



ORIGINAL RESEARCH PAPER

Paediatrics

OIL MASSAGE AND WEIGHT GAIN IN VERY LOW BIRTH WEIGHT NEONATES

KEY WORDS: Massage, neonate, preterm, very low birth weight

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ABSTRACT

BACKGROUND: Preterm babies' survival has improved considerably due to better neonatal care. Oil massage for neonates is reported to improve weight gain by better thermoregulation. The aim of this study was to assess the effect of oil massage on weight gain in very low birth weight neonates.

METHODS: This study is a nonrandomized trial in Neonatal Intensive Care Unit. Fifty neonates who were enrolled in study, were divided into two groups of case (*n* = 25) and control (*n* = 25). Both groups received standard care of preterm neonates. Additionally, case group received the oil massage therapy 3 times daily for 10 min for each time for 7 days.

RESULTS: Difference in weight gain between two groups was not significant until day 4, but there was significant weight gain in neonates having massage therapy on day five onward.

CONCLUSION: The massage therapy increases weight gain in very low birth weight neonates.

INTRODUCTION

Topical oil massage is routinely practiced in many countries. For hundreds of years, populations especially in the Indian subcontinent have routinely applied natural oils to the skin of newborn. The practice of oil massage has gained favor in neonatal intensive care units in the developed countries as well¹. Increased preterm birth has led to more very low birth weight babies. Neonatal mortality has decreased in last two decades due to improved neonatal care. The benefits to the neonate are due to those related to the oil application per se, and those related to tactile kinesthetic stimulation due to the massage. Topical oil application has been shown to improve skin barrier function, thermoregulation and also is suggested to have a positive effect on growth^{2,3}. Massage has been described as "a mechanical manipulation of body tissues with rhythmical pressure and stroking for the purpose of promoting health and well-being."⁶ Moreover, a number of studies have also demonstrated superior growth and development in preterm infants receiving tactile kinesthetic stimulation.^{4,8} Oil application may occasionally cause adverse effects in the form of skin rashes and a greater propensity for bacterial colonization.¹ Trials on the effect of massage on growth in premature infants have used either massage alone as a form of tactile stimulation or massage with some type of vegetable oil.⁹ It is not clear yet whether oil has any profit on the growth of preterm infants.⁷ The present study was designed to test the effect of oil massage on weight gain in very low birth weight neonates during 10 days of massage compared to standard care of very low birth weight neonates without massage.

METHOD

This study is a nonrandomized trial in the Neonatal Intensive Care Unit (NICU) of the level III at Patna medical college & hospital from July 2016 to June 2017. Inclusion criteria were birth weight between 1000 and 1500 g, gestational age between 28 and 32 weeks, birth weight appropriate for their gestational age, gavage feeding, age between 10 and 20 days, medical stabilization, and receiving KMC. Calories intake and time or duration of KMC in two groups were equal. Infants who were sick, with congenital anomalies, central nervous system dysfunction, infant surgery, were excluded. Prior to recruitment, informed consent was obtained from parents of eligible infants. Fifty neonates, who were selected for this study, were divided into two groups (25 massages and 25 controls). Infants were alternatively assigned in 10 blocks of five cases of control and massage. The study on any case started when intravenous therapy was discontinued and neonate had a condition of medical stabilization.

The Field's protocol for massage was used¹⁰. In massage group, the intervention was done 3 times/day for 10 min for each time during 7 consecutive days.¹² Massage was done 1 h after feeding.

During the study, massage of all cases in the intervention group was done by one special nurse.

Each session of massage consisted of tactile stimulation in a prone position, followed by kinesthetic stimulation in the supine position in end. The nurse warmed and lubricated (with 1 cc coconut oil) her hands before starting of massage during intervention. During tactile stimulation, the infant was placed under warmer set that regulated with infant body temperature in a prone position and was given moderate pressure stroking with the flats of the fingers of both hands. Massaging was gentle using the ventral part of the fingers. The whole massage was divided into 5 sections of 1 minute each and each section to 6 fractions of 10 seconds each. In the first section, massage was started from the head to the posterior neck and back to the head. In the second and third sections, massage started from the posterior neck to the shoulders and back to the posterior neck. In the 4th section, massage started from the shoulders down to the buttocks and back to shoulders except for the vertebral area which was left untouched. The fifth section included simultaneous massage of both legs from the hip down to the soles and back. The sixth section included both hands from the shoulders to the wrists and back to shoulders simultaneously.

For the kinesthetic phase, consisted of six passive flexions and extension movements lasting approximately 10 s. These "bicycling-like" movements of the limbs occurred in the following sequence: (a) Right arm, (b) left arm, (c) right leg, (d) left leg, and (e) both legs synchronously. Infant was monitored continuously for heart rate, respiratory rate, and percutaneous oxygen saturation during massage by monitoring set. None of the neonates showed an adverse effect due to massage during the study.

The weight of neonate was measured every day (at 8 a.m.) by digital balance with a standard deviation of ±5 g. Head circumference and length of neonates was measured at before and after of study. Measuring and recording the data was carried out by one nurse who was not aware of the purpose of our study. The homogeneity of the massage and control groups was tested with independent t-test and Chi-square test, and comparison of the weight gain between the two groups was done using the repeated measurement test with SPSS version 21.

RESULT

None of the 50 neonates who were enrolled in the study were excluded during the study. Two groups were matched in terms of confounding variables such as birth weight, weight at enrolment, gestational age, age at enrolment, sex and Apgar score at 5 min of birth.

Table 1: Comparison Of The Mean Percentage Of Weight Gain Among The Infants Of 2 Groups During The Study Period.

Percentage of weight gain	Massage group Mean ± SD	Control group Mean ± SD	P value
Day 2 compared to 1	1.1 (0.6)	1.0 (0.4)	0.50
Day 3 compared to 2	2.4 (0.8)	1.9 (0.6)	0.20
Day 4 compared to 3	3.10 (0.9)	2.6 (0.8)	0.18
Day 5 compared to 4	5.2 (1.0)	3.5 (1.1)	0.04
Day 6 compared to 5	6.5 (1.20)	4.1 (1.30)	0.02
Day 7 compared to 6	7.6 (1.50)	4.5 (1.40)	0.001

Results of our study demonstrated that average weight of neonates between massage group and control group had no statistically significant difference until 4th day of study ($P > 0/05$). However, this difference became significant from 5th day of the study and the following days became more and more significant. The difference of head circumference and length between two groups was not statistically significant at the beginning and end of study ($P > 0.05$).

DISCUSSION

The present study demonstrates significantly more weight gain in the massage group compared to the control group after 4 days of massage. In this study, massage therapy causes more weight gain in very low birth weight neonates after 5 days. Duration of each massage session was for 10 min 3 times/day until 7 days. Dieter et al, in 2003 conducted a study on 32 premature infants. The newborns were randomly divided into 2 groups of test (massage) and controls. Since the previous 10 day studies had demonstrated that gaining weight usually starts from day 5 of intervention, the test group infants were massaged for 5 days. At the end of massage therapy, the test group gained 53% more weight compared to controls.¹⁰ Safety and efficacy of massage therapy for premature infants have been confirmed in several studies. Researchers have demonstrated that kinesthetic stimulation in infants by mothers improves the parentchild relationship. Massage therapy can also improve this relationship by facilitating the development of preterm newborn.¹² In Massaro et al., Kumar et al., Alizadeh et al. and Field' studies that had results similar to our study. In our study, the massage began on an average of 16 days after birth. Additionally, all infants massage performed by one specific nurse. Kumar et al.⁷ found that massage therapy of premature infant increases the weight gain after 28 days of massage. In their study, intervention group received the massage from the 1st day of birth until 28 days by mothers in hospital or after discharging at home. Alizadeh et al.¹³ studied 44 infants with birth weight of 1000 to 2500 g for 5 days and their study showed massage resulted in a significant difference in weight gain between intervention and control groups ($P = 0.001$). Number of daily massage in this study was 3 times for 15 min. In this study, infants who received massage were discharged earlier from the hospital on an average 12 days. Another study by Badiee et al.¹⁵ used the massage (5 min 3 times a day for 5 days), similar to our study, resulted in increasing the rate of weight gain in preterm infants. Their study included three groups of massage by mother, massage by nurses, and without massage (control) that showed massage by mother or nurses increased weight in preterm infant with gestational age between 28 and 34 weeks without reference to birth weight when compared to control group. Unlike our study, the massage was performed by several nurses in the second group and each massage session was only 5 min in the intervention groups. A study in Iran by Hosseinzadeh et al.¹⁶ presented that massage increases the rate of weight gain in infants but infants who were enrolled had weight of 2000 to 2500 g whereas our inclusion criteria were weight of 1000 to 1499 g. In another study in America by Massaro et al.³ on infants <33 weeks and birth weight <1500 g, weight gain was significantly higher than the control group infants who were 1000 and 1499 g ($P < 0.05$). In their study, massage had no effect on weight gain in infants <1000 g. Infants who received massage, duration of hospital stay did not show significant differences from the control group in its study. The result of another study in Iran to determine the effect of therapeutic touch on weight premature infants was conducted by Keshavarz et al.¹⁷ showed a moderate pressure massage for 5 days

(3 times a day for 20 min) due to significant difference on weight gain in preterm infants with birth weight of more than 1500 g between the intervention and control groups ($P = 0.01$). The massage was done in right and left lateral positions in this study but we massaged the infants in supine and prone positions. Golchin et al.¹⁸ studied the effects of massage on weight gain in infants with birth weights <2500 g and the results showed that massage increases the speed of their weight; the average birth weight of the massaged infants was 1709 g whereas in our study, it was 1275 g. Field et al.¹⁴ in a study of 5-day (15 min 3 times a day) demonstrated that the massage increased the rate of weight gain in preterm infants was similar to the results obtained in the present study. As regards, the mean birth weight and weight gain entry to the study were 1789 and 1292 g, respectively, whereas in our study those were 1275 and 1238 g, respectively.

Amini et al.¹⁹ examined 10-day massage effect on weight gain in preterm infants and the results showed that weight gain was not significantly different between the two groups at the end of the study, while like our study, intervention group was massaged commonly by a trained massage therapist. Age of enrollment in their study was 2 to 7 days after birth. Mendes and Procianoy conducted a study in Brazil,²⁰ contrary to the results of this study showed that massage therapy by mothers had no significant effect on the increase in weight gain in infants <1500 g but the hospital stay in the intervention group was 7 days less than the control group ($P = 0.007$). Because of their result did not show a significant effect of massage on weight gain, perhaps the mothers cannot use moderate pressure during massage therapy because of their intense emotions about their small baby. However, based on our idea the massage can be more effective if it was done by nurses or other trained ones. We propose to study the effect of massage by trained fathers on weight gain in preterm infants for future studies.

CONCLUSION

This study showed that the massage can promote weight gain in hospitalized, very low birth weight infants in the NICU. Massage can be used for weight gain in very low birth weight babies apart from other measure.

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Nil.

CONFLICTS OF INTEREST

There are no conflicts of interest.

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