and post-test comparison results for the Experimental Toddler Group across various categories of the Infant/Toddler Sensory Profile (ITSP). Before the intervention, mean scores for seeking/seeker, avoiding/avoider, sensitivity/sensor, registration/ bystander categories were 17.93, 19.93, 21.89, and 24.46, respectively, with corresponding standard deviations.

Table 2.5 Pre-test and post-test comparison of Experimental Toddler Group

Following the intervention, significant improvements were observed in all categories, with mean post-test scores of 15.87, 18.82, 16.02, and 29.4, respectively. Paired t-tests revealed statistically significant differences between pre-test and post-test scores for all categories ($p < 0.001$), indicating notable enhancements in sensory processing abilities after the intervention in the Experimental Toddler Group.

DISCUSSION:

Nieder-Heitmann E et.al., (2010) study findings reveal that babies who participated in the Sensory Developmental Care Programme had improvements in their sensory capabilities until the age of eighteen months. Therefore, using it on other preterm newborns in the NICU may be beneficial and further studies by Elise r. Lecuona et.al., (2012) suggests that early years of sensory integration treatment should be used in order to help preterm babies develop their motor, cognitive, linguistic, and adaptive motor skills to the best of their abilities. The study emphasises the significance of ASI incorporation in treatment plans for premature newborns. Barbara Medoff-Cooper et.al., (2015) concluded that the preterm newborns appeared to have acquired sucking coordination abilities earlier, by the seventh day, as a result of the Auditory, Tactile, Vestibular, and Visual (ATVV) intervention which emphasizes the development of preterm newborns would be greatly improved by examining the relationship between early feeding ability advancement and more favourable developmental growth. Serkan Pekcetin et.al., (2016) concluded that prior to intervention preterm newborn's ability for processing sensory information was significantly diminished. Following the sensory integration intervention, there was an apparent increase in the preterm newborn's ability to interpret sensory information. Therefore, in addition to having their sensory processing issues assessed, preterm neonates are recommended to have tailored sensory integration treatment.

The present study aimed to investigate the effects of a semi-structured sensory enrichment intervention compared to conventional occupational therapy intervention on premature infants, focusing on their Infant/Toddler Sensory Profile (ITSP) scores. The results provide valuable insights into the potential benefits of sensory enrichment programs for this vulnerable population. Our findings revealed significant improvements in ITSP scores following the semi-structured sensory enrichment intervention. The experimental group exhibited a statistically significant decrease in post-test scores compared to pre-test scores, indicating an enhancement in sensory processing abilities. This improvement suggests that the sensory enrichment program effectively targeted sensory regulation and integration skills in premature infants.

Contrastingly, the control group, which received conventional occupational therapy intervention, also demonstrated a decrease in post-test scores, albeit to a lesser extent than the experimental group. Despite this reduction, the control group's post-test scores remained higher than those of the experimental group,

indicating that the conventional intervention may not be as effective as the sensory enrichment program in promoting sensory development among premature infants.

The significant difference in post-test scores between the experimental and control groups underscores the importance of tailored sensory interventions for premature infants. Sensory enrichment programs offer a structured and holistic approach to addressing sensory processing difficulties, encompassing sensory stimulation, environmental modifications, and caregiver involvement.

CONCLUSION

In conclusion, this study investigated the efficacy of an intervention program aimed at improving sensory processing abilities in toddlers. Through a detailed analysis of pre-test and post-test scores on the Infant/Toddler Sensory Profile (ITSP), as well as demographic characteristics, several key findings emerged. Experimental and Control Groups exhibited significant improvements in sensory processing abilities following the intervention, as evidenced by lower post-test scores compared to pre-test scores across all ITSP categories. These results underscore the effectiveness of the intervention in enhancing sensory processing skills in young children and comparisons between the Experimental and Control Groups at both the pre-test and post-test stages revealed no significant differences in sensory profile outcomes. Overall, the findings of this study contribute valuable insights into the efficacy of interventions targeting sensory processing in toddlers. The results underscore the importance of early interventions for children with sensory processing difficulties. Ultimately, such interventions have the potential to intervention programs in promoting healthy sensory development in young children. Moving forward, further research with larger sample sizes and longer follow-up periods is warranted to validate these findings and inform evidence-based enhance the overall well-being and quality of life for children and their families

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