A study to assess the effect of massage therapy on weight and feed tolerance among premature neonates admitted in selected hospital.

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Abstract :

Introduction: Human touch has been shown to be emotionally and physically healing for centuries. Touch is a primal need, and the first important mode of communication between a mother and her new baby. Baby friendly approach suggests that positive touch and massage are important aspects of child care as it promotes health on all levels – physiologically, psychologically, emotionally and developmentally,
 Design &method: The development of the tool started with a conceptualization phase. followed by design, pilot testing & validation. Experimental pre-test post-test control group design was used this study.sample was used 60 for this study.

Result : The Researcher applied two sample t-test for Comparison of change in weight among premature neonates in experimental and control group. In experimental group, the change in weightwas positive after day1 obsevation-2 and consistently increased over time-points, whereas change in weight of control group premature neonates was negative and decreased over time-points. Day 2 observation-3 onwards, p-values for this comparison were small at all the time-points.
Conclusion: It is evident that the massage therapy was significantly effective in improving the weight of neonates. This indicates that the feed tolerance among the premature neonates had improved remarkably after massage therapy

Key word- effect , massage ,feed tolerance , neonate, premature.

Introduction

Human touch has been shown to be emotionally and physically healing for centuries. Touch is a primal need, and the first important mode of communication between a mother and her new baby. Baby friendly approach suggests that positive touch and massage are important aspects of child care as it promotes health on all levels – physiologically, psychologically, emotionally and developmentally. Massage is a 'hands-on' treatment in which a therapist manipulates muscles and other soft tissues of the body to improve health and well-being which ranges from gentle stroking and kneading of muscles and other soft tissues to deeper by using techniques. It has also been practiced as a healing therapy for centuries in nearly every culture around the world. Though baby and infant massage is a tradition in India and other Asian countries.

Preterm is defined by World Health Organization (WHO) as babies born alive before 37 completed weeks of gestation or fewer than 259 days of gestation since the first day of a woman's last menstrual period (LMP). Based on WHO report (2016) ,more than 1 of 10 neonates were born prematurely worldwide, making an estimate of 15 million preterm births ,of which more than 1 million die as a result of their prematurity. More than 60% of preterm births occur in Africa and South Asia. Across 184 countries, the rate of preterm birth ranges from 5% to 18% of babies born. Preterm birth is the single largest cause of neonatal deaths and second leading cause of death in children under age of 5yrs. In lower income countries, on average, 12% of babies are born too early compared with 9% in higher income countries. Within countries, poorer families are at higher risk

In India, among the total 27 million babies born annually, 3.6 million babies are born preterm, and over 300,000 of these preterm babies die each year because of associated complications. India, with its highest number of PTBs and the highest number of preterm deaths worldwide, contributes 25% of the overall global preterm related deaths.

Jamal S et al. 2017, conducted retrospective analytical study of epidemiology and causes of preterm birth. The study was conducted in the Department of Obstetrics and Gynecology, SMS and R, Greater Noida. A total of 2564 pregnancies were analyzed in the study. The result revealed out of 2564, the number of live births was 2365, making an incidence of 18.4%. The number of preterm deliveries was 436. Maximum preterm deliveries were observed in the teenage group (27%) and elderly gravida (23.9%), both the groups falling into high risk categories for preterm birth. Multiparity was an independent risk factor observed in study and was found to be associated with 47.5% cases. As high as 58.4% of the females landed into preterm birth, who never sought antenatal care, the commonest risk factor for preterm birth was premature rupture of membrane (26.6%) followed by hypertensive disorders of pregnancy (18.6%). Researcher observed a labor induction rate of 23.4% and caesarean delivery was performed in 146 (33.5%)

cases, thus indicating a high induction and caesarean rates in such pregnancies.[3]

Design & methods

Setting : The setting for this study was Dr.D.Y.Patil Hospital & Research center, Mankikar Hospitalof Pune city.

Research design: Quasi experimental pre-test post-test control group design was used this study.

Sample size :60

Sampling technique: This study was used Non-probability purposive sampling technique

Independent Variable

In this study, the independent variable is Massage therapy.

Dependent Variable

In this study, the dependent variable is weight and feed tolerance of premature neonates.

Inclusion criteria:

1. Premature neonates as medically classified from both gender
2. Gestational age was ranged between 32 to $\leq$ 36 weeks & 6 days.
3. Premature neonates weight at the onset of study was $\leq$ 2.5grams.

Exclusion Criteria:

1. High risk premature neonates who are critically ill.
2. Premature neonates who are on phototherapy.
3. Apgar score less than 6
4. NBM babies
5. Premature neonates who are on breastfeeding

Ethical Consideration

The researcher followed the ethical and legal issues related to nursing research. Moreover, permission was taken from the nursing superintendent, the authority was informed and consent was taken from parents. This study was done only for study purpose and researcher maintained the confidentiality.

Result :

The collected data is tabulated, analyzed, organized and presentedunder the following headings:Section

I: Description of samples based on their demographic characteristics

Section II: Analysis of data related to the weight and feed tolerance among premature neonates.

Section III: Analysis of data related to the effect of massage therapy on weight and feed toleranceamong premature neonates.

Section IV: Analysis of data related to association of weight and feed tolerance with selected demographic variables

Table 1: Description of samples based on their personal characteristics in terms of frequencyand percentages　　　　　　　　　　　　　　　　　　　　　　　　**n=30, 30**

Sr. No.	Demographic variable	Experimental		Control	
		Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
1.	**Gender**				
	Male	15	50.0%	14	46.7%
	Female	15	50.0%	16	53.3%
2.	**Family income per month**				
	Up to Rs. 10,000/-	4	13.3%	1	3.3%
	Rs. 10,001-20,000/-	20	66.7%	16	53.3%
	Rs. 20,001-30,000/	3	10.0%	9	30.0%
	>Rs. 30,000/-	3	10.0%	4	13.3%
3.	**Gestational age**				
	32-34 weeks	7	23.3%	6	20.0%
	34.1-36 weeks	12	40.0%	14	46.7%
	36.1 - 36.6 weeks	11	36.7%	10	33.3%
4.	**Birth weight**				
	1.5-1.750 Kg	5	16.7%	4	13.3%
	1.751-2 Kg	6	20.0%	7	23.3%
	2.001-2.25 Kg	11	36.7%	11	36.7%
	2.251-2.5 Kg	8	26.7%	8	26.7%
5.	**Birth order**				
	First	14	46.7%	16	53.3%

Second	9	30.0%	6	20.0%
Third	4	13.3%	4	13.3%
More	3	10.0%	4	13.3%

Sr. No.	Demographic variable	Experimental		Control	
		Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
6.	**Type of feeding**				
	EBM	7	23.3%	6	20.0%
	Donor milk/ Human milk	10	33.3%	10	33.3%
	Formula feeding	13	43.3%	14	46.7%
7.	**Time of initiation of feeding after birth**				
	Within 1 hours	16	53.3%	16	53.3%
	1 to 6 hours	9	30.0%	11	36.7%
	6 to 24 hours	5	16.7%	3	10.0%

Table 1 : shows with the description of samples with regards to demographic characteristics.

In experimental group, 50% for the neonates were males and 50% of them were females. In control group, 46.7% for the neonates were males and 53.3% of them were females.

In experimental group, 13.3% of them had family income up to Rs. 10000, 66.7% of them had monthly f/+amily income Rs.10001-20000, 10% of them had family income Rs.20001-30000 and 10% of them had monthly family income above Rs. 30000. In control group, 3.3% of them had family income up to Rs. 10000, 53.3% of them had monthly family income Rs.10001-20000, 30% of them had family income Rs.20001-30000 and 13.3% of them had monthly family income above Rs.30000.

In experimental, 23.3% of them had gestational age of 32-34 weeks, 40% of them had gestational age of 34.1-36 weeks and 36.7% of them had gestational age 36.1 -36.6 weeks. In control, 20% of them had gestational age 32-34 weeks, 46.7% of them had gestational age 34.1-36 weeks and 33.3% of them had gestational age 36.1 -36.6 weeks.

 In experimental group, 16.7% of them had birth weight 1.5-1.750kg, 20% of them had birth weight 1.751-2kg, 36.7% of them had birth weight 2kg-2.25kg and 26.7% of them had birth weight 2.251- 2.5kg. In control group, 13.3% of them had birth weight 1.5-1.750kg, 23.3% of them had birth weight 1.751-2kg, 36.7% of them had birth weight 2kg-2.25kg and 26.7% of them had birth weight 2.251-2.5kg.

In experimental group, 46.7% of them were first child, 30% of them were second child, 13.3% of them were third child and 10% of them had birth order more than 3. In control group, 53.3% of them were the first born child, 20% of them were second born child, 13.3% of them were third born child and 13.3% of

them had birth order more than 3.

In experimental group, 23.3% of them EBM feeding, 33.3% of them had feeding by Donor milk/ Human milk and 43.3% of them had Formula feeding. In control group, 20% of them EBM feeding, 33.3% of them had feeding by Donor milk/ Human milk and 46.7% of them had Formula feeding.

In experimental group, 53.3% of them had initiated feeding within 1st hour after birth, 30% of them had initiated feeding within 1 to 6 hours after birth and 16.7% of them had initiated feeding within 6 to 24 hours after birth. In control group, 53.3% of them had initiated feeding within 1st hour after birth, 36.7% of them had initiated feeding within 1 to 6 hours after birth and 10% of them had initiated feeding within 6 to 24 hours after birth

SECTION II:Analysis of data related to the weight and feed tolerance among premature neonates.
Table 2: Description of weight among premature neonates

n=30, 30

Time-point	Experimental		Control	
	Mean	SD	Mean	SD
Baseline	2.069	0.227	2.102	0.200

Table 2: It shows that in experimental group, average weight of neonates at baseline was 2.069kgwith SD 0227 and average weight in control group was 2.102kg with SD 0.200.
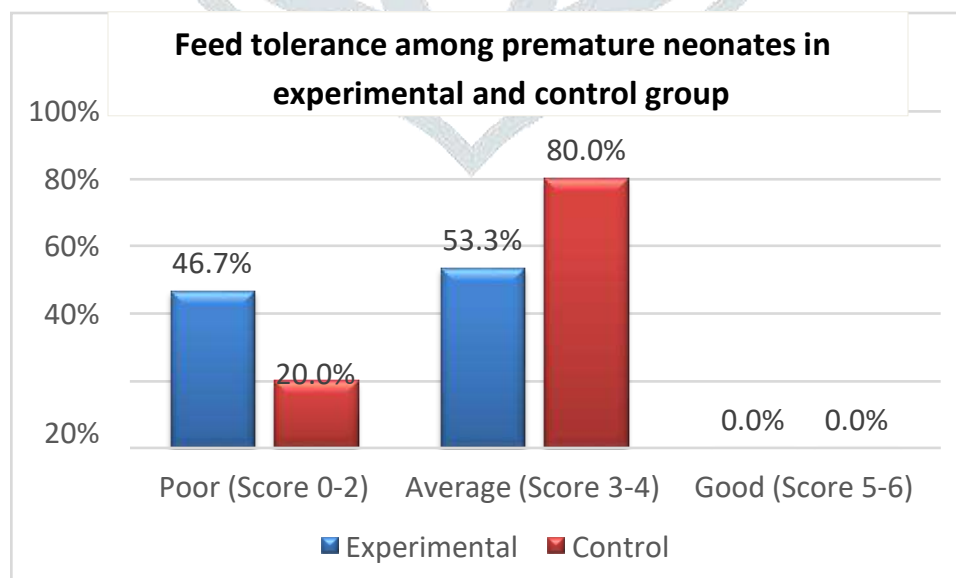
n=30, 30

Fig. No 2: Bar graph showing analysis of data related to feed tolerance among premature neonates in experimental group and control group

Fig No 2 shows that in experimental group, 46.7% of the premature neonates had poor feed tolerance (0-2) and 53.3% of them had average feed tolerance (score 3-4) at baseline. In control group, 20% of the premature neonates had poor feed tolerance (0-2) and 80% of them had average feed tolerance (score 3-4) at baseline.

SECTION III:Analysis of data related to the effect of massage therapy on weight and feed tolerance among premature neonates.
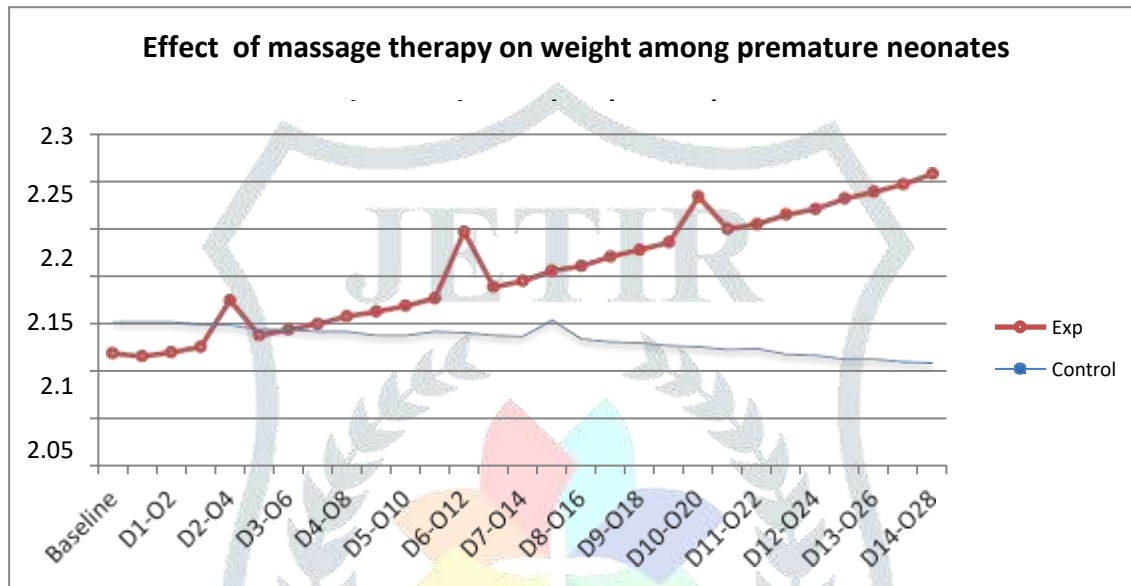
n=30, 30

Fig No 3: Line graph related to the effect of massage therapy among premature neonates in experimental and control group

Fig No 3 shows that, on day 2 observations-3 onwards, weight of the premature neonates in experimental group increased continuously over time-points. Whereas, weight of premature neonates in control group was decreased over time-points. This indicates that there is improvement in the weight of premature neonates in experimental group.

Researcher applied paired t-test for the effect of massage therapy on weight of neonates. The weight of the neonates in experimental group increased continuously over time-points. Since Day 2 observation-3 onwards, all the p-values were small (less than 0.05), the null hypothesis is rejected. Day 2 observation-3 onwards, the massage therapy was significantly effective in improving the weight of neonates.

Section III

Table 4: Effect of massage therapy on feed tolerance among premature neonates in experimental and control group   **n=30, 30**

Sr. No.	Time-point	Feed Tolerance	Experimental		Control	
			Frequency (f)	Percentage %	Frequency (f)	Percentage %
1.	Baseline	Poor (Score 0-2)	14	46.7%	6	20.0%
		Average (Score 3-4)	16	53.3%	24	80.0%
		Good (Score 5-6)	0	0.0%	0	0.0%
2.	Day 1	Poor (Score 0-2)	14	46.7%	1	3.3%
		Average (Score 3-4)	16	53.3%	29	96.7%
		Good (Score 5-6)	0	0.0%	0	0.0%
3.	Day 2	Poor (Score 0-2)	1	3.3%	5	16.7%
		Average (Score 3-4)	29	96.7%	25	83.3%
		Good (Score 5-6)	0	0.0%	0	0.0%
4.	Day 3	Poor (Score 0-2)	0	0.0%	23	76.7%
		Average (Score 3-4)	30	100.0%	7	23.3%
		Good (Score 5-6)	0	0.0%	0	0.0%
5.	Day 4	Poor (Score 0-2)	0	0.0%	25	83.3%
		Average (Score 3-4)	19	63.3%	5	16.7%
		Good (Score 5-6)	11	36.7%	0	0.0%
6.	Day 5	Poor (Score 0-2)	0	0.0%	14	46.7%
		Average (Score 3-4)	11	36.7%	16	53.3%
		Good (Score 5-6)	19	63.3%	0	0.0%
7.	Day 6	Poor (Score 0-2)	0	0.0%	29	96.7%
		Average (Score 3-4)	6	20.0%	1	3.3%
		Good (Score 5-6)	24	80.0%	0	0.0%
8.	Day 7	Poor (Score 0-2)	0	0.0%	30	100.0%
		Average (Score 3-4)	1	3.3%	0	0.0%
		Good (Score 5-6)	29	96.7%	0	0.0%
9.	Day 8	Poor (Score 0-2)	0	0.0%	26	86.7%
		Average (Score 3-4)	0	0.0%	4	13.3%
		Good (Score 5-6)	30	100.0%	0	0.0%

Table 4: Effect of massage therapy on feed tolerance among premature neonates in experimental and control group   **n=30, 30**

Sr.no	Time-point	Feed tolerance	Experimental		Control	
			Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
10	Day 9	Poor (Score 0-2)	0	0.0%	30	100.0%
		Average (Score 3-4)	0	0.0%	0	0.0%
		Good (Score 5-6)	30	100.0%	0	0.0%
11	Day 10	Poor (Score 0-2)	0	0.0%	30	100.0%
		Average (Score 3-4)	0	0.0%	0	0.0%
		Good (Score 5-6)	30	100.0%	0	0.0%
12	Day 11	Poor (Score 0-2)	0	0.0%	30	100.0%
		Average (Score 3-4)	0	0.0%	0	0.0%
		Good (Score 5-6)	30	100.0%	0	0.0%
13	Day 12	Poor (Score 0-2)	0	0.0%	26	86.7%
		Average (Score 3-4)	0	0.0%	4	13.3%
		Good (Score 5-6)	30	100.0%	0	0.0%
14	Day 13	Poor (Score 0-2)	0	0.0%	30	100.0%
		Average (Score 3-4)	0	0.0%	0	0.0%
		Good (Score 5-6)	30	100%	0	0.0%
15	Day 14	Poor (Score 0-2)	0	0.0%	30	100.0%
		Average (Score 3-4)	0	0.0%	0	0.0%
		Good (Score 5-6)	30	100.0%	0	0.0%

Table 4 shows that analysis of data related to effect of massage therapy on feed tolerance in experimental and control group

In experimental group, 46.7% of the premature neonates had poor feed tolerance (Score 0-2) and 53.3% of them had average feed tolerance (Score 3-4). On day1, 46.7% of them had poor feed tolerance (Score 0-2) and 53.3% of them had average feed tolerance (Score 3-4). On day 2, 3.3% of them had poor feed tolerance (score 0-2) and 96.7% of them had average feed tolerance (score 3-4). On day3, all of them had average feed tolerance (Score 3-4). On day 4, 63.3% of them had average feed tolerance (Score 3-4) and 36.7% of them had good feed tolerance (score 5-6). On day5, 36.7%

of them had average feed tolerance (Score 3-4) and 63.3% of them had good feed tolerance (score 5-6). On day 6, 20% of them had average feed tolerance (Score 3-4) and 80% of them had good feed tolerance (Score 5-6). On day7, 3.3% of them had average feed tolerance (Score 3-4) and 96.7% of them had good

feed tolerance (Score 5-6). Day 8 onwards, all the premature neonates in experimental group had good feed tolerance (Score 5-6).

In control group, 20% of the premature neonates had poor feed tolerance (Score 0-2) and 80% of them had average feed tolerance (Score 3-4). On day1, 3.3% of them had poor feed tolerance (Score 0-2) and 96.7% of them had average feed tolerance (Score 3-4). On day 2, 16.7% of them had poor feed tolerance (score 0-2) and 83.3% of them had average feed tolerance (score 3-4). On day3, 76.7% of them had poor feed tolerance (Score 0-2) and 23.3% of them had average feed tolerance (Score 3-4). On day 4, 83.3% of them had poor feed tolerance (Score 0-2) and 16.7% of them had average feed tolerance (Score 3-4). On day5, 46.7% of them had poor feed tolerance (Score 0-2) and 53.3% of them had average feed tolerance (Score 3-4). On day 6, 96.7% of them had poor feed tolerance (score 0-2) and 3.3% of them had average feed tolerance (Score 3-4). On day7, all of them had poor feed tolerance (Score 0-2). On day 8, 86.7% of them had poor feed tolerance (Score 0-2) and 13.3% of them had average feed tolerance (Score 3-4). On day 9 through day 11, all the premature neonates in control group had poor feed tolerance (Score 0-2). On day 12, 86.7% of them had poor feed tolerance (Score 0-2) and 13.3% of them had average feed tolerance (Score 3-4). On day 13 and day 14, all the control group premature neonates had poor feed tolerance (Score 0-2).

This indicates that the feed tolerance among premature neonates in experimental group improved continuously over time-points on the other hand, feed tolerance among premature neonates in control group worsened over time-points. This indicates that the feed tolerance among the premature neonates had improved remarkably after massage therapy.

SECTION IV:

Analysis of data related to association of weight and feed tolerance with selected demographic variables: since p-value corresponding to demographic variable gestational age was small (less than 0.05), gestational age was found to have significant association with the weight of premature neonate because as the stomach maturity improves as per gestational age. All the neonates having weight 1.5-1.750 Kg had gestational age 32-34 weeks.

Discussion:

A similar study was conducted on to assess the effect of touch stimulation on weight gain, length gain, enteral intake and responds admitted in H. Adam Malik hospital and several hospitals at Medan. A total 30 low birth weight baby were taken divided equally into two groups, intervention and control group. Univariate and bivariate (t-test) analysis were performed with 95% CI and P value <0,005 were considered statistically significant. There were differences on weight [mean diff. 87,6 (SD 49); P<0,001], length [mean diff. 0,5 (SD 0,2); P<0,001] and respiratory rate [mean diff. 2,5 (SD 3,7); P=0,021] after the administration

of touch stimulation. There was no difference in enteral intake. There were differences on mean weight gain (87,6 g and 34 g; P=0,003) and length gain (0,5 cm and 0,3 cm; P=0,027) between intervention and control group. There is significant difference on weight gain and length gain between LBW infants who receive and do not receive touch stimulation.[4]

A similar study was conducted at the Neonatal Intensive Care Unit at Tanta University Hospital. The aim of the study was to determine the effect of abdominal massage therapy on feeding tolerance of premature neonates. A total 60 premature neonates were taken divided into three groups, control group, study group before feeding, study group after the feeding. Premature neonate was received abdominal massage therapy 15 minutes twice a day for 7 days. Findings of the study revealed that all of premature neonates in both massage groups had less gastric residual, abdominal distention, vomiting and abnormal characteristics and consistency of stool in the last day of abdominal massage therapy compared to premature neonates in control group. The premature neonates in both massage groups reached to full feeding faster than premature neonates in control group. Premature neonates who received abdominal massage therapy took less time to reach full feeding than premature neonates in control group and exhibited less feeding intolerance criteria as less gastric residual, less abdominal distention, less vomiting and less abnormal defecation compared to premature neonates in control group.[33]

The present study was done to assess the effect of massage therapy on weight and feed tolerance among premature neonates. In that, 60 samples were taken, of which 30 were in experimental group and 30 in the control group. In pretest showed for the experimental group,
average weight of neonates at baseline was 2.069kg with SD 0.227, 46.7% of the premature neonates had poor feed tolerance (0-2) and 53.3% of them had average feed tolerance (score 3-4) at baseline. In control group average weight was 2.102kg with SD 0.200, 20% of the premature neonates had poor feed tolerance (0-2) and 80% of them had average feed tolerance (score 3-4) at baseline. In post-test, weight of the neonates in experimental group increased continuously over time-points. Since morning Day 2 onwards, p-values were found to be small (less than 0.05). Hence, the null hypothesis is rejected. Day 2 morning onwards, the massage therapy was significantly effective in improving the weight of neonates. In experimental group, 46.7% of the premature neonates had poor feed tolerance (Score 0-2) and 53.3% of them had average feed tolerance (Score 3-4). On day1, 46.7% of them had poor feed tolerance (Score 0-2) and 53.3% of them had average feed tolerance (Score 3-4). on day 2, 3.3% of them had poor feed tolerance (score 0-2) and 96.7% of them had average feed tolerance (score 3-4). On day3, all of them had average feed tolerance (Score 3-4). On day 4, 63.3% of them had average feed tolerance (Score 3-4) and 36.7% of them had good feed tolerance (score 5-6). On day5, 36.7% of them had average feed tolerance (Score 3-4) and 63.3% of them had good feed tolerance (score 5-6). On day 6, 20% of them had average feed tolerance (Score 3-4) and 80% of them had good feed tolerance (Score 5-6). On day7, 3.3% of them had average

feed tolerance (Score 3-4) and 96.7% of them had good feed tolerance (Score 5-6). Day 8 onwards, all the premature neonates in experimental group had good feed tolerance (Score 5-6).

A similar study was conducted on the effect of massage on physiological and behavioral parameter among low birth weight admitted in selected hospital of Pune. A total 150 babies were selected for the study. Physiological parameters like weight, oxygen saturation, heart rate, temperature, skin color recorded daily before and after massage. Behaviour were assessed be using Brazelton neurobehavioral scale. Chi square test used for the study. Findings of the study revealed that in control group there was association was found between demographic variable gestational age (p is less than 0.05) and weight of the babies. In experimental group there was no association found between weight and gestational age.[39]

The present study was done on 60 samples, of which 30 in experimental and 30 in the control group. Weight was recorded before and after massage therapy. Fisher's exact test used for the study. The findings of the study revealed that demographic variable gestational age (p-less than 0.05) was found significant association with weight of premature neonates.

Conclusion:

The overall experience of conducting this study was satisfying one, as there was good response of massage therapy& feed tolerance about neonate. The study was a new learning experience for the investigator.

It has been observed this indicates that the feed tolerance among premature neonates in experimental group improved continuously over time-points on the other hand, feed tolerance among premature neonates in control group worsened over time-points. This indicates that the feed tolerance among the premature neonates had improved remarkably after massage therapy. The researcher applied paired t-test for the effect of massage therapy on feed tolerance of neonates. Average feed tolerance score in experimental group premature neonates increased continuously day 2 onwards. Since day 2 onwards, all the p-values were small (less than 0.05), the null hypothesis is rejected. The massage therapy was significantly effective in improving the feed tolerance of neonates. It is evident that the massage therapy was significantly effective in improving the weight of neonates.

Limitations: The study done on premature neonates comprised of 60 samples. The setting chosen for the studywas limited to the NICUs of selected hospital

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References:

1. http://www.who.int/news-room/fact-sheets/detail/preterm-birth

2. https://www.nibmg.ac.in/?q=content/preterm-birth-program

3. Jamal S et al. "A retrospective analytical study of the epidemiology and causes of preterm" Int J Reprod Contracept Obstet Gynecol. 2017 Dec;6(12):5453-5457

4. Lili Rohmawati, Syamsidah Lubis. "The Effect Of Touch Stimulation On Weight Gain In Low

Birth Weight (Lbw) Infants" February-2019, Volume-8, Issue-2,

5. Amini E, Ebrahim B, Dehghan P, Fallahi M, Sedghi S, Amini F, et al. "The effect of massage therapy on weight gain and calories intake in premature neonates: a brief report." Tehran Univ Med J 2014; 71(10): 674-78.

6. Mahboobeh Ghasemi, Bita Najafian, Mohammad Hossein Khosravi, Mehrandokht Nekavand. "Effect of Abdominal Massage on Gastric Residual Volume and Weight Gain of Premature Infants Admitted in NICU" Canon journal of medicine.
 DOI: 10.30477/cjm.2019.87285

7. Mahdi Basiri-Moghadam, Kokab Basiri-Moghadam, Mojtaba Kianmehr, Somaye Jani. "The effect of massage on neonatal jaundice in stable preterm newborn infants" June2015
Volume-65, No.6.

8. Kulkarni A, Kaushik JS, Gupta P, Sharma H, Agrawal RK. "Massage and touch therapy in neonates: the current evidence." Indian Pediatr 2010 Sep; 47(9):771-6

9. Prince D, Prince J. "Effectiveness of oil massage on weight gain among pre-term neonates in selected pediatric hospitals, Hyderabad" 21-Jul-2016, 09:32:56 AM GMT

10. Huda Shawky Mahmud , Soheir Abd Elhamid Dabash , Elham Mohamed Ahmed , Ragia Mohamed Kamel & Safaa Salah Ismail. "Effects Of Oil Massage Therapy OnAnthropometric Parameters And Behavioral State Of Stable Low Birth Weight Neonates" International Journal of Research in Applied, Natural and Social Sciences (IMPACT:IJRANSS) ISSN(P): 2347-4580;ISSN(E): 2321-8851 Vol. 4, Issue 6, Jun 2016, 33-42

11. Miguel A. Diego, Tiffany Field, and Maria Hernandez-Reif. "Preterm Infant Weight Gain is Increased by Massage Therapy and Exercise Via Different Underlying Mechanism" Early Hum Dev. 2014 March ; 90(3): 137–140. doi:10.1016/j.earlhumdev.2014.01.009. NIH

12. Ali Sheidaei, Alireza Abadi, Farid Zayeri , Fatemeh Nahidi, Nafiseh Gazerani, Anita Mansouri. "The effectiveness of massage therapy in the treatment of infantile colic symptoms: A randomized controlled trial", Med J Islam Repub Iran 2016 (9 April). Vol. 30:351.

13. Reza Saeidi1, Zahra Ghorbani and Abbas Shapouri Moghadam. "The Effect of Massage with Medium-Chain Triglyceride Oil on Weight Gain in Premature Neonates." Acta Medica Iranica (2015) Vol. 53, No. 2

14. Badini Pourazar S, Shirinabadi Farahani A, Ghahri Sarabi A, Pourhoseingholi MA, Dehghan K. "The Effect of Abdominal Touch on Nutritional Tolerance in Premature Infants: A Randomized Clinical Trail" Int J Pediatr 2018; 6(8): 8119-28. DOI: 10.22038/ijp.2018.28656.2496

15. The Oxford dictionary, 6th edition; Jai singh road New Delhi; Oxford University press; 2005 No 35-36

16. Merenstein and Gardner's, Handbook of NICU, Elsevier, 8 th edition, pg no.407

17. Op Ghai, Textbook of pediatric nursing, paras medical publisher p.g.no.118

18. Abdelmoneim Khashana, Rehab Moussa. "Incidence of feeding intolerance in preterm neonates in neonatal intensive care units, Port Said, Egypt." J Clin Neonatol. 2016:5:230-2

19. Sushma Nangia, Amit Bishnoi, Ankita Goel, Piali Mandal, Soumya Tiwari and Arvind Saili. "Early Total Enteral Feeding in Stable Very Low Birth Weight Infants: A Before and After Study." Journal of Tropical Pediatrics. 2018, 64, 24–30 doi: 10.1093/tropej/

20. SB DeMauro, S Abbasi and S Lorch." The impact of feeding interval on feeding outcomes in very low birth-weight infants" Journal of Perinatology (2011) 31, 481–486

21. Manoj Modi, Siddarth Ramji, Ashish Jain, Pradeep Kumar And Neeraj Gupta "Early Aggressive Enteral Feeding In Neonates Weighing 750-1250 Grams: A Randomized Controlled Trial." Indian Pediatrics. Volume 56, April 15, 2019

22. Babaei H, Vakiliamini M. "Effect of Massage Therapy on Transcutaneous Bilirubin Level in Healthy Term Neonates." Iranian Journal of Neonatology 2018; 9(4)

23. Orban Ragab Bayomi, Nahed Saied El-Nagger. "Effect of applying massage therapy on physical, physiological and behavioral states of premature neonates." Journal of Nursing Education and Practice 2015, Vol. 5, No. 10 DOI:10.5430/jnep.v5n10p105

24. Sedighah Akhavan Karbasi, Motahhareh Golestan, Razieh Fallah, Mohammad Golshan, Zinabossadat Dehghan. "Effect of body massage on increase of low birth weight neonates growth parameters: A randomized clinical trial." Iranian Journal of Reproductive Medicine. July 2013, Vol.11. No.7. pp: 583-588,

25. Khan S. A, Punj A, Agarwal A. "Evaluation of effect of medium chain triglycerides on growth pattern of newborn in a tertiary care hospital." Int J Med Paediatr Oncol. 2018;4(4):152-156.

26. Jocelyn Y. Ang, Jorge L. Lua, Ambika Mathur, Ronald Thomas, Basim I. Asmar, Sureyya Savasan, Steven Buck, Michael Long, and Seetha Shankaran. "A Randomized Placebo- Controlled Trial of Massage Therapy on the Immune System of Preterm Infants." Pediatrics December 2012, Volume 130, Number 6.

27. Fatemah Nahidi, Nafiseh Gazerani and Ali Reza Abadi. "The Comparison of the Effects of Massaging and Rocking on Infantile Colic, Iran" J Nurs Midwifery Res. 2017 Jan-Feb; 22(1): 67–71. doi: 10.4103/ijnmr.IJNMR_31_13.

28. Nirupam Nisha Sahu. "Effectiveness of Coconut Oil Massage on Gain in Weight among Low Birth Weight Babies".International Journal of Pediatric Nursing/Volume-4,Number 3 / September - December 2018

29. Zahra Akbarian Rad, Mohsen Haghshenas, Yahya Javadian, Mahmoud Hajiahmadi, Fahimeh Kazemian. "The Effect of Massage on Weight Gain in Very Low Birth Weight Neonates" Journal of Clinical Neonatology. April-June 2016, Vol. 5, Issue 2.

30. Jabraeile M, Rasooly AS, Farshi MR, Malakouti J. Effect of olive oil massage on weight gain in preterm infants: a randomized controlled clinical trial, Niger Med J 2016; 57:160-3

31. Fathia Zaky Mohamed, and Eman Saied Ahmed, "Efficacy of Abdominal Massage on Feeding Intolerance of Preterm Neonates." American Journal of Nursing Research. vol. 6, no. 6 (2018): 371-379. doi: 10.12691/ajnr-6-6-4

32. Kim HY, Bang KS. "The effects of enteral feeding improvement massage on premature infants: A randomised controlled trial." J Clin Nurs. 2018;27:92–101.

33. Maha Ebrahim Fouda "Effect of Abdominal Massage Therapy on Feeding Tolerance of Premature Neonates" IOSR Journal of Nursing and Health Science (IOSR-JNHS) 2018.vol. 7, no.5 , pp. 01-12

34. Aghshenas Mojaveri M, Jafarian Amiri S R, Dalili H, Khafri S, Hamed F. The Effect of Abdominal Massage on the Feeding Tolerance of Neonates with Very Low Birth Weight,Iran J Pediatr. Online ahead of Print ; 30(2):e95074. doi: 10.5812/ijp.95074.

35. Amal Ahmed Mobarak "Effect of Massage Therapy on Weight Gain and Hospital Stay for Premature Neonates."." IOSR Journal of Nursing and Health Science (IOSR-JNHS) , vol. 7, no.2 , 2018, pp. 19-27

36. Polit F. Denise & Hungler P. Bernadette," essential of nursing research" 2nd edition Lippincott publications 1989.

37. Basavanthappa BT, " Nursing research", 2nd edition, Jaypee publications,2007

38. Sharma S, "Nursing research and statistics", Gurgaon, Haryana; Elsevier publication; 2011.

39. Sneha pitre. "Effect of massage therapy on physiological and behavioral parameters among low birth weight babies." international journal of science and research, May 2014; volume-3 issue-5