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## EFFECTS OF MASSAGE WITH OR WITHOUT KINESTHETIC STIMULATION ON WEIGHT GAIN IN THE PRETERM NEONATES

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### ABSTRACT

The achievement of ideal weight is one of the parameters taken into account when preterm new-borns are discharged from the hospital. The goal of this study was to assess the effect of massage, with or without kinesthetic stimulation, on weight gain of the preterm neonates. A randomized clinical trial with a quasi-experimental design was conducted to assess the effect of massage with or without kinesthetic stimulation (KS) on weight gain in medically stable premature (>2000 g and/or >34 weeks gestational age) neonates. Infants were randomly assigned to one of three groups: no intervention (control), massage therapy alone (massage), or massage therapy combined with KS (MKS). After controlling for variables, linear regression analysis was used to assess differences in average daily weight increase across the groups. For this study, a total of 60 preterm new-borns were enrolled, with 20 new-borns in each group. The findings show that in the intervention groups, average daily weight gain was higher than in the control groups especially in MKS. The massage therapy can endorse weight gain in low birth weight neonates and also leads to earlier discharge.

### KEYWORDS

Massage, Neonate, Preterm, Low birth weight and Kinaesthetic exercise.

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### INTRODUCTION

Premature newborns are functionally immature, sedentary, and underweight, necessitating particular care to ensure their survival. In the ratio of preterm births, WHO estimates that low birth weight accounts for 1/6 of all annual global live births. At 23 weeks, babies have a 17 percent chance of survival. At 24 weeks, babies have a 39% chance of

surviving. Babies who are born at 25 weeks have a 50% chance of surviving. Most newborns can live with the help of medical technology from 32 weeks onwards [EPI Cure statistics]. A lasting condition such as lung disease, cerebral palsy, blindness, or deafness affects one out of every ten preterm babies. In the post-surfactant era, the management and outcome of preterm infants have changed. With more premature infants surviving into the peripartum period, greater attention has been paid to maximizing this population's growth and development. The stressful atmosphere and lack of tactile stimulation associated with care in the neonatal intensive care unit (NICU) may further impair these vulnerable new-borns, in addition to the physiologic implications of preterm birth. A number of research have been undertaken over the last two decades to investigate the influence of tactile and kinesthetic stimulation (KS) on the growth and development of children.

In comparison to controls, preliminary studies indicated that massage treatment with KS may have favorable effects on preterm infants, such as better weight gain<sup>1-5</sup>, enhanced bone mineralization<sup>6</sup>, earlier hospital discharge,<sup>1-3</sup> and more optimum behavioral and motor responses<sup>2-4,7,8</sup>. However, these outcomes are inconsistent among research, and methodological issues with earlier trials have led some writers to caution against using premature infant massage on a regular basis<sup>9</sup>. According to a study on massage stimulation, newborns in the therapy group spent fewer days in the hospital than those in the control group. Massage may be a cost-effective means of stimulating growth and behavioral organization even in extremely small preterm neonates, based on the aforementioned research (Field *et al*, 2004).

Preterm birth affects more than 18 million infants in the developing countries. More than half of the people live in South Asia, with 7 million in India. Despite this, India alone is home to more than a third of the world's low-birth-weight babies. Preterm births account for 7.8% of all babies born in India. Low-birth-weight babies have an increased risk of dying in their first months and years. Those who survive are prone to have an impaired immune

system and may endure a higher incidence of illnesses as diabetes and heart disease in later life. Hence, this study to assess the effect of massage, with or without kinesthetic stimulation, on weight gain of the preterm neonates was undertaken by the researchers.

## **MATERIAL AND METHODS**

A prospective randomized controlled clinical trial, with a quasi-experimental design was conducted to evaluate the effects of massage with or without KS on preterm infants. The samples consisted of healthy preterm infants with (1) weight at birth (BW) >2000g and/or gestational age >34 weeks, (2) postnatal age >10 days and current weight >1750g and (3) medically stable as per the NICU Protocol. Neonates were excluded if they had a major health conditions such congenital anomaly or were in movement restriction like pathological fractures etc. Institutional ethical clearance, no harm certificate for the intervention protocol and informed consent was obtained from the neonatologists and parents.

Twenty preterm infants were allotted each to no intervention (C), massage alone (M) or massage with kinaesthetic stimulation (MKS). The clinical variables such as weight, type of feeding, calorie and volume was collected. The group B (Massage -M) was given 6 strokes of massage, each for 10 seconds in the supine as well as in prone position including the whole body from head to toe. The group C (Massage and kinaesthetic stimulation - MKS) group received the same massage protocol and in addition, 6 movements in the arms and legs at elbow and knee respectively. Preterm neonates were monitored constantly for heart rate, respiratory rate and oxygen saturation throughout the intervention. Massage and MKS were performed by bedside registered nurses in the NICU who were trained by the investigators. This was done after each feeding to minimise the unnecessary contact with the preterm babies. The intervention was done at a minimum of 4 times per day for 5 - 10 minutes. The control group infants were receiving the care as per the NICU standard protocol. The average gain in weight was assessed. Descriptive and inferential statistics were used to analyse the data.

## RESULTS AND DISCUSSION

The Table No.1 shows that the intervention was well received, and no participants dropped out of the trial due to any complications are adverse reactions of the interventions. In massage only group, one preterm baby was identified as sepsis after 2 days of enrolment with the study and was excluded. Table No.1 shows the demographic and clinical characteristics of the preterm babies. The birth weight of the babies in the massage and MKS group has been improved significantly with a average weight gain of 30grams per day. The average gestational age was  $34\pm 0.45$ ,  $34\pm 0.46$  and  $34\pm 0.57$  for control, M and MKS groups respectively. The percentages of enrolled female preterm babies were 51, 56 and 48 respectively for control, M and MKS groups. The caloric intakes by the preterm babies were  $151\pm 5.2$ ,  $168\pm 5.4$  and  $168\pm 5.6$  g /kg / day respectively for control, M and MKS groups. Similar findings were reported from a systemic review conducted by Kulkarni, A, Kaushik, J S, Gupta P. *et al.* That massage has several positive effects in terms of weight gain, better sleep-wake pattern, enhanced neuromotor development, better emotional bonding, and reduced rates of nosocomial infection and

thereby, reduced mortality in the hospitalized preterm infants<sup>10</sup>.

The Table No.2 shows the regression analysis on daily weight gain of the preterm infants in which the weight gain in the study group is highly significant especially in the MKS group at  $p=0.001$ . This indicates that the massage only as well massage with kinaesthetic exercises given for the preterm infants gives adequate tactile stimulation for them and helps them to gain the weight and reduce their chance of morbidity and mortality. Similar findings were reported in few studies which concluded such as: the treated infants average weight gain was 21% greater per day (34 vs. 28gms) and were discharged 5 days prior, healthy, low-risk preterm infants gained more weight and slept less with just 5 days of massage, and the results support the continued use of massage as a cost-effective therapy for medically stable preterm infants. Also, considering the positive effect of infant massage on weight gain, it is recommended to give oil massage to the preterm neonates. The massage therapy can support weight gain in very low birth weight neonates and also leads to earlier discharge<sup>11-14</sup>.

**Table No.1: Demographic and clinical data of the preterm infants**

S.No	Variables	Control (n=20)	Massage - M (n=19)	MKS (n=20)
1	Birth weight (g)	1959±74	2097±48	2124±57
2	Gestational age (weeks)	34±0.45	34±0.46	34±0.57
3	Gender (% female)	51	56	48
4	Caloric intake (g /kg / day)	151±5.2	168±5.4	168±5.6
<b>Weight (g)</b>				
5	At start of study	2174±32	2216±64	2263±204
6	At end of study ( 2 weeks)	2598±82	2636±88	2795±93

**Table No.2: Regression analysis on daily weight gain of the preterm infants**

S.No	Variables	$\beta$	95% CI	S.E	p
1	Study group weight gain	3.38	0.87–5.57	1.14	0.001***
2	Gestational age	0.12	-1.12 -1.52	0.58	0.08

## CONCLUSION

According to the present study findings, the massage and kinaesthetic exercises, individually or combined give beneficial effects such as weight gain in the

stable preterm infants. Hence, this can be considered as a standard protocol for the neonatal ICU so that it can reduce the morbidity, mortality and hospital stay among the preterm infants.

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## DECLARATION OF CONFLICTING INTEREST

The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

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