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Comparative study on massage therapy with coconut oil and without oil on body weight in low birth weight preterm neonates

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ABSTRACT

Background and Aim

Prematurity and low birth weight are important causes for neonatal mortality and hospitalization. The present study aimed to investigate the benefit of massage therapy with coconut oil and massage alone on the weight gain of low birth weight preterm neonates admitted in Neonatal Intensive Care Unit (NICU).

Methods and Results

This observational study was performed on 60 stable preterm neonates hospitalized in the NICU of a tertiary care hospital. They were divided into two groups: massage with coconut oil and massage alone. These groups were compared on the basis of weight gain during first fifteen days. In the massage with coconut oil group, the mean weight gain on the 7th day was 119.6±25.85 gr and on the 15th day was 297± 37.52 gr, whereas in the massage alone group the mean weight gain on the 7th day was noted to be 70.9±17.27 gr and on the 15th day was 196±16.52 gr. Significant differences were observed between the massage with coconut oil group and the massage alone group ($p< 0.0001$).

Conclusion

The findings of this study suggest that transcutaneous feeding with coconut oil in low birth weight preterm neonates can result in better weight gain velocity as compared to massage alone group.

Keywords: Coconut oil, Preterm neonates, Benefits

INTRODUCTION

Preterm birth is defined as birth occurring at less than 37 completed weeks or 259 days of gestation and Low birth weight (LBW) is defined as weight at birth of less than 2500 grams irrespective of gestational age [1]. Both are approximately 20 times more likely to succumb to death, than the term babies [2]. Premature neonates have increased chances to develop cerebral palsy, sensory deficits and learning disabilities. Previous studies have reported that the most common cause for hospitalization in NICU is prematurity and low birth weight [3, 4].

Studies have proven hospitalized preterm neonates with various forms of stimulation like massage therapy is an effort to increase weight gain

or to accelerate development [5, 6]. Tactile-kinesthetic stimulation of preterm neonates as a massage therapy with moderate pressure was introduced in 1986 [7]. This includes 5 min of tactile stimulation (with the infant in a prone position stroking the head, shoulders, arms, back, and legs with moderate pressure), then 5 min of kinaesthetic stimulation (with the infant on the back, moving legs in flexion and extension as in bicycling legs and then arms) and then 5 min stroking as in the first 5 min. Skin massage is also considered as a therapeutic-touching intervention that has physiological and mental effects on the neonates. Many studies have been done on the effects of massage on preterm neonates showing a positive effect on birth weight, length of hospital stay, incidence of late onset sepsis, behavioural and brain development [8]. Mechanism of increased weight gain is attributed to activation of vagal system, which increases gastric peristalsis and baby's weight gain [9, 10].

Sankaranarayana *et al*., showed that the topical application of oil results in better function of the dermal barrier, regulation of skin temperature and a positive effect on its growth. In addition, the effect of oil absorption from the premature neonate's delicate skin has been proven [11, 12].

The aim of the present study was to investigate the effect of massage with coconut oil on weight gain of newborns as compared to massage alone.

MATERIAL AND METHOD

Study design

This was a Hospital based prospective observational study on comparative effect of massage with coconut oil and massage alone on weight gain in low birth weight preterm neonates.

Study setting

This study was conducted in a tertiary care hospital and teaching institute in Jamshedpur. The present study was conducted over six month (October 2018-april 2019) and data was analysed after that.

Source of data

Patients admitted in neonatal intensive care unit of the tertiary care hospital with diagnosis of preterm and low birth weight and who fulfil the inclusion criteria were enrolled in the study.

Sample size

Total 60 neonates were included in the study fulfilling the inclusion criteria and were randomly divided into two groups: 1) massage with coconut oil and 2) massage only group (30 in each group).

Aim and objective

The aim and objective of this study was to compare the effectiveness of massage therapy with coconut oil and without coconut oil on weight gain in low birth weight preterm neonates.

Inclusion criteria

- APGAR of 5 min score >7 with no resuscitation required at birth,
- Infants fed with breast milk or ‘katori-spoon’ feeds with expressed breast milk,
- Birth weight < 2500 g,
- Gestational age between 32 and 37weeks,

Exclusion criteria

- Allergic to oil,
- Congenital anomalies, neuromuscular disorders and systemic illnesses

Outcome variables

The primary outcome measure was the weight gain velocity over the first fifteen days of life. In the self-designed questionnaire, personal data and weight before the study and daily weight gain after the study for fifteen consecutive days were recorded.

Neonates were massaged for 15 minutes, 3 times per day, at least 1 hour after being fed according to the Field massage therapy protocol [7]. For massage therapy, 10cc/kg/d of coconut oil was used in group 1 by an expert nurse. The weight of neonates were measured naked with a digital scale at 7 o'clock every morning, by a single observer.

STATISTICAL ANALYSIS

Data collected was entered in Microsoft Excel worksheet. Characteristics of neonates included in the study were tabulated as mean with standard deviation (SD). The groups were compared on each parameter using unpaired‘t’ test for parametric data and chi square test for nonparametric data. The analysis was done using the SPSS version 11. A ‘P’ value of <0.05 was considered as statistically significant.

RESULTS

In this study 60 neonates were divided into two groups; group 1 massage with coconut oil and group 2 massage only, in which 16 (53.3%) and 15 (50%) were male in the above mentioned two groups, respectively. In the group 1 and 2, the mean gestational age was 34.5±1.52 and 34.1±1.32 weeks respectively. No, statistically significant difference was observed between the two groups regarding gestational age (P=0.28).

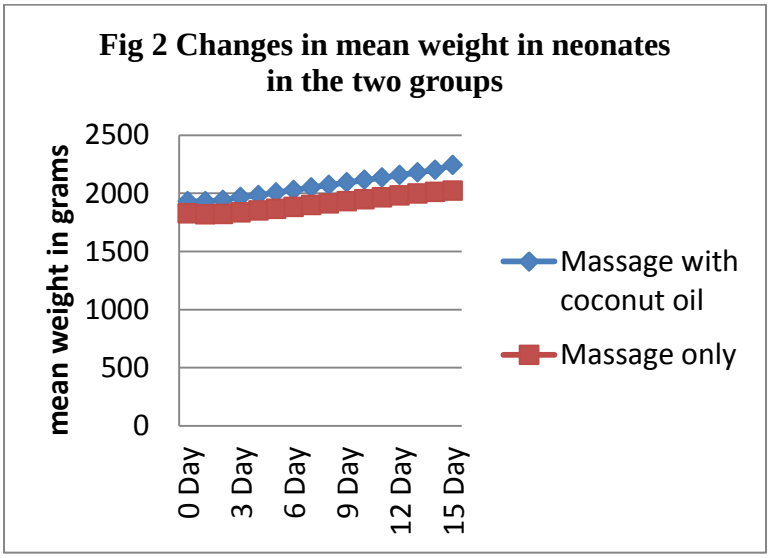
The mean birth weight in the first and second group was 1931±264.15 grams and 1826±302.20 grams respectively; again without any significant difference (P=0.15).

Mean neonatal weight on 1st day, 7th day and 15th day were compared and statistically significant difference was found only on 7th day and 15th day of life (P<0.05) as shown in table 1.

The mean weight gain on the 7th day in the group1 was 119.6±25.85 and group 2 was 70.9±17.27 grams, but on the 15th day in the group1 was 297± 37.52 and in the group 2 was 196±16.52 gram. Weight gain was significantly more in the massage with coconut oil group (18.56 gram per day) as compared to the massage alone group (12.25 gram per day) (P<0.05) as shown in figure 2.

Table 1. Comparison of demographic characteristics of neonates in the two groups

Variable related to neonate		Group 1	Group 2	P value
Gestational age (mean±SD)wks		34.5±1.52	34.1±1.32	0.28
Sex	Male	16	15	
	Female	14	15	
Birth weight (mean±SD)gr		1931±264.15	1826±302.20	0.15
Weight at 1st day (mean±SD)gr		1930.1±265.95	1819.3±303.08	0.13
Weight at 7th day (mean±SD)gr		2050.6±275.05	1896.9±314.38	0.04
Weight at 15th day (mean±SD)gr		2243±260.23	2022±316.60	0.004
Weight changes (0 day to 7 days) (mean±SD)gr		119.6±25.85	70.9±17.27	< 0.0001
Weight changes (0 day to 15 days) (mean±SD)gr		297± 37.52	196±16.52	< 0.0001



DISCUSSION

The result of this study showed that massage with coconut oil causes significant weight gain in comparison with the massage alone group.

According to Field et al., moderate pressure massage therapy proved to give a greater weight gain and shorter hospital stay for premature newborns [13]. The weight gain was related to increased vagal activity, gastric motility, insulin, and IGF-1 levels following the stimulation of pressure receptors under the skin [13, 14]. Diego et al. explored a theory that moderate pressure massage stimulates vagal activity which leads to an increase release of digestive hormones and a better gastric motility [15].

Vegetable oils are extensively used for baby massage in Indian scenario. Coconut oil is preferred for oil massage in newborns as it is easily available and affordable. Olive oil is also useful but not seed based oils (almond oil and mustard oil) due to chances of contact dermatitis. Various studies have found better weight gain after oil application. Application of a barrier such as oil prevents insensible water loss from the skin and helps in thermoregulation which may promote better weight gain [16, 17]. Sankaranarayanan et al., concluded that coconut oil massage therapy increased weight gain in comparison to mineral oil and placebo powder massage groups [18].

Similar to our study conclusion, Salam et al. study, documented 11.3 g greater weight gain for the massage with coconut oil versus the control group infants and massaged infants also had better skin condition, possibly because of greater natural killer cell activity [19]. According to Arora et al., weight gain in the oil-massage group was higher than the massage alone group and the control group [20]. In a randomized controlled clinical trial, preterm infants were given olive oil massages by their mothers [21]. In this study, the massage was 15 min 3 times a day for 10 days. The infants massaged with oil showed a daily weight gain of 21 g versus 7 g for the group who received massage without oil.

Data from an earlier study had shown greater vagal activity in infants receiving massage with oil versus without oil [22]. Higher cortisol levels were also seen in the non-oil massage group in the Field et al. study which would suggest discomfort related to the greater friction in massages without oil [22].

In another randomized clinical trial (from Iran), medium-chain triglyceride oil massage was used as supplement [23]. In this study, 121 preterm infants were randomly assigned to three groups including an oil massage group, a non-oil massage group, and a non-massage control group. By the 7th day of the study, the oil massage group had a mean weight gain of 105 g as opposed to 52 g for the non-oil massage group and a weight loss of 54 g for the control group. The findings of this study suggest that oil application improves the weight gain velocity in preterm neonates over and above the benefits of tactile kinaesthetic stimulation due to massage alone.

Preterm neonates additionally showed a better weight gain velocity after application of coconut oil as compared to mineral oil. This suggests that there is absorption of coconut oil through the skin of the preterm neonate as it is more vascular and thinner. This may also result in greater energy intake and hence a better weight gain [24].

The result of the present study showed that the daily massage with coconut oil in preterm neonates is effective for weight gain without causing any complications.

Limitations

There are several factors like feeding amount, urine and stool output that can have a possible effect on the outcome measure used in this study.

CONCLUSION

This simple method is recommended to nurses in hospitals for a better weight gain of preterm neonates. Coconut oil should be recommended to all mothers for regular massage for infants and neonates especially premature born. Also training for oil massage to the mothers of preterm baby at home is necessary to stimulate baby's development after discharge.

Conflict of interests

There is no conflict of interests to this publication.

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