Effectiveness of coconut oil massage therapy for weight gain among low birth weight babies

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Abstract

Low birth weight (LBW) is one of the causes for neonatal mortality and morbidity in Kolhapur. Admission of LBW neonates in a Neonatal Intensive Care Unit (NICU) causes deprivation of tactile sensory stimulation. Massage with oil can help in improving weight. Hence, the study was aimed to evaluate the role of coconut oil massage therapy in weight gain among LBW babies in the Kolhapur region. As this study involves evaluating the effectiveness of coconut oil massage therapy on weight gain among low-birth-weight babies, a Quasi-experimental non-equivalent re-tests, post-tests and control group design was chosen for this study. Sixty neonates of 8-28 days from birth, and gestational age of >32 weeks, and the parents consenting to the study were included and non-random assignment in to experimental and control group was done. Babies in the experimental group were massaged for 10 minutes twice daily with certified coconut oil for 5 days. Whereas the routine massage was given to the neonates of the control group. Pre-assessment and post-assessment weights of all babies were recorded. Wilcoxon sign rank test, Mann Whitney U test and Chi-Square test were used to analyse the data. A significant difference was observed between mean weight gain in experimental and control group (P=2.96e^{-07}). Post-assessment weight was significantly associated with age (P= 0.011) and birth weight (P= 0.03). Significant mean difference was observed between pre and post-assessment weight of LBW neonate in the experimental group (P=6.734e^{-12}). Body massage using coconut oil showed higher weight gain in LBW babies after the 5th day of intervention.

Keywords: Coconut oil, Infant, Intensive care unit, Low birth weight, Traditioanl massage

1. Introduction

Low birth weight (LBW or birth weight <2500 gm) is caused due to preterm birth, intrauterine growth retardation or both and a reason behind neonatal and postnatal morbidity (WA, 2011; Islami *et al.*, 2012). According to the UNICEF-WHO report, nearly 15% of babies worldwide are born with LBW. The prevalence of LBW in Asia itself is 17.3% and in Indian subcontinent is around 20% and in Maharashtra region is 29.53% (Bharati *et al.*, 2011; Patale *et al.*, 2018; WHO, 2019). LBW neonates are admitted in the neonatal intensive care unit (NICU) and only minimal touch protocol is followed to avoid acquired infection. This deprives them of tactile and sensory stimulation which is important for their growth outcome (WA, 2011).

Previous studies including clinical trial, concluded that massage with coconut oil can improve weight gain in LBW neonates (Arora, *et al.*, 2005; ESJ, 2017). Body massage can improve growth in LBW infants including weight gain, decreased stress behaviour, neuromotor development, improved sleep, decreased chances of infections and mortality of LBW infants (Vickers *et al.*, 2004; Field *et al.*, 2010; Kulkarni *et al.*, 2010).

Traditional oil massage is a common practice in many communities, especially throughout the Asian subcontinent (Darmstadt and Saha, 2003). While there are strong traditional practices, like performing oil massage especially before giving bath to the infant has seemingly evolved due

to discerning benefits, although little has been documented with regards to the actual benefits or detriments of this practice. Benefits may include improved skin condition, prevention of skin injury and skin infection, improved thermoregulation due to decreased trans epidermal water loss, absorption of essential lipids and enhanced maternal–infant bonding with repetitive tactile stimulation (Darmstadt *et al*., 2003).

There is a lack of evidence on the impact of coconut oil massage on LBW infants of Kolhapur region. As the researcher came across many case of low birth weight babies during her clinical service and she also found that the length of hospitalization was more for such low birth weight babies because of slow weight gain and complications aroused parallel because of it. This provoked the researcher to find out the easiest, economical and feasible solution for increasing weight in LBW babies. Coconut oil massage therapy is a traditional practice followed in India for centuries but lacks concrete evidence. Hence after extensive review of literature, researcher decided to test the effectiveness of coconut oil massage therapy on weight gain among LBW babies.

2. Materials and methods

The Quasi-experimental non-equivalent pre-tests, post-tests and control group design was performed from January 2019 to February 2019 on 60 LBW babies, who were admitted to neonatal intensive care unit (NICU); in randomly selected hospitals named as Komal hospital, Masai hospital, Aster Aadhar hospital and Apple Saraswathi hospital of Kolhapur, Maharashtra. The ethical approval for the study was obtained from the institutional ethical committee prior to the initiation of the study. The informed consent was obtained from all the subjects or guardians prior to enrolment in the study. The samples were selected based on non-probability, purposive sampling technique. LBW babies of 8-28 days of age and gestational age of more than 32 weeks, with APGAR score of 7-10 at 5 minutes and whose parents consented were included in the study. Whereas LBW neonates on a ventilator, on parenteral nutrition therapy, any on breast milk fortifier, who were seriously ill with a skin infection or abnormalities and nil per oral were excluded from the study. The pre-assessment weight was assessed by using infant monitor

weighing scale in both the groups. Coconut oil massage was administered to subjects in the experimental group by the research investigator for 10 minutes twice daily for 5 days as it shows greater increase in the weight. After 5 days, post assessment weight was assessed by using the same scale in both the groups.

2.1. Study tool

It consisted of a questionnaire related to selected socio-demographic data, which was collected through interview method. Infant weighing scale and infant weight monitoring chart was also used. The weighing scale was calibrated, checked and certified by the biomedical Engineer of D Y Patil Engineering College, Kolhapur. Coconut oil was used as the intervention in the experimental group. The coconut oil was tested at PURU lab, Jaysingpur, district Kolhapur, to maintain standard parameters and certified by a qualified Ayurvedic doctor. The tool was validated by 14 experts of whom 9 were specialized in child health nursing, 2 were statisticians and 3 were MD in paediatrics.

2.2. Pilot study

Pilot study was conducted in December 2018 at randomly selected hospitals. D. Y. Patil hospital and research centre was selected for the experimental group and Gurukrupa hospital was selected for the control group. Purposive sampling was used to select 16 participants fulfilling the inclusion criteria. They were divided into two groups experimental and control. Pre-assessment weight was done prior to the intervention using the tool. Coconut oil massage was administered in experimental group for 10 minutes twice daily at an interval of 6 hours for 5 days. Routine procedure (massage without oil) was done in the control group. After 5 days post assessment weight was done by using the same scale in both groups.

2.3. Study groups

The same procedure as the pilot study was carried out in 60 LBW participants who were divided into the experimental (Masai hospital and Aster Adhar hospital) and control groups (Komal and Apple Saraswati hospital) (n=30 in each group).

2.4. Statistical analysis

Data was analysed using R v 3.6.1 software. Explanatory data analysis was performed to know

Table 1. Distribution of socio-demographic variables

Socio-demographic variables	Subcategories	Experimental group		Control group	
		Frequency	%	Frequency	%
Age	08-14 days	6	20	11	37
	15 - 21 days	15	50	12	40
	22 - 28 days	9	30	7	23
Gender	Male	13	43	13	43
	Female	17	57	17	57
Birth weight	1.5-2.0 kg	26	87	24	80
	2.1-2.5 kg	4	13	6	20
Gestational age	32-36 weeks	14	47	10	33
	37-40 weeks	16	53	20	67

the frequency of variables. Paired t-test was used to analyze the mean weight difference of pre and post-assessment in the experimental group. Post-assessment mean difference of control and experimental group was analyzed by using the Mann Whitney U test. Chi-Square test was used to find an association between socio-demographic variables and post-assessment weight gain of the experimental group. $P < 0.05$ was considered as statistically significant.

3. Results and discussion

The pilot study proved that the study tool was reliable and consistent. The study population had a higher number of female participants (n=34) with most (n=27) in the 15-21 days of age bracket. The distribution of socio-demographical variables is shown in Table 1.

By observing Table 2, we conclude that, at 5 % level of significance there is no statistically significant mean difference between pre and post-assessment of experimental group ($p > 0.05$). post-assessment of experimental group is greater than pre-assessment of experimental group.

Table 2. Summary table of Wilcoxon sign rank test

Experimental group		P-value
Mean of pre-assessment weight	Mean of post-assessment weight	
1784.0667	1835.8667	0.1931

Table 3. Summary table of Mann-Whitney-U test

Sl. No.	Variable	Weight gain (mean ± sd)	P-value
1	Experimental group	51.8 ± 25.71	2.96e^{-07}
2	Control group	19.2 ± 12.06	

From Table 3, we conclude that, at 5 % level of significance, there is statistically significant mean difference of weight gain in experimental and control group ($p < 0.05$).

A significant difference between mean weight gain of experimental and control group was observed (P=2.96e-07). A significant association was found between post-assessment weight gain

and age (P=0.011) and birth weight of LBW neonates (P=0.03). In the experimental group, significant difference was observed between pre and post-assessment weight of the LBW neonate (P=6.734e-12). Mean weight gain in the experimental group was 51.8 ± 25.71 gm and in the control group 19.2 ± 12.06 gm (Fig. 1).
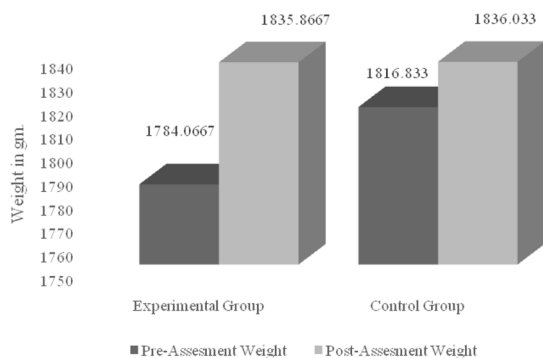
Fig. 1. Pre and post assessment weight of experimental group and control group

LBW is one of the causes of neonatal mortality, morbidity and disability and also has a long-term impact on health outcomes in adult life (Singh, 2017). In Maharashtra, during the year 2015-16, 60.6% neonatal deaths were due to LBW, of which 745 neonatal deaths were occurred in Kolhapur region (Saunik *et al.*, 2017). Therefore, the study was conducted to evaluate the role of oil massage therapy in the weight gain of LBW babies.

Mean weight gain in the experimental group was more as compared to the control group (51.8 ± 25.71 gm vs 19.2 ± 12.06 gm) and the difference was found to be significant (P=2.96e−07). Significant difference was observed between pre and post-assessment weight of the LBW neonate (P=6.734e-12). In a study conducted by Singh *et al.*, 2017, mean weight gain was more in experimental group as compared to the control group (4.5 ± 3.65 gm vs 2.03 ± 0.7gm). Massage therapy is a non-invasive procedure having a positive impact on the physical and developmental outcomes of LBW neonates (Vickers *et al.*, 2004). Weight gain by massage can be explained by increased vagal activity, sucking increases insulin release, reduced energy expenditure, decreased norepinephrine serum level, increased gastric motility and hence better absorption of nutrients (Chhugani and Sarkar, 2014). Massage of coconut oil is a traditional

practice in Indian subcontinent for centuries. It act by supplementation of essential fatty acids, augmentation of the skin barrier, reduced water loss, reduced hypothermia and thereby reduces infections and new-born mortality. It plays key role in the growth promotion (Konar *et al.*, 2020). Significant association was found between post-assessment weight gain and age (P=0.011), birth weight of LBW neonates (P=0.03). In a study conducted by Singh *et al.* (2017), reported there was no significant association between demographic variables which included birth weight of the new born and weight gain except sex of the new born in experimental group.

No significant difference was found in the post assessment weight of both groups as the initial weight is lower in the experimental group. By the end of the study, massage of either form has helped in some amount of weight gain.

The present study is the first of its kind in Kolhapur, Maharashtra. The findings of this study are in line with various similar studies that have already proved coconut oil to be effective in improving weight gain in LBW neonates (Shah *et al.*, 2011; Karbasi *et al.*, 2013; Jabraeile *et al.*, 2016). In Maharashtra, LBW is the leading cause of neonatal morbidity and mortality therefore, the government of Maharashtra should consider recognizing coconut oil massage as a therapy for the management of LBW babies.

The sample size and neonatal follow-up of the study was small hence, generalization could be better if a large sample size with long term follow-up is included. A comparative study with various other oils and a prospective longitudinal study for analysing the long-term effect of massage on LBW babies are further recommendations of the study.

4. Conclusion
Body massage using coconut oil showed higher weight gain in low-birth-weight babies.

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