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Effect of Massage on Physiological and Behavioral Parameters among Low Birth Weight Babies

Sneha Pitre

Professor cum Principal, Bharati Vidyaapeet Deemed University's College of Nursing Pune (India)

Abstract: ***Low birth weight babies admitted in NICU are usually exposed to stressful environment and are deprived of tactile stimulation. Massage seems to help in reducing stress and promote physiological and behavioral development. Aim: To determine whether massage helps in improving weight gain and behavioral development among low birth weight babies admitted in NICU. Methods: Quasi experimental pre-test post test control group design. Neonates with birth weight 1200 -1500gms. stable without any complication. Total 150 eligible babies were assigned alternately to experimental or control group. Massage was given with sesame oil daily for 15 days by investigator continued by care taker or mother. Physiological parameters like Weight, oxygen saturation, Heart rate, temperature, skin color were recorded daily before and after massage for 15 days and again on 21st day. Behavior was assessed by using Brazelton's Neurobehavioral scale on 1st and 14th day. Results: Significant difference in weight gain was observed among experimental and control group on 14th and 21st day of the study. Massage has not shown any change in physiological parameters. In relation to behavior massage had made the babies more interactive ,less irritable, better adaptable to noxious stimuli and maintain autonomic stability. Mothers of experimental group babies appreciated the need and beneficial effects of massage and took active part in administration. Conclusion: Oil massage has potential to enhance weight gain and neurobehavioral development of low birth weight babies.***

Keywords: Physiological Parameters, Behavioral Parameters, Low Birth Weight Babies, massage

1. Introduction

Approximately 16 – 18 % neonates born in developing countries are low birth weight having weight less than 2.5 Kg. The highest rates are found in South Asia .India alone contributes 8 million (40 %) low birth weight babies every year. Birthing is a traumatic experience both for the mother and her baby. Apart from the discomfort and trauma associated with the process of delivery, the baby is suddenly thrust into a world of bright lights, loud sounds and cold environment. Healthy term babies are neurologically mature to withstand these environmental onslaughts and they rapidly adjust to the extrauterine environment with minimal assistance and without any serious difficulties or hazards. But low birth weight babies are neurologically immature and physiologically unstable. They cannot tolerate environmental insults. These babies begin life with handicap not only with respect to survival but also for their postnatal physical growth & intellectual development. These babies carry 5 times more risk of dying in peri natal period & 3 times more during infancy.

As level of maturity which can permit these infants to make a successful transition to extra uterine life is lacking, these children usually require hospitalization & that to also in special care units such as N.I.C.U.

Generally infants in N.I.C.U get little rest. The tactile stimuli they receive are often painful & very rarely they receive gentle handling. These babies often require intravenous therapy, nasogastric feeding, heel stick prick etc. which deprive them from natural handling in form of cuddling, stroking. A study was done by Blackburn & Barnard to assess the type of touch provided to preterms admitted in N .I.C.U preterm care for 102 babies was reviewed by using time lapsed video recordings . It was observed that social stroking was least frequently observed type of contact. A total of 25 infants received no stroking at all [1].

A Similar study was done by Worner& Conway; they observed the care given to 11 preterm infants. Two observations for 55 minutes each was done. In this they found that only 4.4 % of the sensory stimuli provided by caregiver can be described as comforting touch [1].

Deprivation from comforting human touch imposes a great threat to physiological & behavioral development of the child .It can be observed in form of irritability, failure to thrive, anxiety etc. Many theories have also emphasized the need of comforting touch for the normal growth & development during infancy.

According to Psychosocial theory by Erikson, infancy is a period of developing trust. During this period, infants depend on others to meet their basic needs, & therefore blindly trust their caregivers. Infant needs trust promoting activities in form of cuddling, rocking, stroking etc. to grow in healthy manner. If these activities are lacking, child may show development of mistrust which can be expressed in the form of failure to thrive, poor weight gain ,irritability & in long run, feeling of hopelessness [2].

Many studies have revealed the effect of deprivation of human touch on babies. A survey which was conducted in 1915 in 10 orphanages of US revealed that though babies were kept in clean environment with adequate feeding they did not from infectious diseases or malnutrition, they simply wasted away in a condition called Marasmus. Sterile surrounding could not cure it; having enough food made no difference. These babies died due to lack of appropriate touch. When these babies were removed from the clean but impersonal environment & they receive a physical nurturing along with formula, marasmus reversed. They gained weight & finally began to thrive [3].

Zahr & Balidn observed 55 premature babies from 3 NICUs situated at California & Lebanen reported that these babies received average of 8.5 episodes of nursing procedures .It was associated with a significant decrease in oxygen saturation level [4].

In NICU these babies are not only exposed to aversive stimuli but also to bright light, loud noise which disturb their sleep pattern. It is said that chronic suppression of REM sleep can result in behavioral changes &reduced cerebral cortical size.It is also a common observation that babies admitted in NICU are looked after in bright light and aggressive-invasive environment without much concern with their comfort.

In view of all this, many techniques have been used to provide comforting touch. Example of these is regular gentle stroking, encouraging mother to cuddle the child whenever possible, & use of therapeutic touch in form of massage, Kangaroo mother care. Shinde M(2014) concluded that there were significant differences on the quality of sleep before and after slow stroke back massage. This shows that there was gradual improvement in the sleep quality after back massage on 3 consecutive days. The back massage has effect on quality of sleep among ICU patients [5].

Massage has been found as an accepted routine of infant care throughout the world. In India it is an accepted practice for all full term neonates. Many studies have shown the positive influence of massage on full term as well as on premature babies. But adequate published data is not available related to effect of massage on low birth weight babies. As percentage of low birth weight babies is quite high in India there was a need for developing safe yet cost effective methods of ensuring weight gain and improve behavioral status among these babies. In view of this present study evaluated the effect of massage on physiological and behavioral parameters among low birth weight babies admitted in NICU of Bharati Hospital Pune.

2. Objectives of the Study:

1. To assess the selected physiological& behavioral parameters of samples before & after the massage in experimental group
2. To assess the physiological & behavioral parameters of samples in control group.
3. To evaluate the effect of massage on selected physiological & behavioral parameters in babies from experimental group.
4. To compare the scores of selected physiological & behavioral parameters in experimental &control group
5. To determine the association of selected demographic variables with physiological & behavioral parameters.
6. To determine the opinion of mothers related to massage for their babies.

3. Research Methodology

According to Shinde M and Anjum S (2007), Research approach refers to the overall plan for obtaining answers to the research questions and for testing the hypothesis. The research designs spells out the strategies that the researcher adopts to develop information that is accurate, objective and interpretable [6].

In present Study Evaluative research approach with quasi experimental pretest – post test control group design was used.
Total 150 (75-Control ,Experimental – 75)babies were selected as per the sampling criteria i.e. birth weight between 1.2 – 1.5kg., with stable vital parameters,minimum seven days old, not on ventilatory support and having congenital anomaly. They were divided in either control or experimental group by using random sampling method. Weight temperature, heart rate, oxygen saturation, respiration and skin color were selected as physiological parameters where as behavior parameters were assessed as per Brazelton,s Neonatal assessment scale.

The NBAS assesses the newborn infant's behavioral repertoire on 28 behavioral items which are scored on 9 point scale. This scale also includes an assessment of the infant's neurological status on 18 reflex items , each on 4-point scale. These 28 items were categorized in seven clusters such as Habituation: It measures the capacity of an neonate to decrease responses to repeated disturbing stimuli.

Social interactive: It measures the ability to attend to visual and auditory stimuli and the quality of overall alertness. Motor system: Measures motor performance and the quality of movement and tone

Range of state: this measures the infant's arousal and state liability.

Regulation of state: Measures the infant's ability to regulate her state in the face of increasing levels of stimulation.

Autonomic Stability; It records signs of stress related to homeostatic adjustments of the central nervous system
Reflexes: records the number of abnormal reflexes.

After taking informed consent physiological parameters were assessed daily before and after massage for 14 days in experimental group. In control group it was assessed daily twice with gap of 15 minutes. Massage was given daily once for 14 days with sesame oil and was continued by caregiver or mother further. Behavioral assessment was done on 1st and 14th day of study in both groups. At the end of 21st day weight was assessed for all babies involved in the study. At the end of 14th day an opinion of mother /caregiver regarding massage was assessed by using oppinnior.

4. Major Findings and Discussion

Data was analyzed by using Inferential and non inferential statistics. The data was analyzed by using inferential and noninferential statistics. It was presented in four sections:
Section I:

It deals with the analysis of demographic data related to mothers and samples. It was analyzed by using frequency & percentage.

Section II:
This section is divided in to two:
Section A: It includes the analysis of data related to physiological parameters in experimental and control group. . Data was analysed by using Z test & unpaired 't 'Test.
Section B: It deals with the analysis of the data related to the comparison between experimental & control group. It was analyzed by using Z test & unpaired't' test.

Section III:
Section A:
It includes the analysis of data related to the behavioral parameters in experimental & control group. It was analyzed by using inferential statistics.
Section B:
It deals with the analysis of the data related to the comparison between experimental & control group. Data was analyzed by using Z test& unpaired t test.

Section IV:
It deals with the analysis of the data related to the association of selected demographic variables with selected physiological & behavioral parameters. The data was analyzed using chi square test.

Section V:
It deals with the analysis of the data related to the opinion of mothers/caregivers regarding massage for the babies. The data was analyzed by using descriptive statistics (frequency & percentage)

Section I: It deals with the analysis of demographic variables of mothers and samples.

5. Findings of the Study

Table 1: Demographic description of mothers

Sr no	Characteristics	Exp. N=75		Control	
		Freq.	%	Freq. N=75	%
1	**Age**				
	18 – 25	61	81.3	55	73.3
	26 - 35	14	18.7	20	26.7
	36 - 45	-	-	-	-
2	**Education**				
	Illiterate	6	8.0	7	9.3
	Primary	5	6.7	14	18.7
	High school	57	76.0	50	66.7
	Graduate	7	9.3	4	5.3
3	**Occupation**				
	Housewife	75	100.0	71	94.7
	Unskilled worker	-	-	2	2.7
	Professional	-	-	2	2.7
4	**Abnormal Antenatal History**				
	Nil	36	48.0	51	68
	PIH	34	45.3	15	20.0
	Other	5	6.7		12.0
5	**Mode of delivery**				
	NORMAL	42	56.0	40	53.3
	LSCS	33	44.0	35	46.7

Table number 1 indicates that majority of mothers of samples from experimental group 81.3 % & 73.3 % from control group were in the age group of 18 – 25 Yrs where as 18.7% ,26.7 % were in the age group of 26 – 35 yr respectively. Usually reproductive age is 18-35yrs it may the cause that there was nobody in age group of 36-45 yrs. Distribution of mothers according to age is presented in figure number 3. In relation to level of education it was observed that in both groups; majority of mothers 76 % in experimental & 66.7 %from control studied up to high school level, very few ie.9.3 % in experimental group & 5.3 % in control studied up to graduate level.

Little more difference was observed in relation to primary education. In experimental group 6.7 % & in control group 18.7 % mothers studied up to primary level. Though government has made primary education compulsory & free for girl's still 8 % from experimental & 9.3 % mothers were found to be illiterate. Distribution of mothers in both the groups according to their educational status is presented in figure no. 4. All mothers (100 %) from experimental group &94.7 % from control were housewives. Distribution of mothers in both the groups according to their occupation is presented in Figure No.5

Values related to antenatal history indicates that quite substantial percentage of mothers from experimental group 45.3 % & 20 % from control had history of pregnancy induced hypertension.48% from experimental group & 68 % from control group had normal antenatal period. 6.7 % from experimental &12 % from control group had problem other than pregnancy induced hypertension. It also indicates that though government has implemented various programmes related to reproductive child health still percentage of mothers suffering from pregnancy induced hypertension is not reduced it may be due to either ignorance of the people or unavailability of the services

Values in the table indicates that nearly equal % of mothers in both groups (56.0 % & 53.3 %) had normal delivery but, 44 % from experimental & 46.7 % from control had to undergo cesarean section. As per nature 96% should deliver normally but due to development of modern technology, inadequate coping and communication of health services number of cesarean deliveries are on increase.

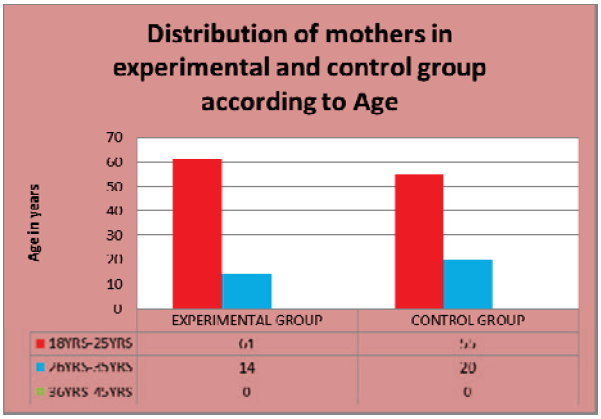

Figure 1: Distribution of mothers in both the groups according to age

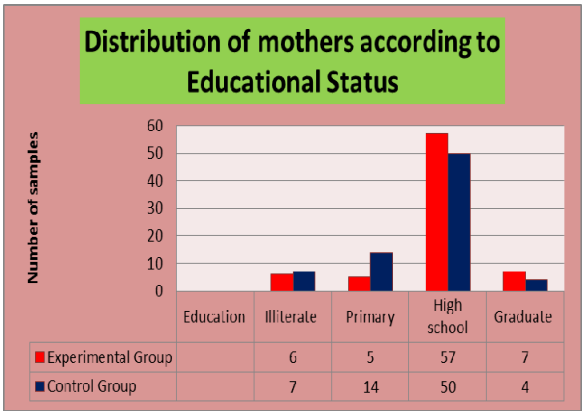

Figure 2: Distribution of mothers in both the groups according to their educational status

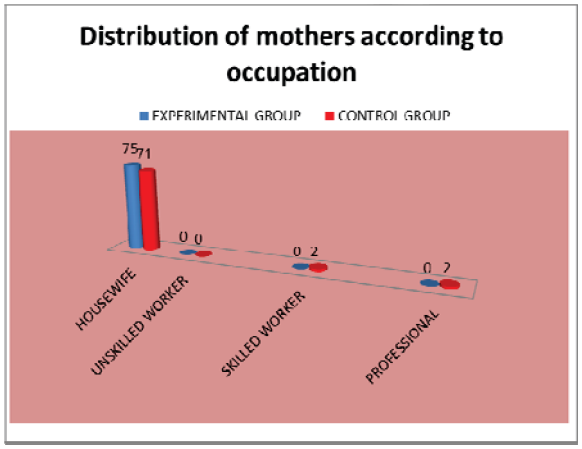

Figure 3: Distribution of mothers in both the groups according to their occupation

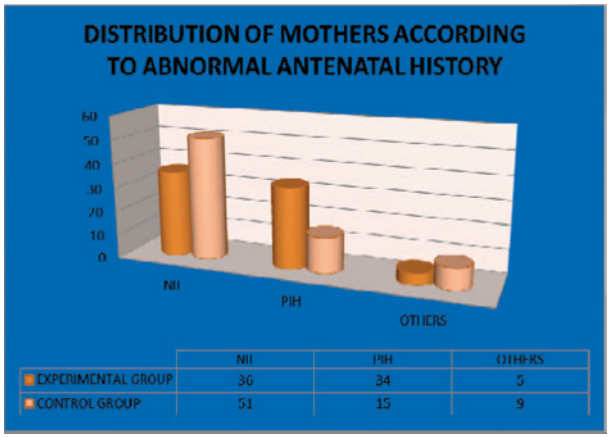

Figure 4: Distribution of mothers in both the groups according to antenatal history

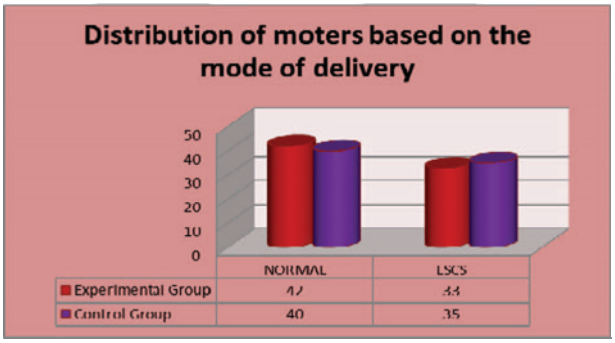

Figure 5: Distribution of mothers in both the groups according to mode of delivery

Table 2: Demographic description of samples

Sr no	Characteristics	Experimental N=75		Control N=75	
		Freq.	%	Freq.	%
1	**Gender** Male	53	70.7	53	70.7
	Female	22	29.3	22	29.3
2	**Gestational Age in wks**				
	30-33	35	46.7	36	48.0
	34 - 37	40	53.3	39	52.0
	38 - 40				
3	**Birth weight** (gm)				
	1400 - 1600	23	30.7	30	40.0
	1601 -- 1800	14	18.7	20	26.7
	1801 -- 2000	5	6.7	4	5.3

Data in table 2 shows that there was equal representation of samples in relation to gender in both groups. Both groups had 70.7 % of male babies. Percentages of female babies were also 22 percentages. From this data it can be interpreted that percentage of low birth weight was more in male babies than females.

It is observed that both groups had almost equal percentage of babies with respect to gestational age 46.7 % from experimental & 48.0 % from control were from the category of gestational age between 30 – 33 weeks , 53.3 & 52.2 of 34 - 37.weeks. This data reflects that all babies were born prematurely. It indicates that vicious cycle of ignorance, poverty and nutrition is still not broken inspite of priority given to child health programmes by government.

In relation to birth weight majority of the babies (44 %) from experimental group had birth weight between 1200 – 1400 gms . 30.7 % were between 1201 – 1600 gms , 18.7 % from 1601 -1800 gms very few (6.7%)were having weight between 1801-2000 gms.

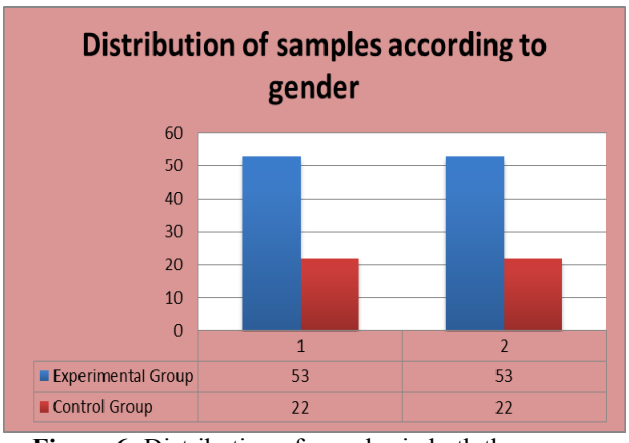

Figure 6: Distribution of samples in both the groups according to gender

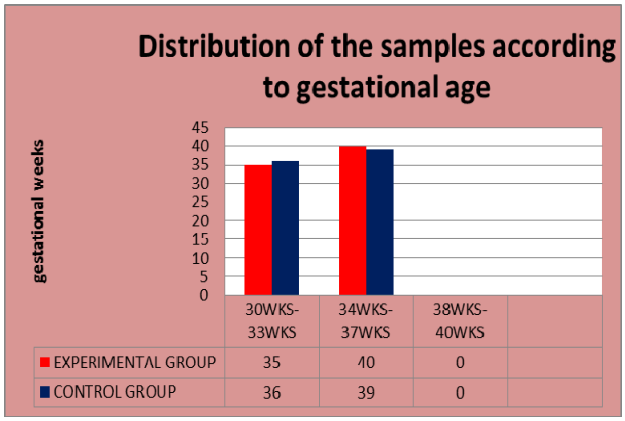

Figure 7: Distribution of samples in both the groups according to gestational age

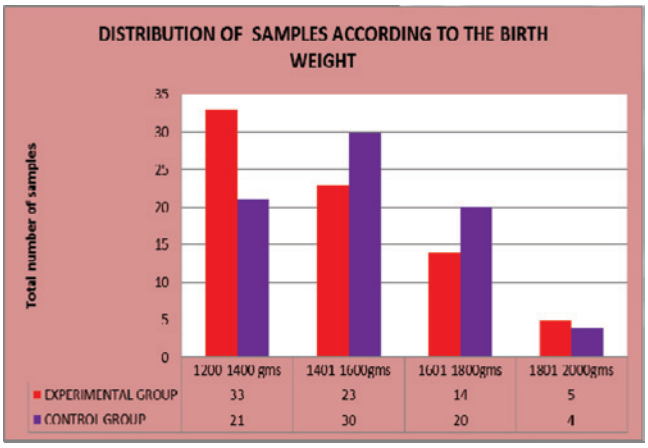

Figure 8: Distribution of samples in both the groups according to birth weight

Section II A

This section represents the analysis of data related to physiological & behavioral parameters of samples before and after the massage in experimental group. Physiological parameters studied in this study were weight, Oxygen saturation, heart rate, temperature, & skin color.

Table 3: Mean, SD &'t 'value of weight in Experimental group, N = 75

	Weight (gms)				
	Birth	first day	7th day	14 th day	21st day
Mean	1469	1445	1596	1842	2062
S.D.	185	172	194	207	216
't' cal		-0.82	4.11	11.6	18.1
't' table		-2.33	2.33	2.33	2.33
'P' value		0.28	0	0	0

This table 3indicates that mean weight of the babies had reduced from 1469 gms to 1445 gms initially, but slowly it has started increasing to 1596 gms at the end of 7 th day of massage but was not found significant as P value is not <0.01.After 7th day, weight had shown continuous increment as evidenced by increase in mean weight 1842 gms on 14 th & 2062 gms on 21 st day .It was significant as

P – value is <0.01.From these values, it can be interpreted that reduction in weight initially may be due to physiological changes in the babies & is considered normal. It was also observed that baby had started gaining weight after 7 days which is also considered as normal.

Table 4: Mean SD &'t 'value of weight in control group

	Weight (gms) N = 75				
	Birth	first day	7th day	14 th day	21st day
Mean	1517	1460	1546	1717	1880
S.D.	183	199	202	219	235
't' cal		-1.8	0.95	6.07	10.6
't' table		-2.33	2.33	2.33	2.33
'P' value		0.08	0.26	0	0

This table 4 indicates that mean weight of the babies had reduced from 1517 gms to 1460 gms initially ,but slowly it has started increasing to 1546 gms but was not found significant as p value is not < 0.01 on 7 th day. After 7th day weight had shown continuous increment as evidence by increase in mean weight 1717 gms.on 14th day & 1880 gms on 21st day .It was significant as p- value is < 0.01.From these values, it can be interpreted that reduction in weight initially may be due to physiological changes in the babies & is considered to be normal. It was also observed that baby had started gaining weight after 7 days.

Section II B

Table 5: Comparison of weight among Experimental and Control group

		Weight(gms)				
		Birth	*first day*	*7th day*	*14th day*	*21st day*
Control N=75	Mean	1517	1460	1546	1717	1880
	S.D.	183	199	202	219	235
Experimental N = 75	Mean	1469	1445	1596	1842	2062
	S.D.	185	172	194	207	216
't' cal		-1.6	-0.49	1.546	3.592	4.938
't' table		-2.33	2.326	2.326	2.326	2.326
'P' value		0.111	0.353	0.121	6E-04	2E-06

Table 5 shows that in both groups mean weight has reduced from 1517 to 1460 in control group & 1469 to 1445gms in experiment group.

On 7th day mean weight in experiment group was 1546 gms & 1596 gms in control group. It means that weight gain was similar in both groups till 7th day of the study.

When comparison of weight between 7th and 14th day of study was done it was observed that mean weight was 1717 gms in control group & 1842 gms in experiment group .It indicated that there was a significant difference in weight gain between experimental & control group babies. It also shows that massage had positive effect on weight gain in low birth weight babies.

When weight was again assessed on 21st day of the study mean weight in control group was 1880 gms &2062 gms in experimental group babies. This difference was found to be significant as 'p' value was less than 0.01.It shows that massage was useful continuously for increasing weight of the babies. Above findings it was evident that massage has contributed significantly in increasing the weight of the low birth babies. So null hypothesis Ho1 is not accepted but alternative hypothesis H1 is accepted.

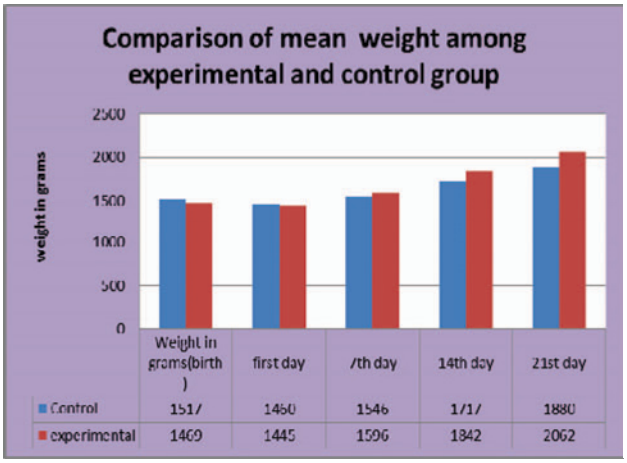

Figure 9: Comparison of mean weight among experimental and control group.

Findings related to Heart rate, Oxygen saturation, Temperature & skin color in experimental and control group:

It was observed that in experimental group all babies maintained heart rate between 140–150/min. Oxygen saturation was maintained between 95 - 100 % range. Temperature was within 36.6-36.7 degree centigrade, skin color was pink in all babies who received massage. All these findings indicate that massage did not disturb the stability of physiological parameters.

It was also observed that none of the babies developedany complication in form of trauma, skin infection & rash. All these findings suggest that massage did not have any ill effects on the physiological parameters among low birth weight babies.

Babies from control group also maintained heart rate between 140-150/min, oxygen saturation 95-100%, temperature within 36.6-37.7 degree centigrade and skin colour was pink. These babies also did not develop any complications during the period of study.

Section III: A

Table 6: Comparison of Behavior parameters in Experimental group on Ist & 14th day of massage.

Parameter	*Ist day*	*14th day*	*t cal.*	*t table*	*P*
Habituation Mean SD	17.3 2.48	26.8 2.38	60.3	2.326	0
Social Interaction					
Mean SD	13.7 3.10	33.1 5.64	34. 99	2.326	5 E – 267
regulation Mean SD	13.3 2.13	15.6 1.95	20.278	2.3263	2 E 90
State organization					
Mean SD	16.5 1.78	18.8 1.25	36.45	2.326	1E – 289
State regulation					
Mean SD	10.3 1.61	22.4 3.22	69.54	2.326	0
Motor Mean SD	2.93 1.01	24.3 2.36	129.5	2.326	0
Autonomic Stability					
Mean SD	21.6 1.41	23.5 0.73	57.68	2.326	0
Reflex Mean SD	20.1 3.15	33.2 3.24	48.09	2.326	0

Above table indicates the mean scores of various behavioral parameters on 1st& 14th day of the massage.

It was observed that in all clusters there was a significant improvement as evidence by having P value <0.01.

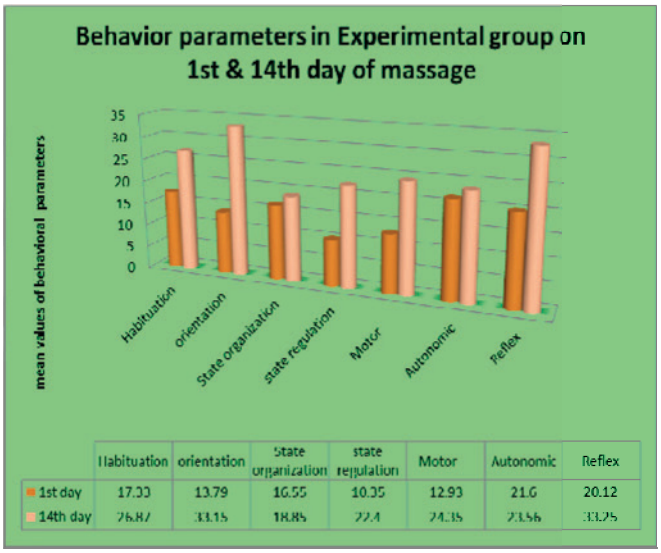

Figure 10: Distribution of samples in experimental group according to behavior parameters on 1st and 14th day of massage

Table 7: Comparison of Behavioral parameters in Control group on Ist & 14 th day of the study, N = 75

Parameter	Ist day	14 th day	t cal.	t	P
abituation					
Mean SD	18.08 3.169	21.89 3.231	13.95	2.326	2E - 43
Social Interaction					
Mean SD	15.48 2.999	20.52 .8379	15.932	2.3263	3 E 56
State organization					
Mean SD	17.65 2.042	17. 72 2.242	0.5434	2.3263	0.3442
State Motor					
Mean SD	13.84 1.657	18.38 2.432	39.354	2.3	0
Autonomic Stability Mean SD	22.69 1.487	22 .73 1.278	0.7796	2.3	0.2944
Reflex Mean SD	23.61 3.536	31.74 2.546	32.128	2.326	0

Above table indicates the mean scores of various behavioral parameters at 1st& 14 th day of the study. It was observed

that in all clusters there was a significant increase in the scores& was significant as P value was <0.01.It indicates that the behavior of the babies from control group had also shown improvement on 14th day of the study and it is considered as a normal process

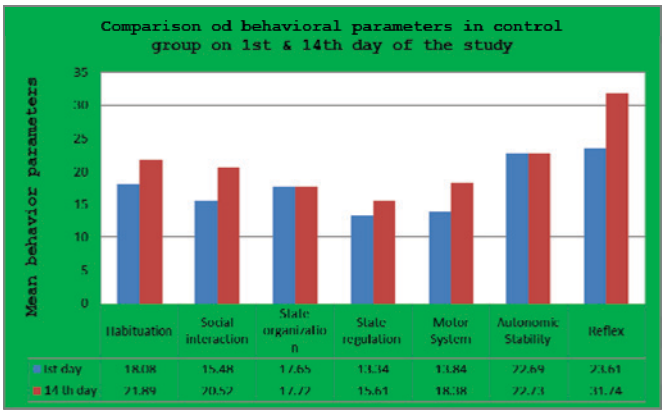

Figure 11: Distribution of samples in the control group according to behavior parameters on 1st and 14th day of massage

Section III B

Table 8: Comparison of Behavioral parameters between experimental & control group.

Parameter	Experimental	ControlN = 75	t cal.	t-table	'P' value
Habituation					
Mean SD	9.533 3.213	3.8133 3.0537	21.82	2.326	0
Social Interaction					
Mean SD	19.36 5.871	5.04 2.2117	27.28	2.326	0
Range of state					
Mean SD	2.306 2.026	0.0667 3.2755	11.325	2.3263	6E – 29
State regulation					
Mean SD	12.05 3.080	2.2667 2.0287	53.94	2.326	0
Motor Mean SD	 1.413 2.673	 4.5467 2.2645	41.948	2.326	30
Autonomic Stability					
Mean SD	1.96 1.578	0.04 1.7772	25.48	2.32	0
Reflex Mean SD	 13.13 2.848	 8.1333 3.7286	17.03	2.326	4 E-
Smile	-	-	-	-	-

This table 8 indicates the comparison of mean scores of selected behavioral parameters on 1st& 14th day of the study. Habituation cluster included the items related to the response of the babies to external stimulus in the form of light, ringing of the rattle, bell & to painful stimuli during first &second state of sleep. Mean score was 9.533 &3.8133 in experimental group & control group respectively which was found to be significant as P value was 1E–104 which is <0.01.It indicates that babies from experimental group had adapted to these stimuli better than control group.

Social interaction included the items related to the response of the babies to visual & auditory stimuli. It was divided in to inanimate visual, Inanimate auditory, Inanimate visual &auditory, Inanimate visual, Inanimate auditory, Inanimate visual & auditory, Alertness. It was observed that overall response of babies from experimental group was better than control group. It has shown statistically significant increase in mean score as evidence by 19.36 & 5.04 in experiment & control group respectively with 'P' value <0.01i.e.9 E–163.

Range of state included the items related to the performance of the babies at various states of the sleep. Components of this cluster were Peak of excitement, Rapidity of build up, Irritability & liability of state. In all these behavioral cues, it was observed that babies who received massage were able to come back to more responsive state when they were at higher degree of upset or excitement, were less irritable during assessment,& also showed less variations in sleep states .Mean score difference between experimental & control group was 11.325 with P value 6 E–29. It was found statistically significant as P value was <0.01.

State regulation had four behavioral responses i.e. Cuddliness, consol ability, Self - quieting & hand to mouth activity. Cuddliness was the summary measure of the infant's response to being held in alert states. Consolability was the number of maneuvers the examiners utilizes in order to bring the baby to a quiet state. Self quieting was a measure of the activity which the baby initiates while in crying state, as an observable effort to quiet self. In this behavior also, experimental group had better performance than control group. It was evident from the mean scores of the both groups. Mean score difference in two groups was 53. 947 with table value 2.3263 , P value was 0 which was < 0.01

Motor response was elicited to assess general tone, motor maturity, pull to sit maneuver, defensive action &overall activity levels of the baby. Mean score difference between experimental & control group was 41.948 which was found to be significant as calculated P value was 0 which is < 0.01.It indicates that massage was effective in improving overall motor response in experimental group.

Items in assessment of autonomic system included presence of tremors, startles & lability of skin color in the babies during examination .When comparison was made between the mean score of experimental & control group, it was observed that there was statistically significant difference as P value was 4 E- 142 which is < 0.01 .It indicated that babies from experimental group did not have tremors, and startles only during moro's reflex. All babies maintained healthy color predominantly throughout the assessment.

Though there was significant difference between mean scores of two groups, babies from control group also did not show any major signs of central nervous system irritation. It also can be interpreted from the values shown in the Table 8that massage had helped the babies to maintain the balance in central nervous system better than babies in control group. Last cluster in this table indicates the mean scores of experimental & control group babies related to the neonatal reflexes. It was observed that mean score of experimental

group & control group was 13.133, 8.1333 respectively value was found to be 4 E- 64 & is considered to be statistically significant as it is < 0.01. It shows that babies from experimental group had better neurological response than control group babies. In relation to the score of number of times baby smiled during behavioral assessment it was observed that babies from both groups nobody smiled during assessment.

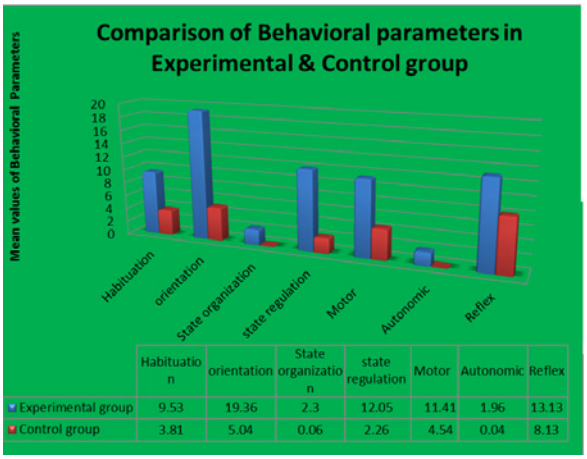

Figure 14: Comparison of samples according to behavior parameters on 1st and 14th day of massage in experimental and control group

Table 9: Comparison of behavioral scores (item wise) of motor & autonomic stability in experimental & control group, N = 150

Item	*F*	*Sig*	*t*	*Df*	*Sig.(2 tailed*
Habituation: Response decrement to a. Light	4.066	.04	8.766	148	.000
b. Bell	10.880	.00	7.996	148	.000
c. Rattle	7.681	.00	7.480	148	.000
d. Pain	1.914	.16	6.862	148	.000
Social Interaction a. Inaminate visual	60.614	.00	5.318	148	.000
b. Inaminate auditory	9.433	.00	13.26	148	.000
c. Inaminate visual & auditory	10.848	.00	12.09	148	.000
d. Animate visual	.292	.59	18.10	148	.000
e. Animate auditory	1.950	.16	17.8	148	.000
f. Animate visual & auditory	.077	.78	16.1	148	.000
g. Alertness	.557	.45	13.8	148	.000
Range of state					
a. Peak of excitement	13.242	.00	-.366	148	.715
b. Rapidity of build up	3.366	.06	.108	148	.914
c . Irritability	20.875	.00	2.16	148	.032
d. Lability of state	27.825	.00	2.43	148	.016
Regulation of state a. Cuddliness	136.73	.00	10.2	148	.000
b. Consolability	1.293	.25	7.74	148	.000
c. Self quieting	.188	.66	14.6	148	.000
d. Hand to mouth	1.159	.28	8.48	148	.000
Motor : a. Tonus	4.457	.03	10.0	148	.000
b. Maturity	7.428	.00	6.96	148	.000
c. Pull to sit	16.331	.00	5.18	148	.000
d . Defense	8.582	.00	11.5	148	.000
e. Activity	7.019	.00	10.3	148	.000
Autonomic stability : a. Tremors	117.97	.00	4.21	148	.000
b. Startles	3.570	.06	1.19	148	.235
c. Skin color	3.570	.06	1.19	148	.235

Data in table number 9 indicates the significance of behavioral responses in experimental & control group. All items from habituation clusters reveal that babies from experimental group had shown better adaptation to external stimuli in form of light, rattle, bell& pain.

In relation to items in social interaction when babies' responses to human voice, face, rattle were assessed babies who received massage were more interactive, active & alert throughout the examination as evidenced by having P value.000 for all items, which is significant at .05 levels.

In relation to values in Range of state cluster indicates that babies from experimental group showed less irritability, had few variation in sleep states as evidenced by having statistically significant difference in mean scores at 0.05 level. But it was observed that there was no significant difference observed in items related to Rapidity of Build Up &Peak of excitement. These values are not significant at 0.05 level.

Table no. 9 also shows the values related to regulation of state. It was observed that babies who received massage took active part, were able to relax, cling to examiner better than control group during examination. Values also indicate that a significant difference was observed in both groups related to self quieting ability& hand to mouth co-ordination. Difference in mean score was significant at0.05 level.

The values related to motor activity indicates that there was significant difference between experimental & control group on 14 th day of the study related to muscle tone , maturity , pull to sit maneuver , & defensive mechanisms as "t" value is < 0.05 in all items .

In relation to autonomic stability, it was observed that babies from experimental group had less tremors, startles & maintained healthy skin color throughout the examination in comparison with the babies from control group.

From the findings presented in table 8 & 9 the investigator does not accept the H_{02} but accepts H_2.It indicates that massage had contributed in improving behavior of the babies from experimental group significantly.

Section IV

It deals with the analysis of the data related to the association of selected demographic variables with selected physiological& behavioral parameters. The data was analyzed using chi square test.

Table 10: Association of Selected demographic variables with weight in Control Group N = 75

Sr. No	*Demographic Variables*	*Chi – square*		*Table Value*
		Value	*Df*	
1	Gestational age	9.562[a]	3	7.185
2	Gender	2.626[a]	3	7.185

P <0.05

Above table indicates that there is an association between gestational age and weight as calculated chi square value is more than table value but there is no association observed

between gender and weight of the babies belonging to control group.

Table 11: Association of Selected demographic variables with weight in Experimental group, N=75

Sr. No	Demographic Variables	Chi – square		Table Value
		Value	Df	
1	Gestational age	4.374[a]	3	7.815
2	Gender	2.626[a]	3	7.185

$P < 0.05$

Above table indicates that in babies from experimental group both, gestational age & gender do not have statistically significant association as calculated value is less than table value. It indicates that there was no statistically significant association between gestational age & behavior of the babies in experimental group as calculated value is less than table value in all behavioral cluster .It was true for the gender also. The association has been found between gestational age & social interaction, state organization &reflex at<0.05 level. Habituation, Motor, Autonomic stability, state regulation have no statistically significant association with gestational age. In relation to gender, there was no statistically significant relationship observed as calculated value is less than table value in all behavioral clusters.

Section V

It deals with the analysis of data related to the opinion of mothers / care givers regarding massage for the babies. That 72 mothers responded to the opinionner (as 3 mothers had twin babies).Majority of the mothers (64.6%) feel that massage should be given to all babies, 26 % agreed strongly where as nobody had denied the administration of massage for the babies. It is tradition and ritual in India. 71 % mothers agree & 29 % strongly agree that massage helps in enhancement of overall development of the baby.

67 % mother's feels that it can be given by anybody, 25 % did not agree for this. Majority of the mothers felt that after receiving massage their babies looked better (74 %) & it also helped developing bond between them. Most of the mothers (53%) felt that every mother should learn massage. All mothers agreed that massage should be given atleast for 45 days. All above findings reflects that massage is a well appreciated routine of baby care in Indian culture.

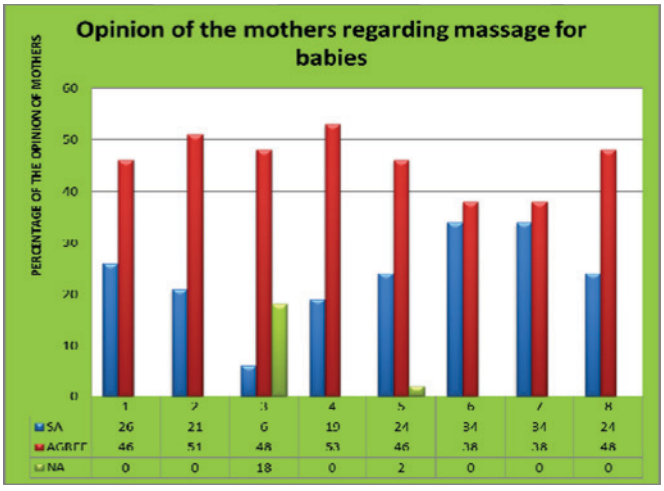

Figure 13: Opinion of mothers regarding massage/caregivers for the babies

6. Major Findings and Discussion

6.1 Findings related to demographic data of mothers & samples

1. In both groups 61 % in experimental & 55 % of mothers were from age group between 18 – 25 Yrs.
2. A large number of mothers from experimental group (57 %) were educated up to high school level.
3. All mothers from experimental (100%) &71%from control group were housewives.
4. In relation to abnormal antenatal history 48% mothers did not have any major problems during their antenatal period. But 45.3 % had history of pregnancy induced hypertension during antenatal period.
5. In relation to mode of delivery in mothers from experimental group,56% mothers had normal delivery &44% had to undergo L.S.C.S .In control group 53% mothers had normal delivery where as 46.7 % mothers had undergone L.S.C.S.

6.2 Findings related to demographic data of samples:

1. It was observed that babies from both groups had equal presentation in relation to the gender of the baby. In both groups 70.7% were male babies and 29.3% females.
2. In relation to gestational age surprisingly both groups had near equal presentation i.e. 53.3 % babies in experimental group and 52% from control group had gestational age between 34–37weeks. Whereas 46.7%from experimental and 48% from control group were between 31- 33 weeks of gestation which means that all babies were born prematurely.
3. Little difference was observed in experimental and control group with regard to birth weight. In experimental group, 44% and 21% from control group had birth weight ranging between 1200-1400gms Whereas 30.7% from exp. and 40% in control group had weight between1401-1600gms.Remaining 14% from experimental and 5.3 % from control group were between the range of 1801-2000gms

6.3 Findings related to physiological and behavioral parameters in experimental and control group. .

Physiological parameters selected in the study were weight, heart rate, oxygen saturation, temperature & skin color. They were assessed daily for 14 days and weight was again checked on 21st day in both groups. In relation to weight it was observed that from birth till first day of study babies from both group had shown loss of weight. It started increasing afterwards. To start with weight gain was similar in both group till 7 days of the study as evidenced by calculated t value (1.546) is less than table value(2.326)with p value(0.121)>0.01. After7thday babies from massage group showed significant weight gain than control group. On 14th day mean difference of weight between experimental & control group was statistically significant as evidence by the values indicated in table no 5.It shows that calculated t value (3.592)is greater than table value (2.326) with P value 6E-04 .Similar findings

were observed on 21st day of the study. It clearly indicates that babies who received massage had continued in gaining weight more than control group babies.

Similar findings have been observed by Sheila Mathai,Armida Fernandez, Jayeshree Mondkar & Wasundhara K[6]. In this study, effect of tactile-kinesthetic stimulation to preterm's on physiological parameters, physical growth &behavioral development was assessed. In this study, 48 preterm babies were distributed randomly to experimental or control group. Structured baby massage was given from day 3 to term corrected age. They were observed for the changes in vital parameters i.e. heart rate, temperature, & oxygen saturation during the first few days of stimulation in hospital .Thereafter massage was continued at home. Changes in weight, length, head circumference & neurobehavioral were assessed in both groups. Heart rate was found significantly greater in experimental group but was found within normal limits. Respiration, temperature, & oxygen saturation values remained within physiological limits.

In relation to anthropometric parameters, the weight gain in the test group was 4.24 gms or 21.92 % more per day as compared to control group. There was no significant difference in the rate of growth of the head circumference or length in two group. No complications were observed during this study.

Another study which was done by Vaidya Shah Rahul on Effect of Abhyanga on Growth during Infancy . This study was done on 40 full term infants having completed 37 weeks of gestation. These 40 babies were distributed among two groups i.e. group A & B. Group A babies received massage with Mahamasataila& Bwith Balataila. Massage was given twice a day by mother. Babies were followed up at the age of 4 months 9 months &12 months. At the pediatric OPD of Sir Sunderlal Hospital, Banaras Hindu University (December 2003). Weight, length , head circumference , chest circumference , skin fold thickness , serum albumen & cholesterol was assessed on each follow up on 4 , 9 & 12 months of age. Both group had shown significant increase in all these parameters but when intra group comparison was made, it was observed that Mahamasataila has shown better results than Balataila. Mean weight score (in grams) was 04.22, 108.46 , 121.01 , 137.28 in group A & 02.86 , 05.5 , 07.68 , 08 .88 in group B on initial , 1st , 2nd, 3rd follow up respectively. Initial serum protein level (in grams)in group A was 05.60 & 5.89 in group B , it increased to 06.86 & 06.98 respectively for the group A & B Serum cholesterol was initial value on first day of massage in group A was 087.79 & 091.25 in group B It increased up to 137.28 ,& 131.58 respectively in group A & B. Findings of this study reveals the contribution of oil massage in improving anthropometric & biochemical changes in babies[8].

Like this in many studies, neonates who received massage gained more weight than control group. It was noticed that the neonates who gained more weight did not ingest more calories (Dieter et al) , nor did they spend more time in sleeping , which might have allowed them to digest .In response to these findings Diego , M.A. , Field ,T. and Hernandez(2005 explored a theory on preterm infants. Massage was given to these babies for 5days. Gastric motility &vagal activity was assessed on first & fifth day of the study. These babies exhibited consistent short term increasein vagal activity & gastric mobility on from first & fifth day of massage & it was associated with weight gain. It is said that premature babies absorbs oil due to increased vascularity and permeability of their skin .However, exact proportion of oil absorption and its effect on fat metabolism is not studied so far .

All these findings support the results of the present study related to weightgain. Though massage hasshown overwhelming positive effect in most of the studies done in NICU and that to also on fragile neonates still , in India and all over the world it is not accepted as a routine . Many of the neonatologists still do not favour administration of massage for the babies admitted in NICU. It may be due to fear of trauma or adverse effect on parameters or concern about its safety. In view of this, present study evaluated the effect of massage on other physiological parameters such as, heart rate oxygen saturation, temperature and skin color . It revealed that parameter such as heart rate was maintained between 140 – 160 / min. before & after the massage in experimental group. Oxygen saturation was maintained between 95 -100 %, temperature was maintainedbetween the range of 36.6- 36.7 degree centigrade.

Skin color also did not show any significant change. It was pink in all babies before and after the massage. In relation to development of any complication,not a single baby from experimental group developed any complication in form of skin infection, trauma & fever. From control group also nobody developed any complication during the period of the study. It provides the evidence that massage is safe to practice.

Similar types of findings were observed in the study performed by White - Trout and colleagues (1988) . In this study, researcher studied response of the neonate to massage .Thirty three premature infants were randomly assigned to a control group and massage group. In the massage group , the Rice Infant Sensorimotor stimulation massage technique was administered. . This technique uses eye to eye contact , auditory stimulation , and five minutes of rocking after a 10 minutes massage .Neonates were massaged daily for 10 days . Heart rate , respiratory rate and temperature was measured at the midpoint of massage .The results showed that there was a slight decrease in body temperature in experimental group , but there was no significant difference between the experimental and control groups for heart rate and respiratory rate . In terms of safety of massage , change in heart rate , body temperature and respiratory rate were within acceptable clinical range for premature infants. With this understanding that massage has positive effect on babies in NICU it can be made as a routine[10].

6.4 Findings related to Behavioral Parameters

Behavior was assessed on 1stand 14th day of the study. It included the items related to habituation, social interaction, Range of state, state regulation, motor, autonomic stability and reflexes.
Findings were as follows:

One of the most impressive mechanisms in the neonate is its capacity to decrease response to repeated stimuli &is called as habituation. Reduction in the response to repeated stimuli over a period of times represents the capacity of the neonate to maintain constancy of the state & his control over the autonomic system in response to disturbing stimuli in the form of ringing of bell, rattle, light, & small prick. In the present study as per the values indicated in Table- 8, it was observed that overall mean score of babies from experimental group was 9.5333 and 3.8133 in control group . When unpaired 't' test was used to assess the mean difference, it revealed that calculated t value (21.828) was more than table value (2.3263) & P value was 1 E -104 which is < 0.01 .It indicated that babies who received massage had shown better adaptation to the repeated stimuli than babies from control group.

1. It was also observed by the investigator that when bright light was used 48 % of babies from experimental group were able to shut down their body movements & some diminution in blinks after 5- 6 presentations. In control group babies showed shutdown of body movements, some diminution in blinks after 7- 8 presentations.Similar observations were found in relation to rattle & bell. When response to pain stimuli was assessed it was observed that 49 % babies from experimental group & 38 % from control group showed response decrement after 5 trials & it was localized to stimulated foot .

2. Second cluster was related to the orientation. In this cluster also babies from experimental group showed better performance than control group. As indicated in Table - 8 mean score value for exp group was 19.36 and 5.04 in control group. When comparison was assessed by using unpaired test it was observed that calculated value (27.285) is more than table value (2.3263).P value was 9E-163. It indicates that there is a significant difference in mean scores. It was observed that babies who received massage showed marvelous capacity to be oriented to visual, auditory & animate stimuli. For assessing response to inanimate visual & auditory stimuli non living object such as rattle was used. It was observed that majority (31%) babies from experimental group could focus & follow the rattle horizontally at least 30 degree arc with smooth movement, loses the stimulus but could find it again. But babies from control group majority (52 %) of them could only still with stimulus & had brighten their faces. In animate visual & auditory items response to human face along with voice was assessed. It was observed that majority(54 %) of babies from experimental group responded well by focusing& following the stimuli with smooth movements where as majority (48%) from control group were able to focus on the stimuli & showed little spontaneous interest, with brief following. When this data was compared with inanimate data it indicated that babies were more responsive to human face & voice than rattle. Overall performance in this cluster showed that babies who received massagewere more interactive & oriented than control group.

3. In third cluster items related to the state organization wereanalyzed. It had 4 items namely peak of excitement. Rapidity of build up, irritability and lability of states. Overall mean score in experimental group was 2.3067 and 0.0667 in control group. It was found significant ascalculated value (11.325) was more than table value (2.3263) P value was 6E-29 which is < 0.01. In peak of excitement overall amount of motor and crying activity was observed during the course of whole examination. In this the investigator observed that(52 %) babies from experimental group remained predominantly in state 5 or lower & also reached to state 6 for brief period . In state 5, babies were alert with considerable motor activity & was reactive to external stimuli in form of voice & visual objects. Once or twice they went in to state 6 i.e. crying but they could consol themselves with the minimal support of examiner. In the babies from control group majority of times (49 %) they remained in state 4 or lower & reached to state 5 or 6 briefly. In state 4 babies looked alert, bright & were able to focus their attention to the source of visual & auditory stimuli. In relation to irritability which assessed the number of stimuli which makes the baby irritable during the examination revealed that in both group majority times 100 % in experimental & 93 % in control they showed irritability towards 4-5 stimuli. Analysis related to lability of states indicated that babies from both groups had changed the state for 3-5 times during the course of examination. State regulation cluster had 4 items i.e cuddliness, Consolability , self quieting & hand to mouth activity. According to (Barnard ,1999) It is the "capacity to adapt to ones surroundings in a healthy & predictable way". Overall mean score for this cluster in experimental group was 12.053 and 2.2667 for control group with Z calculation 3.947. It was found greater than table value (2.3263). P value was 0 which is<0.01. It indicates that babies in experimental group had better abilities to relax & to console themselves. These babies required less efforts from examiner to make them comfortable.

Item wise analysis showed that in relation to Cuddliness which measures the degree to which the newborn moulds & nestles in to the contours of the caregiver's body, it was observed that 39 % babies who received massage were able to mold & relax when held in the arms of the examiner. Whereas72 % of babies from control group could eventually mould in to the arms of examiner but required lot of nestling. In relation to Consolability which measures the number of maneuvers the examiner utilizes in order to bring the baby to a quiet state it was observed that for 35 % babies in experimental group examiners voice & face alone was enough for quieting the baby but in control group for majority(34%)of the babies examiner had to keep hand on the belly & restrained one or two arms of the baby.

4. Infant's state & behavioral abilities are cues. Infant behaviors that indicate readiness for interaction are called as engagement cues .One of the cue is Hand to mouth activity. In relation to this activity, 45 % babies from experimental group & 40 % from control group brought their fist towards the mouth 3 times but with no insertion. In control group majority(53 %)of times baby could bring the fist near the mouth twice but with no insertion .It reveals that babies from both group had shown readiness

for interaction but it was found better in experimental group.

5. 5th cluster was related to motor system. It included the items related to general tone, motor maturity, ability to pull to sit, defensive mechanism and activity level. Here also mean score was 11.413 and 4.5467 in experimental &control group respectively. When unpaired test was used to assess the difference, it was observed that P value(0)was< 0.01. In relation to General tone, it was observed that majority (47 %) of the babies from experimental group were responsive with good tone whereas in control group majority (33 %) of babies responded with average tone.

6. When baby was pulled to seating position 48% babies from experimental group were able to bring their head in midline for 1-2 seconds &examiner was able to feel the increase in the head & shoulder tone of the babies .In control group 59%babies showed increased tone in head & shoulder, were able to bring the head forward through midline but were not able to bring it back to midline. When a cloth was put on the face of the baby to test the defensive movements, majority (45%) of the babies from experimental group rooting & lateral head turning was observed where as in control group maximum (48%) babies showed non specific motor response with short latency. Overall response in motor system was better in experimental group than control

7. In the cluster of autonomic stability responses like tremors, startles & skin color was assessed. Presence of severe tremors indicates irritation of central nervous system or depression. In the present study, mean score of experimental group was 1.96 &0.04 in control group. Calculated value was 25.486 with table value 2.3263. P value was 4E-142 .It indicates that there was significant improvement in experimental group related to autonomic stability .But it was also observed that babies belonging to control group also did not show any symptoms of central nervous system irritation or depression. As per the values in Table No. – 8,overall response to the neonatal reflexes was better in experimental group than control group as evidenced by significant difference in mean score of both groups . Calculated't' value was 17.032 which was more than table value (2.3263).

With the above findings related to the behavior of the babies who received massage had shown better improvement than the babies who did not received massage in all cluster. Similar findings have been observed in the study done by Sheila Mathai , Armada Fernandez etal In their study, effect of tactile kinesthetic stimulation on preterm babies was assessed . Total 48 babies were randomly assigned to either control (24) experimental (24)
Massage was given by trained person for 5 consecutive days which was followed by mother or primary caretaker till 40 – 42 weeks of postmenstrual age.

Behavior assessment was done by using Brazelton Neonatal Assessment Scale after 5 days of stimulation & on follow up (at 40 – 42 weeks of post menstrual age) . On this scale, experimental group showed statistically significant improvement in all clusters 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 only which was on 5- 7 days of the study[9].

It is said that massage helps in decreasing stress behaviors and activities in neonate .In a study done by Hernandez - Rief , Diego & Field (2007)[12] the effects of massage therapy were studied in terms of changes in behavior of the neonates. In this study, massage was given as per Field protocol three times a day for five days. Infant's stress behaviors which included sneezing, crying , grimacing , yawning , jerking of limbs, and finger faring were recorded on first and last day of the study . The results revealed a reduction in duration of stressful behavior and movement in the massaged group in comparison with control group. Findings of the present study also revealed that massage has positive effect on reducing the stressful behavior in babies.

6.5 Findings related to association of demographic variables with weight & behavioral parameters in experimental & control group

1. As per table - 11, in control group association was observed between gestational age & weight of the babies but there was no statistically significant association was observed between gender & weight of the babies
2. In experimental group, there was no association observed between weight & gestational age. Same was true for gender.
3. In relation to behavioral parameters in control group, association was observed between gestational age & orientation, state organization &reflex scores. But no association was observed between behavior parameters & gender of the babies.
4. The babies belonging to experimental group did not show any statistically significant association between behavioral parameters & selected demographic variables.

6.6 Findings related to the opinion of mothers regarding massage for their babies.

When mother's opinion about administration of massage for the babies was asked, none of the mother denied the positive effect of massage. They all accepted that every mother should learn massage. It was observed by the investigator that all mothers took active part in giving massage to their babies.

Findings of this study indicates that massage has helped the parents to develop the bond with their children . According to Bond, 2002,[11] through massage parents can begin to connect and communicate with their children. Some psychologist believe that loving touch during infancy teaches human love , recognition , and self worth. According to the study findings of Adamson , 1996,[13] hundred percent of the mothers who participated in a massage class felt their infants benefitted from the massage and 76.6 % felt that the massage had given them confidence in handling their infants.

This study supports the conceptual framework which was based on General system theory by Ludwig Von Bertalanffy

. According to this theory, a system is a set of interconnected parts of open system which exchanges the matter and energy with its surroundings. It also can be viewed as a bounded information process that transforms inputs in to output. Inputs are consumed and outputs are produced. In present study massage on the babies with personal and environmental factors was considered as an input . This input has caused exchange of energy , interactions and physiological and behavioral processes. This process had transformed the input in to output in the form of significant weight gain with stable physiological parameters and improvement in behavior which was manifested by better interaction , attachment , maintenance of state organization , less irritability and adaptability to negative stimuli.

7. Conclusion

Massage has been used for the treatment & as a routine part of infant care for hundreds of years in many cultures and is one of the oldest therapeutic techniques in the world. .Massage has continued to be practical even until this day in many traditional cultures especially in India, Uganda, Nigeria, Fiji and others have routinely massaged infants for the first several months as a natural part of child rearing that is passed down through the generation of mothers.

In many nurseries, massage has became a component of development supportive care. Infant massage as a form of alternative medicine is becoming increasingly popular because of its simplicity and cost effectiveness. Also, it is easy to learn and can be done at home by the family.

Present study indicates that massage among low birth weight babies may have a potential to contribute greater weight gain and better adaptation to external stimuli. It also assumed that massage is safe and easy to administer which can enhance growth and development of the baby in form of better weight gain, stable physiological parameters and improvement in behavior of the baby.

This study concludes that massage was beneficial in increasing the weight and improving the behavior of low birth weight babies than the babies who did not received massage. Findings of this study also concludes that, massage did not have any ill effect on maintenance of physiological parameters such as heart rate , temperature, oxygen saturation & skin color. Babies who received massage also did not develop any complications.

8. Scope of Study

Massage can be adopted as a routine care in NICU. It can be included as a regular prenatal teaching . Study can be replicated on large number of subjects and for longer duration .

Massage is the oldest baby care practice followed since ages in the Indian culture. It is a scientific manipulation of the soft tissues of the body for the purpose of normalizing those tissues. It consists of a group of the manual techniques that includes applying fixed or movable pressure holding & /or causing movement of the body.

Primary goals of care for the babies admitted in NICU are maintenance of thermoregulation, achieving optimal feeding, gaining weight, and prevention of infections & most important is to develop emotional bonding between baby & parents / caregiver.

There is now a general trend towards a more baby friendly, family centered approach in the Neonatal Unit. Aspects of this approach - including positive touch and massage - are gaining in popularity. But still it has caused much debate due to the ambiguity surrounding the implementation and validity of the interventions.

Staff's workings in Neonatal Intensive Care Units are increasingly looking for new ways to help newborn infants and their parents to endure the stressful experience of the modern day Neonatal Intensive Care Unit (NICU). Neonates not only deserve to receive the best biomedical-technological care, but also the best possible humane, psychological, and emotional support. One way of helping to achieve this is with the use of a positive touch (PT) approach. It involves various types of touch -interaction including handling , holding , kangaroo care and massage.

Massage has been found as an accepted routine of infant care throughout the world. In India it is an accepted practice for all full term neonates. Many studies have shown the positive influence of massage on full term as well as on premature babies. But adequate published data is not available related to effect of massage on low birth weight babies. As percentage of low birth weight babies is quite high in India there is a need for developing safe yet cost effective methods of ensuring weight gain and improve behavioral status among these babies.

Birth of any baby brings about tremendous changes in the lives of the parents. Especially when child requires hospitalization in special care units. If appropriate resources & strategies are not available for them it increases the stress & strain among parents & other family members which can ultimately weaken or destroy the family unit .At this situation neonatal nurses play an important role .She believes on family centered approach in child rearing. Any activity such as infant massage, kangaroo mother care which enhances the parent – baby bond are always appreciated by her. She also believes that babies are aware human beings who deserve respect, tenderness, warmth and, above all, a listening heart.

In view of this, the investigator felt the need of developing evidence to promote this age old practice in a scientific manner. Results of this study can help the hospital authorities to formulate a standard policy of administering massage to all stable babies admitted in NICU. It may likely to reduce hospital cost & most important is to achieve optimal development of low birth weight babies. Regular training of health care professionals working in NICU & parents around the nation can be carried out. If successful, savings may be directed towards researching the ways for reducing birth of low birth weight baby.

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Author Profile

Dr. Sneha Pitre has done M. Sc (NURSING) and PhD. Presently she is working as Principal in Bharati Vidyaapeet Deemed University's College of Nursing Pune (India)