

Effectiveness of Multisensory Stimulation on Neurobehaviour among Preterm Babies

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Abstract: *The present study investigated the effectiveness of multisensory stimulation on neurobehaviour among preterm babies admitted in NICU of selected tertiary care hospital, Kottayam. A quantitative approach with quasi experimental pre test post test control group design was used for the study. The study was theoretically supported by Roy's Adaptation model. A total of 60 preterm babies each 30 in control and experimental group, were selected for the study using non-probability purposive sampling technique. The data were collected using clinical data sheet and Neurobehavioural Assessment Scale to assess neurobehaviour. After pre test, the subjects in the control group received routine care and subjects in the experimental group received multisensory stimulation along with routine care. The multisensory stimulation consisting of audio, tactile and kinesthetic stimulation given by the investigator for 5 consecutive days. Post test were conducted on 5th day and 15th day by the investigator. The results of the study revealed that, multisensory stimulation had a significant effect in improving neurobehaviour among preterm babies at 0.05 level.*

Keywords: multisensory stimulation, neurobehaviour, preterm babies

1. Introduction

Preterm birth (premature birth) is a significant public health problem across the world because of associated neonatal mortality as well as short and long term morbidity and disability in later life.¹

World Health Organization (WHO) defines preterm babies as babies born alive before 37 completed weeks of gestation or fewer than 259 days of gestation since the first day of a woman's last menstrual period (LMP). There are sub-categories of preterm birth, based on gestational age: extremely preterm (<28 weeks), these babies require the most intensive, expensive care to survive; very preterm (28 to <32 weeks), these babies require extra supportive care, most will survive and late preterm (32 to <37 weeks) who also require supportive care for survival.²

Preterm birth will affect all the systems of body, mainly affecting the central nervous system. It is associated with a high risk of cognitive, sensory and behavioral disabilities that can lead to under achievement, social and emotional difficulties. Early interventions in preterm babies improve brain development and preventing complications in future.³

Multisensory stimulation means early interventional therapy for babies at risk for developmental delay and periodic developmental assessment in motor development, cognitive functioning, language development or adaptive functioning. From the first years of life itself, a baby's personality begins to evolve. But all need to be cuddled, spoken gently and stimulated. Stimulation plays an important part in child development.⁴ Repetitive stimulation strengthens these connections and makes them permanent, whereas young connections that don't get used eventually die out.⁵

Objectives

- To assess the neurobehaviour of preterm babies admitted in NICU

- To determine the effectiveness of multisensory stimulation on neurobehaviour among preterm babies

2. Materials and Methods

The quantitative approach was adopted for the study. Research design selected for the study was quasi experimental pretest posttest control group design. Non probability purposive sampling technique was used in this study. In this study sample consisted of 30 subjects in control and 30 subjects in experimental group admitted in NICU of Institute of Child Health and Government Medical College Hospital, Kottayam.

Inclusion criteria of the present study was preterm babies with 32-36 weeks of gestational age, parents/ care givers who are willing to include their baby in the study, birth weight less than 2500 grams. Those who excluded from the study were preterm babies with congenital anomalies such as heart defects, neural tube defects, down syndrome, suffering from severe respiratory distress and on mechanical ventilation, neonatal sepsis, birth weight less than 1500 grams and serious illness. Tools and techniques used to collect data in the present study were the following: Clinical data sheet of preterm babies. Assessment of neurobehaviour of preterm babies was done by Neurobehavioural Assessment Scale which include habituation, orientation, motor activity, autonomic reflexes and crying of preterm baby on the first day of study. Babies in control group received routine care and post test was conducted to measure the neurobehaviour on the 5th and 15th day using the same scale.

Another group of 30 subjects were selected as the experimental group. Clinical data sheet filled by the investigator was used to collect data on the day of beginning the study. Pretest was conducted using Neurobehavioural Assessment Scale on the same day. Sequential stimulations which include audio, tactile and kinesthetic stimulus given

by the investigator. Each stimulus was given for 5 minutes and total duration of 15 minutes, 2 times a day (morning and evening) for 5 consecutive days one hour after feeding.

The audio stimulation was done for baby by speaking in a soft soothing voice by the mother. Baby lay in supine or lateral position and listen for 5 minutes two times a day. The tactile stimulation was administered by placing baby in prone position and moderate pressure was used to provide 12 strokes with palms of the hand, each stroke lasting 5 seconds. The stroke was provided in each area as follow: head, neck, shoulder and back. Next by placing in supine position 12 moderate pressure strokes with palms of the hands, 5 seconds each was provided in each area as follows forehead, cheeks, chest, abdomen, upper limbs (each separately), lower limbs, palms and soles following 5 minutes by the investigator. The kinesthetic stimulation was done by the investigator for 5 minutes, it comprises of passive flexion and extension movements of hip, knee, ankle and elbow joints. Post test was conducted to babies after 5th day and 15th day by the investigator. The obtained data was tabulated and analyzed in terms of objectives of the study using descriptive and inferential statistics.

3. Results

3.1 Clinical data of preterm babies

Among the study participants, 46.7% in the control group and 26.7% in the experimental group were born during 32-33 weeks of gestation. Regarding gender, 60% of the preterm babies in control group were male and in experimental group 53.3% female babies. Among the study participants 76.7% preterm babies in the control group and 80% preterm babies in the experimental group had an APGAR score of 7-10 at 5 minutes. The data revealed that birth weight of 60% of preterm babies in the control group and 23.3% in the experimental group were between 1500 -2000 grams. Considering the age of preterm babies 46.7% in the control group and 73.4% in the experimental group had less than 7 days of age. Most of the babies 83.3% in control group and experimental group 63.3% had birth weight between 1501-2500 grams. Study revealed that 36.7% of preterm babies in the control group and 46.7% preterm babies in the experimental group were born through normal vaginal delivery. Study showed that 56.7% of preterm babies in the control group and 43.3% of preterm babies in the experimental group were fed with expressed breast milk. Among the preterm babies 33.3% in the control group and 23.3% in the experimental group were diagnosed as Respiratory Distress Syndrome.

3.2 Effectiveness of multisensory stimulation on neurobehaviour among preterm babies

Table 1: Frequency distribution and percentage of preterm babies based on neurobehaviour, (n=60)

Neurobehaviour	Control Group (n=30)		Experimental Group (n=30)	
	f	%	f	%
Poor (0-16)	7	23.3	8	26.7
Average (17-26)	22	73.4	18	60
Good (27-40)	1	3.3	4	13.3

Table 1 shows that 73.4% of preterm babies in the control group and 60% of experimental group had average score of neurobehaviour. Only 3.3% of babies in control group and 13.3% in experimental group had good score of neurobehaviour.

3.3 Effectiveness of multisensory stimulation on neurobehaviour among preterm babies

H_{01} : There is no significant difference in neurobehaviour among preterm babies between the control and experimental group

Table 2: Median and IQR of neurobehaviour of preterm babies in control and experimental group during pretest and post test (n=60)

Group	Neurobehaviour					
	Pretest		Posttest 1		Posttest2	
	Median	IQR	Median	IQR	Median	IQR
Control group (n=30)	20	4	20	4	20	4
Experimental group (n=30)	21	7.5	23	5.25	25	5

Table depicts that the pretest median values of neurobehaviour among preterm babies in control and experimental group were 20 and 21 and pretest IQR value of control and experimental group were 4 and 7.5 respectively. The table also shows that the posttest 1 median value of experimental and control group were 20 and 23 and IQR value were 4 and 5.25. Among the posttest 2 median value of experimental and control group were 20 and 25 and IQR value were 4 and 5 respectively.

Table 3: Mean ranks, sum of ranks and Mann Whitney U value of neurobehaviour of preterm babies in control and experimental group in post test, (n=60)

Neurobehaviour	Control Group (n=30)		Experimental Group (n=30)		U value	p
	Mean Ranks	Sum of Ranks	Mean Ranks	Sum of Ranks		
Posttest 1	23.75	712.50	37.25	1117.50	247.50	0.003
Posttest 2	20.42	612.50	40.58	1217.50	147.50	0.000

Table 3 reveals that the obtained U value for neurobehaviour among preterm babies in control and experimental group was statistically significant at 0.05 level. These show that there was significant difference in posttest 1 and posttest 2 neurobehaviour scores between control and experimental group. Hence the null hypothesis was rejected. It was inferred that multisensory stimulation was effective in improving neurobehaviour among preterm babies.

4. Conclusion

Based on the findings of the study, the following conclusions were drawn. There was a significant difference in neurobehaviour among preterm babies between control and experimental group. It can be concluded that multisensory stimulation is effective in improving neurobehaviour among preterm babies. The present study highlighted the need for improving neurobehaviour in

preterm babies by providing multisensory stimulation for overcoming the impacts of behaviour.

Multisensory stimulation consists of multidisciplinary services provided to infants from birth through the first years of life to promote child health, enhance emerging competencies, minimize developmental delays, cure existing disabilities, prevent functional deterioration, and promote adaptive parenting functioning.⁶

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