



“Effect of coconut oil massage on changes in weight and behavioral response among low birth weight newborn”

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Problem statement

Effect of coconut oil massage on changes in weight and behavioural response among low birth weight new-born admitted at Pravara Rural Hospital, Loni

Abstract

Background: Low birth weight new-borns admitted in NICU are usually exposed to stressful environment and are deprived of tactile stimulation. Massage seems to help in reducing stress and improving weight and behavioural response. The present study was undertaken with objective to assess the weight and behavioural response of new-borns before coconut oil massage, Evaluate effectiveness of coconut oil massage on weight and behavioural response among the low birth weight new-borns.

Material and Method: A experimental study was conducted to evaluate the Effect of coconut oil massage on changes in weight and behavioural response among low birth weight new-borns admitted at Pravara rural hospital, Loni (Bk). The sample consisted of 15 new-borns of experimental group and 15 new-borns control group, sampling technique used for present study was nonprobability, purposive sampling technique. was used prepared to collect the data. descriptive Inferential statistics were used to analyse the data according to objectives and hypothesis.

Results: The result of study found that the coconut oil massage is effective to increase the weight of new-borns as control group mean score (1838 grams) increase to experimental means score (1900 grams), and total weight gain for control group was (27 gram) and experimental group was (134 grams) and it also enhance behavioural response as (Cal t= 7.09)

Conclusion: The major conclusion drawn from this study is that the coconut oil was found to be effective in improving the weight and behavioural response among new-borns. This study concludes that massage was beneficial in increasing the weight and improving the behavioural response of low birth weight new-borns than the new-borns who did not received massage.

Introduction

Low birth weight is one of the most serious health problems in today's world. Although LBW neonates comprise 6% to 7% of the total births, 75% of the death rate in neonates is implicated on it. Every year, 19% of neonates in the world are born with LBW which is the major cause of the infants' mortalities and morbidities. The premature birth rate and LBW in Iran is not exactly clear, but some sources in Iran have estimated the rate of LBW as 12%.¹

LBW babies (who survive) suffer 2 or 3 times more than normal children of disabilities and health problems as well as long-term and short-term psychological and social problems. The growth and development of premature infants are of particular importance and weight is the most important factor in this regard since infants actually receive very little nutrients in their first 3 to 4 days of lives (until the flow of the breast milk or other feeding methods be established), a progressive reduction in their body weights occurs. The premature infants lose more weight and regain the normal birth weight at a lower speed compared to the normal weight.²

Gestational age and consequently the neonates' weight can affect the future weight gain in them, i.e. the lower the birth weight, the more weight loss in infants than the normal ones during the first 2 weeks of life. Also, the lower the birth weight, the more the risk of the neurological complications and mental retardation in new-born babies. risk of as much as 50% of the neonates with the birth weight of 500-750 grams are at high developing severe nervous system disabilities such as blindness, deafness, mental retardation, and cerebral palsy. The overall rate of neurodevelopment disorders such as cerebral palsy, visual and audio impairments and learning disabilities in babies with LBW varies from 10% to 20%.⁵ In addition to the effects on the infants' health, LBW can affect the family's mental state so that these parents experience a high level of anxiety about their children's long-term complications and their failure in reaching a normal growth and development.³

Need for the study

Every year around 21 million low birth weight new-borns are born. They represent 16 percent of all new-borns, but large regional variations exist. The percentage of babies born with LBW is 28 percent in South Asia, 14–15 percent in sub-Saharan Africa and North Africa/the Middle East, and 7–9 percent in Latin America and the Caribbean, East Asia, and industrialized countries in which India constitute about 60%-70% of intrauterine growth retardation and remaining 30%-40% preterm infants born before 37 weeks of gestation. As it is generally recognized that shorter the gestational age, smaller the body, higher is the risk of death, morbidity, poor sucking, loss of weight, respiratory distress, hypothermia and disability which have shown that the mortality rate vary 100 folds across the spectrum.⁴

Most preterm LBW babies and term LBW babies require special care and attention to feeding. This Facts for Feeding focuses on LBW babies who are medically stable but need extra care to ensure successful feeding. The exact definition of 'medically stable' will vary from program to program. At minimum, the baby is able to breathe without assistance. LBW refers to babies who have a birth weight less than 2500 grams or are born preterm. The same approaches can be used for preterm babies who are not LBW and for term babies, whether they are LBW or not, who have feeding difficulties.⁵

Touch is a primary form of human communication and stimulation programs of various kinds influence long term developmental outcome of premature babies through improved neurophysiologic maturation and growth (Liaw, 2000; Lindrea & Stanton, 2000). Although the underlying mechanisms of massage therapy effects on growth and development are yet unknown, several possibilities have been proposed (Field, 2002). One possibility is that massage therapy increases vagal activity, which in turn releases food absorption hormones such as gastric and insulin, thus explaining the weight gain in premature infants (Field, 2002).⁶

Massage of new-borns can be done by using a lubricant to reduce the friction between the surfaces. In order to choose an appropriate lubricant, availability, cost, and safety need to be considered. Among all lubricants, coconut oil and sunflower oil have been most commonly mentioned in literature about infant massage therapy. Massage is thus an intervention that may be useful in premature infants and new-borns with low birth weight. Performing massage therapy for infants in NICU is a kind of alternative treatment that has been the subject of long debates. Studies have also indicated that infants who receive massage are usually better adapted to environmental stressors and suffer fewer negative effects.⁷

Weight gain is the most consistent parameter associated with massage therapy in neonates. In a study by Scafidi, et al., forty preterm infants (mean gestational age 30 weeks; mean birth weight 1.17 kg) were subjected to tactile/ kinaesthetic stimulation of 45 minutes per day (three sessions of 15 minutes each) for 10 days. It was observed that infants who received massage had 21% greater weight gain (34 vs. 28 grams). The weight gain was observed to be 47% greater in another study on preterm infants (mean gestational age 31 weeks; mean birth weight 1280 g) who received similar session of massage therapy with

weight gain of 21.9%; 4.24grams/day. Most of the studies have enrolled medically stable infants >30 weeks of gestation. The effect of massage therapy in infants <30 weeks is not known. Infants who receive massage therapy appear more alert and spend less time in sleep.⁸

From above it is observed that oil massage therapy, promotes the weight gain, increases appetite, improve in sucking behaviour, thermoregulation, positive effects on neurobehavioral pattern, enhance mother to child bonding and induce sleep to the infants, which helps the preterm infants and low birth weight babies to improve health status as like term infants and decreases the mortality, morbidity rate. There are studies proved that the stay hospital significantly reduced by massage therapy. Even though, oil massage is traditionally practiced in India. It is not routinely practiced in the hospital setting, if practiced in hospital setting it will play an important role in reducing the infant morbidity and mortality rate and helps to maintain the normal growth pattern. Thus the investigator has taken an effort to promote the weight gain of preterm infants by oil massage in the clinical setting.⁹

Aim of the study: Effect of Coconut oil massage on changes in weight and behavioural response among low birth weight new-borns admitted at Pravara Rural Hospital Loni (Bk)

Objectives:

1. Assess the weight and behavioural response of new-borns before and after coconut oil massage.
2. Evaluate effectiveness of coconut oil massage on weight and behavioural response among the low birth weight new-borns.
3. Co-relate the effect of coconut oil massage on weight and behavioural response of low birth weight new-borns with selected variables.

Hypotheses

H01- There will be no significant effect of coconut oil massage on changes in weight and behavioural response among the low birth weight new-born

H1- There will be significant effect of coconut oil massage on changes in weight and behavioural response among the low birth weight new-born

H02- There will be no significant association of weight and behavioural response with selected demographic variable

H2- There is significant association of weight and behavioural response with selected demographic variable

Research design: As the research aimed at Effect of coconut oil massage on changes in weight and behavioural response among low birth weight new-borns the research design used for study was quasi experimental study where experimental and control group design with control group approach used to achieve the aim of the study.

Subjects and Methods

Research setting: The present study was conducted in the paediatric ward of Pravara Rural Hospital, Loni.

Subjects: The sample size was 30 of which 15 samples were selected for experimental and 15 samples were selected for control group.

Statistical analysis: The data were computerized and verified using the SPSS (statistical package for social science) version 16.0 to perform tabulation and statistical analysis. Qualitative variables were described in frequency and percentages, while quantitative variables were described by mean and standard deviation.

Results

The data was analysed and presented in the following sections:

Section A

Part I: Description of Socio demographic profile of new-borns.

Part II: Description of Socio demographic profile of new-borns mothers

Section B –Assessment of weight before and after coconut oil massage.

Section C –Assessment of new-borns behavioural response according to system.

Part I: New-borns behavioural response according to system wise.

Part II: New-borns behavioural response according to item wise.

Section D- Effectiveness of coconut oil massage on weight and behavioural response.

Section E

Part I: Association of selected demographic variables with weight

Part II: Association of selected demographic variables with Behavioural response.

Section A

Part I: Description of Socio demographic profile of new-borns.

Description of socio demographic data of new-borns

1. High percentage experimental group all (100%) of new-borns were belongs to 1st week of age
2. Majority (53%) of new-born were male and 47 were female in both control and experimental group
3. High percentage (93%) were belongs to 37-41 week of gestational age and (7%) were below 36 weeks of gestational age, in experimental group all (100%) of new-borns belongs to 37-41 weeks of gestational age, and none of them were belongs to less than 36 weeks of gestational age
4. Major in control (33%) of new-borns belongs to 2nd day and (67%) belongs to 3rd day, in experimental group (13%) of new-borns belongs to 2nd day and (87%) of them were belongs to 3rd day
5. High percentage that in both experimental and control group all (100%) new-borns were consciousness.
6. In control group majority (60%) of new-borns immunization status is complete up to the age, (27%) then (20%) were having incomplete immunization status and (13%) of new-borns immunization status is partial complete up to the age, in experimental group majority (53%) were belong to complete immunization status (40%) were incomplete and (7%) were partial complete up to the age.
7. In both control and experimental group majority (67%) of mothers of new- born belong to 19-22 years of age
8. In control group majority (60%) of new-born parent's education is primary while in experimental group higher percentage (47%) accounted for secondary education.
9. Majority (67%) of new-born's mothers' occupation is home maker in both control and experimental group.
10. Higher percentage (67%) of new-borns belong to joint family while in experimental group (53%) of new-borns belong to type of family joint family.

Section –B**Assessment of weight before and after coconut oil massage.****Table no. I (N= 30)**

SN	Group	Mean weight during admission	Mean weight gain after 8 day	Total mean weight gain in (Gram)
1	Control	1811	1838	27
2	Experimental	1766	1900	134

Table depicts that in control group mean weight of new-borns during admission was 1811 grams whereas mean weight gain of new-borns after 8 days was 1838 grams and the mean weight gain was 27 grams, In experimental group mean weight of new-borns during admission was 1766 grams, mean weight gain of new-borns after 8 days was 1900 grams and total mean weight gain in new-borns was 134 grams.

The table concludes that total mean weight gain in experimental group (134 grams) is more than control group (27 grams) and It prove that oil massage was effective in improving the weight.

C – Assessment of new-borns’ behavioural response according to system**Table no. II (N=30)**

		Control (15 Sample)			Experimental (15 Sample)		
SN	system	0	1	2	0	1	2
1	Autonomic system	0	9	5.9	0	4.58	10.38
2	Motor system	8.6	1.96	4.34	8.18	0.70	6.14
3	State system	0.03	9.09	5.47	0	3.71	11.28
4	Social system	1.25	11.34	2.4	0	3.34	11.65

The table depicts that in autonomic, motor, state and social system among control group majority 7.84 were belong to average behavioural response and 4.52 were belongs to normal behavioural response and 2.46 were belong to absent behavioural response, in experimental group majority 9.96 belongs to normal, 3 were belong to average behavioural response and 2 were belongs to absent behavioural response. It all system interpret ate that normal behavioural response is more in experimental then in control.

C- 1 Newborns behavioral response according to system wise.**Table no. III****1. Behavioural response according to autonomic system (N=30)**

Control (15 Sample)					Experimental (15 Sample)		
SN	Items	0	1	2	0	1	2
1	Tremulousness	0	9	6	0	5	10
2	Startle	0	8.62	6.3	0	5	10
3	Cost of Attention to Exam	0	9.8	5.1	0	4.6	10.3
4	Lability of Skin Color	0	8.6	6.3	0	3.75	11.25

The table shows that in autonomic system among control group majority 9 were belong to average behavioural response and 5.9 were belongs to normal behavioural response, in experimental group majority 10.38 belongs to normal and 4.58 belong to average behavioural response. It interpretate that normal behavioural response is more in experimental then in control.

Table no. IV**2. Behavioural response according to motor system (N=30)**

Control (15 Sample)					Experimental (15 Sample)		
SN	Items	0	1	2	0	1	2
1	Sucking	0	0	15	0	0	15
2	Rooting	0	0	15	0	0	15
3	Palmer grasp	0	0	15	0	0	15
4	Plantar grasp	15	0	0	15	0	0
5	Standing	15	0	0	15	0	0
6	Stepping	15	0	0	15	0	0
7	Incurvation	15	0	0	15	0	0
8	Crawling	15	0	0	15	0	0
9	Motor Tone	2.37	11.87	0.75	0	4	11
10	Motor Maturity	3.25	9.75	2	0	3.75	11.6
11	Pull to Sit	15	0	0	15	0	0

The table shows that in motor system among control group majority 8.6 were belong to absent behavioural response and 4.34 were belongs to normal behavioural response and 1.96 were belongs to average behavioural response in experimental group majority 8.18 belongs to absent and 6.14 were belong to normal behavioural response and 0.70 were belong to normal behavioural response.

It interpretate that absent behavioural response is more in experimental then in control.

Table no. V

3. Behavioural response according to state system (N=30)

Control (15 Sample)					Experimental (15 Sample)		
SN	Items	0	1	2	0	1	2
1	Habituation	0.125	5.875	9	0	3.75	11.25
2	Lability of States	0.125	13.875	0.875	0	3.75	11.25
3	Peak of Excitement	0	8	7	0	3.75	11.25
4	Rapidity of Build Up	0	10.75	4.25	0	3.5	11.5
5	General Irritability	0	5.625	9.3	0	5.125	9.875
6	Self- Quieting	0	5.375	9.62	0	1	14
7	Hand to Mouth	0	14	1	0	5	10
8	Consol ability	0	9.25	5.75	0	3.87	11.125

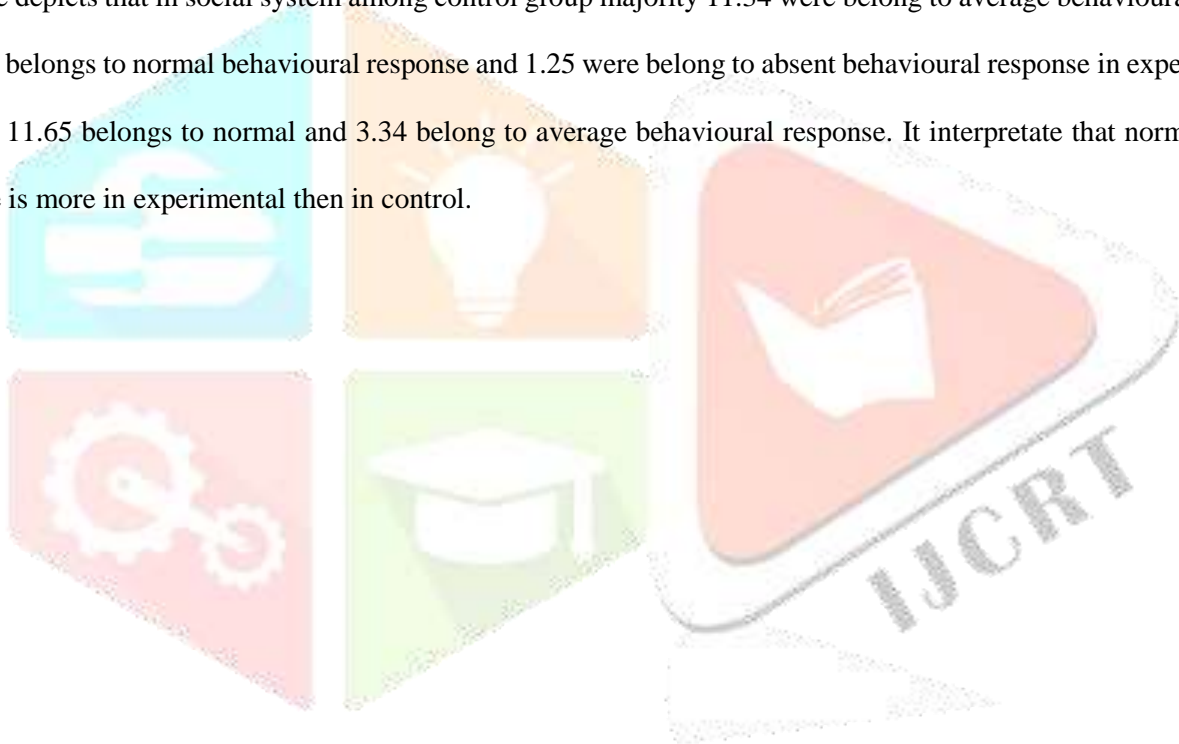
The table indicates that in state system among control group majority 9.9 were belong to average behavioural response and 5.47 were belongs to normal behavioural response and 0.03 were belong to absent behavioural response in experimental group majority 11.28 belongs to normal and 3.71 belong to average behavioural response. It interpretate that normal behavioural response is more in experimental then in control.

Table no. VI

4. Behavioural response according to social system (N=30)

Control (15 Sample)					Experimental (15 Sample)		
SN	Items	0	1	2	0	1	2
1	Visual orientation	1.375	11.125	2.5	0	3.875	11.125
2	Auditory orientation	0	11.875	3.125	0	3.25	11.75
3	Alertness	0	11.5	3.5	0	2.875	12.125
4	Facial expression	3.625	10.875	0.5	0	3.375	11.625

The table depicts that in social system among control group majority 11.34 were belong to average behavioural response and 2.4 were belongs to normal behavioural response and 1.25 were belong to absent behavioural response in experimental group majority 11.65 belongs to normal and 3.34 belong to average behavioural response. It interpretate that normal behavioural response is more in experimental then in control.



C-2 Newborns behavioral response according to item wise. Table no.**VII****(N=30)**

Tremulousness				
Control (15 Sample)			Experimental (15 Sample)	
Score	Frequency	Percentage	Frequency	Percentage
0	0	0	0	0
1	9	60	5	33.3
2	6	40	10	66.6
Startle				
0	0	0	0	0
1	8.62	57.33	5	33.3
2	6.3	42	10	66.6
Cost of attention to exam				
0	0	0	0	0
1	9.1	65.33	4.6	30.66
2	5.1	34	10.3	68.66
Liability of skin color				
0	0	0	0	0
1	8.6	57.53	3.75	25
2	6.3	42	11.25	75
Sucking				
0	0	0	0	0
1	0	0	0	0
2	15	100	15	100
Rooting				
0	0	0	0	0
1	0	0	0	0
2	15	100	15	100
Palmer grasp				
0	0	0	0	0
1	0	0	0	0
2	15	100	15	100
Planter grasp				
0	15	100	15	100
1	0	0	0	0
2	0	0	0	0
Standing				
0	15	100	15	100
1	0	0	0	0
2	0	0	0	0
Stepping				
0	15	100	15	100
1	0	0	0	0
2	0	0	0	0

The above table depicts that out of 30 new-borns, those in control group have average response and those who belong to experimental group had reached normal response after coconut oil massage.

C-2 Newborns behavioral response according to item wise.

Incurvation				
Control			Experimental	
Score	Frequency	Percentage	Frequency	Percentage
0	15	100	15	100
1	0	0	0	0
2	0	0	0	0
Crawling				
0	15	100	15	100
1	0	0	0	0
2	0	0	0	0
Motor tone				
0	2.375	15.83	0	0
1	11.875	79.16	4	26.6
2	0.75	5	11	73.3
Motor maturity				
0	3.25	21.6	0	0
1	9.75	65	3.375	22.5
2	2	13.3	11.6	77.33
Pull to sit				
0	15	100	15	100
1	0	0	0	0
2	0	0	0	0
Habituation				
0	0.125	0.83	0	0
1	5.875	39.16	3.75	25
2	9	60	11.25	75
Liability of state				
0	0.25	1.66	0	0
1	13.875	92.5	3.75	25
2	0.875	5.83	11.25	75
Peak of excitement				
0	0	0	0	0
1	8	53.33	3.75	25
2	7	46.6	11.25	75
Rapidity of build up				
0	0	0	0	0
1	10.75	71.6	3.5	23.3
2	4.25	28.3	11.5	76.6
General irritability				
0	0	0	0	0
1	5.625	37.5	5.125	34.16
2	9.3	62	9.875	65.83

The above table depicts that out of 30 new-borns, those in control group have average response and those who belong to experimental group had reached normal response after coconut oil massage.

C-2 Newborns behavioral response according to item wise.

Self-quilting				
Control			Experimental	
Score	Frequency	Percentage	Frequency	Percentage
0	0	0	0	0
1	5.375	35.83	1	6.6
2	9.62	64.13	14	93.33
Hand to mouth				
0	0	0	0	0
1	14	93.33	5	33.3
2	1	6.6	10	66.6
Consol ability				
0	0	0	0	0
1	9.25	61.6	3.875	25.83
2	5.75	38.3	11.125	74.16
Visual orientation				
0	1.375	9.16	0	0
1	11.125	74.16	3.875	25.83
2	2.5	16.6	11.125	74.16
Auditory orientation				
0	0	0	0	0
1	11.875	79.16	3.25	21.66
2	3.125	28.83	11.75	78.33
Alertness				
0	0	0	0	0
1	11.5	76.66	2.875	19.16
2	3.5	23.33	12.125	80.83
Facial expression				
0	3.625	24.16	0	0
1	10.875	72.5	3.375	22.5
2	0.5	3.33	11.625	77.5

The above table depicts that out of 30 new-borns, those in control group have average response and those who belong to experimental group had reached normal response after coconut oil massage. So, this indicates coconut oil massage has good effect on improving behavioural response among new-borns.

d) Effectiveness of coconut oil massage on weight and behavioral response**Table no. VIII (n=30)**

SN	Parameters	t calculated	Level of significance
1	Weight	1	Not significant
2	Behavioral response	7.09	Significant

(df =1) Table value 2.1 (P > 0.05)

Above table depicts that isn't calculated is lesser than 't' tabulated for weight it indicated statistically coconut oil massage is not effective on weight but research wise do. The t test value of 8th days computed to 1st day was significantly higher for behavioural response it indicates there is statistical effectiveness of coconut oil massage on behavioural response. So, there is significant effect of coconut oil massage on behavioural response but there is no significant effect of coconut oil massage on weight.

d) Demographic variable

1) Association of selected demographic variables with weight

Table no. IX

SN	Demographic variable	χ^2 calculated	Level of significance
1	Age of child in week	4.85	Significant
2	Gender	2.43	Not significant
3	Gestational age	5.9	Significant

(df =1) Table value 3.8 (P > 0.05)

This table depicts that age of child in week and gestational age are significant and gender is not significant. So, there is significant association between weight with selected demographic variable.

2) Association of selected demographic variables with Behavioral response.

Table no. X

SN	Demographic variable	χ^2 calculated	Level of significance
1	Age of child in week	11.26	Significant
2	Gender	8.32	Significant
3	Gestational age	11.26	Significant

(df =1) Table value 3.84 (P > 0.05)

This table depicts that demographic variables like age, gender, and gestational age are significant. So, there is significant association between behavioral response with selected demographic variable.

Discussion:

Description of socio demographic data of new-borns

High percentage experimental group all (100%) of new-borns were belongs to 1st week of age (fig No. 1) It was sink with the study conducted by Priya S Megha S. who also noted that majority (86%) group includes new-born belong 1st week ¹⁰.

Majority (53%) of new-born were male and 47 were female in both control and experimental group (fig No .2) It was supported by Christopher D, that among the samples of his study (55%) were male and 45% were female in both control and experimental group ¹¹.

High percentage (93%) were belongs to 37-41 week of gestational age and (7%) were below 36 week of gestational age, in experimental group all (100%) of new-borns belongs to 37-41 weeks of gestational age ,and none of them were belongs to less than 36 weeks of gestational age (fig No. 3). It was correlate with study conducted by Sudesh S, Giris S who also found that (95%) in the group of 37-41 week of gestational age ¹²

Major in control (33%) of new-borns belongs to 2nd day and (67%) belongs to 3rd day, in experimental group (13%) of new-borns belongs to 2nd day and (87%) of them were belongs to 3rd day (FIG No. 4). These studies also had similar finding conducted by Maria J that (70%) belongs to 3rd day in experimental group in study ¹³.

High percentage that in both experimental and control group all (100%) new-borns were consciousness (fig No 5). This study also had similar findings conducted by Gebremedhin M. who also found majority new-born in study were conscious ¹⁴.

In control group majority (60%) of new-borns immunization status is complete up to the age, (27%) then (20%) were having incomplete immunization status and (13%) of new-borns immunization status is partial complete up to the age, in experimental group majority (53%) were belong to complete immunization status (40%) were incomplete and (7%) were partial complete up to the age (Fig. 6) It was sink with the study conducted by Deep B, Surya B who noted majority (55%) of new-borns immunization status is complete up to the age ¹⁵.

In both control and experimental group majority (67%) of mothers of new- born belong to 19-22 years of age (Fig. No. 7).It was correlated with the study conducted by Karbasi SA, GolestanM,Fallah R et al. who noted that majority (74%) of mothers of new-borns belong to 19-22 years of age ¹⁶

In control group majority (60%) of new-born parent's education is primary while in experimental group higher percentage (47%) accounted for secondary education (Fig. No. 8). Similarly, Kumar J, Upadhyay A, Dwivedi AK et al. also found that majority (68%) of new-born's parent education is primary in control group because of rural setting of the study ¹⁷.

Majority (67%) of new-born's mothers occupation is home maker in both control and experimental group (Fig. No. 9).This was contradictory with the study findings of Islami Z, Fallah R, Mosavian T et al. who noted private job as a prime occupation (71%) as the variance in the sociocultural differences of population under study ¹⁸.

Higher percentage (67%) of new-borns belong to joint family while in experimental group (53%) of new-borns belong to type of family joint family (Fig. No. 10). It was contradictory with the study conducted by Saeadi R, Ghorbani Z, Shapouri A who found that majority (91%) of new-borns belong to nuclear type of family because of variability of the population under study ¹⁹.

Section II:

Assessments of effectiveness of coconut oil massage on changes in weight and behavioural response among low birth weight new-borns.

a. Assessment of weight before and after coconut oil massage.

Total mean weight gain in experimental group (134 grams) is more than control group (27 grams) and highlight the oil massage was effective in improving the weight (Table No. I). This was similarly coincidental with the study findings of Taheri PA, Goudarzi Z, Shariat M et al. body massage with sunflower oil for only five days increases preterm infants' weight gain and decreases their duration of NICU stay significantly though there is difference in the interventions used for both the study²⁰

b. Effectiveness of coconut oil massage on behavioural response according to system

The behavioural response was average (Mean=7.84) in control group while in experimental group behavioural response was normal (Mean=9.96) (Table No. II). This interpret that majority had normal behavioural response in experimental group and depicts that coconut oil massage is effective on behavioural response of the new- born. It was similarly coincidental with the findings of the study performed by Pitre S who noted that improvement in all listers such as Orientation, range of state , regulation of state , & autonomic stability at follow-up. Habituation & reflex cluster showed improvement as early as on first assessment only²¹.

Testing of hypotheses

Paired 't' test was calculated to analyse the effectiveness of coconut oil massage on weight and behavioural response of the low birth weight new-borns. A significant difference was found between behavioural response of control and experimental group ('t' value 7.09) (Table No. VIII). It was consistent with the study of MathaiS, Fernande A who found calculated' value was 8.04 indicating effectiveness of coconut oil massage on behavioural responses of new-borns²²

Section III:**a. Association of selected demographic variables with weight of the low birth weight new-borns**

The findings of the chi square test revealed that there was statistically significant association between age of child in week($\chi^2=4.85$) and gestational age ($\chi^2=5.9$) and weight of low birth weight new-born (Table No. IX). It was significantly similar with the findings of the study conducted by Harrison who noted significant association between age of child ($\chi^2=5.13$) and weight gain of low birth weight new- born²³.

b. Association of selected demographic variables with behavioural response of the low birth weight new-borns

The findings of the chi square test revealed that there was statistically significant association between age of child in week ($\chi^2=11.26$), gender ($\chi^2=8.32$) and gestational age ($\chi^2=11.26$) and behavioural response of the low birth weight new- born

(Table No. X). These findings were significantly similar with the findings of the study conducted by Zahra, Balian who found significant association between gender ($\chi^2=7.66$) and gestational age ($\chi^2=8.68$) and behavioural response of the new-born below 1500gms of weight ²⁴.

Conclusion:

The major conclusion drawn from this study is that the coconut oil was found to be effective in improving the weight and behavioural response among new-borns. This study concludes that massage was beneficial in increasing the weight and improving the behavioural response of low birth weight new-borns than the new-borns who did not received massage, Findings of this study also concludes that, massage did not have any ill effect on maintenance of improving weight gain and behavioural response of new-borns. New-borns who received massage also did not develop any complications

Implications for Nursing:

The findings of the study are significant and relevant in the area of nursing profession. The implication of this study could be discussed under nursing practice, nursing education, nursing administration and nursing research.

Nursing practice

The role of nurses is constantly changing. These changes are the result of evolving concepts of wellness and illness. Today the emphasis has broadened to include the promotion of health and prevention of illness. Nurses play an important role in comprehensive assessment of the new-born care and associated problems which can minimize the risk of low birth weight. Nurses must have adequate preparation and training on coconut oil massage which will help them to reduce the risk of low birth weight among new-borns. Nurses themselves need to be equipped with advanced knowledge to become involved in providing necessary services. An implication for nursing practices derived from this study is that coconut oil massage will help in gaining weight among new-borns.

Nursing education:

The practical knowledge of nurses depends on the education they receive. So, the nursing education should prepare the nurses to realize their responsibility as a nurse educator. To enhance the knowledge on management of low birth weight new-borns, it is an important aspect of basic education programs in nursing. The primary task of nursing education would be to intervene in hospital in-patient and out-patient departments, rehabilitation centres. Nurse educators will emphasize on evidence-based practices while imparting nursing knowledge to nursing students.

Nursing research:

Extensive research studies can be undertaken in different fields to quantify the magnitude of deficiency of knowledge regarding coconut oil massage on weight gain and behavioural responses among new-born. Evidence-based nursing care can be implemented based on the research findings. Study results will provide clues to nursing researcher for further studies

Recommendation:

1. Based on the findings of the study following recommendation have been made for the study:
2. The study can be replicated with larger sample to generalize the findings.
3. A study could be conducted in different hospital to find the effectiveness of coconut oil massage on changes in weight and behavioural response among low birth weight new-borns.
4. A study may be conducted to find out the effectiveness of coconut oil and olive oil in experimental and control group.
5. A comparative study may be conducted on effectiveness of coconut oil and olive oil on changes in weight and behavioural responses among low birth weight new-borns.
6. A comparative study may be conducted on effectiveness of coconut oil on changes in weight and behavioural responses among low birth weight new-borns in Urban and Rural areas.

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