Effect of Massage Therapy on Vital Signs of Premature Infant at Neonatal Intensive Care Unitsin Sohag city

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Abstract:

In premature infants, weight gain becomes the main criterion for hospital discharge. Research shows that massage therapy had led to weight gain in premature infants when moderate pressure massage had been provided. **Aims:**The present study aimedto determinethe effect of massage therapy on vital signs of premature infant at Neonatal Intensive Care Units**.**The total sample included sixty low birth weight premature infants, who were selected from the Neonatal Intensive Care Units in Sohag Affiliated to the ministry of health hospitals. **Tools:**Two tools have been used: Structure Questionnaire Sheet about Socio-demographic data of low birth weight infants and General condition of premature infants. **Results:** The study revealed significant relation of weight and length of staying of premature infant at Neonatal Intensive Care Units. No significant relation on anthropometric measurements (length) and vital signs in relation to massage therapy. **Conclusion**: massage therapy has positive effect on weight of premature infants. **Recommendation:**nurses who work in Neonatal Intensive care units should receive training program of massage therapy to improve their practice regarding general condition of premature infants.

Keywords: Massage Therapy, Premature Infants, vital signs,Neonatal Intensive Care Units.

Introduction:

Premature infant survivors show a significant growth and development retardation, reflected by lower body weight, length and head circumference and poor motor, adaptive, social and language development in the first five years of life. Later in adult being, they remain at an upturn risk of cardiovascular and metabolic disorders (**Coutinho,et al.,2011**&**Velez ,et al., 2011**).

Premature infant is defined as all births before 37 completed weeks of gestation or less than 259 days since the first day of a woman's last menstrual period. Premature birth can be further sub-divided based on gestational age: extremely preterm (<28 weeks), very preterm (28 - <32 weeks) and moderate preterm (32 - <37 completed weeks of gestation). Moderate preterm birth might be additional part to concentrate on late pre-term birth (34 - <37 completed weeks). The 37 week remove is to some degree self-assertive, and it is currently documented that although the risks connected with premature birth are greater the lower the gestational age, even infants born at 37 or 38 weeks have higher dangers than those born at 40 weeks of gestation (**Marlow 2012)**.

Premature infant mortality for late preterm infants (34–36 weeks of gestation) is threefold greater than for full-term infants, often related to a mix of intra partum events (e.g., placental and umbilical cord injury) and postnatal problems (e.g., respiratory problems, sepsis, and metabolic instability such as hypoglycemia and hypothermia). The morbidity and mortality connected with late premature infants are especially magnificent a direct result of their vast quantities (**Heron M& Sutton 2011)**.

Massage therapy as a non-therapeutic interference may have positive effect on physical and developmental growth of premature and LBW newborn infants including weight gain, decreased stress behavior, promotion of neurologic and neuro-motor development, better infant-parent emotional bonding, improved sleep, reduced rates of nosocomial infection and along these lines, decreased mortality of hospitalized premature infants. A survey has recommended that massage has several beneficial properties in the form psychological relationship. Lubricant oil massage was more useful than simple touch therapy **(Kulkarni et al., 2010)**.

Massage therapy has not any harmful effects and it can enhanced weight rapidity of more than 30 weeks of gestation and physically stable premature infants by different mechanisms. Increase Weight is the most common reliable stricture which is connected with massage therapy in premature infants (**Samsamshariat&Pourmorshed 2011).**

The primary communication that parents can make with their infant is by method of touch, and massage is a standout amongst the most appropriate methods for touching a newborn infant. Therefore, infant massage is essential since because infants interpret touch as physical sign that they are loved. The impact of giving a newborn infant comforting skin massages is evident on several stages. For example, the brain contains psychological classifications that, from the first day of life, directly mediate social bonds and social feelings **(Cheng et al., 2011) & (Kulkarni et al., 2010**).

The care givers have to be properly instructed to avoid too strong a massage that may cause physical injury. Moderate pressure massage therapy and passive movement of the limbs have been shown to result in weight gain in premature infants. **(Field et al., 2010) & (Mukherjee et al., 2011)**.

Aim of the study:

The aim of this study was to: determine the effect of massage therapy on vital signs of premature infant at Neonatal Intensive Care Units.

Research hypothesis:

Premature infant who exposed to massage therapy will experience stable vital signs compared to premature infants who receiving hospital routines care.

Subjects and Method:

Research Design: Quasi experimental research design was used in this study.

Setting: The study was conducted at **Neonatal Intensive Care Units** at Sohag University Hospital and Children Specialized Hospital at Sohag which is affiliated to the Ministry of Health. The study was conducted from march 2015 to July 2015.

Subjects: Sixty premature infant in the above previously mentioned setting who admitted at Neonatal Intensive Care Units.The sample was divided into two equal groups: study group (30 premature infant)and control group(30 premature infant)whichselected by simple random sample by coin. Study group was received massage therapy while the control group: received routine hospital care

Inclusion Criteria of premature infant:

Gestational age ranged from 28-37 weeks of gestation, birth weight of premature infants ranged from 900 gm to 2000 gm, premature infant was stable condition, and both sexes (male and female).

Exclusion Criteria of premature infant:

Congenital anomalies such as congenital heart disease, cancer, sepsis, require surgery, and neurological disorder

Tools of data collection: Data was collected by using two tools**.**

The tools were designed by the researcher after reviewing the received literature to collect essential data about the premature infant.

Tool I: It was contained two parts:

Part I: Socio-demographic characteristics of premature infant as: age, sex and birth order, weight on admission, date of admission and such as discharge, reason for admission and diagnosis.

Part II: This part was included data about feeding assessment of premature infant as: types of feeding of premature (breast or bottle feeding or gavage feeding), amount of every feeding per time and 24 hour, frequency administration of gavage feeding and intra venous fluid.

Tool II: It was contained two parts:

Part I: Measuring vital signs: It included assessment of temperature, pulse and respiration for seven days.

Part II: included recording daily assessment the sign and symptoms of premature infant that was present from one to seven days.

Method for data collection:

An official permission was obtained from the director of intensive care units of premature infants in Sohag city.

Oral Consent was obtained from the mothers of low birth weight premature infants who agreed to participate in this study after explaining both the purpose and importance of this study.

Pilot study: It was carried out on 10 % of the study and control premature infant for the purpose of modification and clarification. The designed tool was tested on premature infant who fulfilled the inclusion criteria to evaluate the content validity and reliability of the tools and to estimate the time required to fill in the sheets. Unclear items will be clarified, unnecessary items will be omitted and new variables will be added. Those who shared in the pilot study were excluded from the study sample.

Premature infants' vital signs were measured daily to the study and control group for seven days.

Daily assessment of sign and symptoms of premature infant of both groups from one day to seven day.

Data collection was done daily according the availability of cases, socio demographic data was obtained for record of premature infants and was randomly selected according the diagnosis and was divided into study and control groups.

Assessment of general condition of premature infants daily (signs and symptoms) was done.

Measuring of vital signs was done twice daily to the study group during seven day before and after massage

Vital signs were measuring before conducting massage to premature infants from the first day of massage to the seventh day.

Daily observation and recording the data was done during one week, and compared between the control and study groups.

Massage sessions will be conducted one hour after feeding the premature infants in a quite

environment 5 minutes for rubbing the body, 5 minutes kneading the body and last minutes for kinesthetic stimulation and other supportive program for premature massage therapy from specialized internet.

-Implementation of massage therapy technique:

The massage will conduct to study group 15 minutes for two times daily for one week.

- Hands should be clean and fingernails short. All jewelers should be removed to avoid scratching, give you time to prepare, as being calm and focused will enhance the effectiveness of the massage, minimize noise, distractions and interactions. Ensure that the room i draught-free and that the temperature is appropriate (not too hot and not too cold) and constant.

The researcher first introduced herself to the care giver of intensive care of premature unit and then explained the purpose of the study at the beginning of interview , so the care giver were reassured that all gathered information will be confidential. The title and objectives of the study were illustrated as well as the main data items to be covered and the study was carried out after gaining the necessary approval from the administrator of Specialized Hospital at Sohag which is affiliated to the Ministry of Health.

Each premature infant was conducted massage in first day for 15 minutes, twice daily for seven days, from the top of the head to the neck and back to the top of the head, and back to the neck; from the neck across the shoulders; from the upper back to the waist and back to the upper back; from the thigh to the foot to the thigh on both legs and from the shoulder to the hand to the shoulder on both arms. This is followed by passive movements of the limbs for 5 minutes.

The newborn is placed in a supine position and each arm, then each leg, and finally both legs together are flexed and extended (as in a bicycling motion). Each flexion/extension motion lasts 10 seconds. This is again followed by 5 minute massage as depicted above.

Massage sessions was conducted one hour after feeding the premature infants in a quite environment 5 minutes for rubbing the body, 5 minutes kneading the body and last minutes for kinesthetic stimulation and other supportive program for premature massage therapy from specialized internet

Evaluation of the effect of massage therapy on vital signs of premature infant:

Reassessment of general condition, vital signs after massage therapy was implemented and evaluated massage.

Ethical considerations:

Parent of premature infant consent for participation was obtained after explaining the purpose of the study privacy of their information obtained from their parent are protected and confidentiality of parent

premature infant, nature of the study and right to withdraw from the study at any time were explained.

Results:

Table (1): showed that the percentage distribution of premature infants was related to socio demographic characteristics in the study and control group. It has been found out that twenty percent (20.0%) of them gestational age is at 28 - <32 weeks in the study group of premature infants. Whereas half (50%) of the premature infants in the study group the gestational age is at32-<36 weeks of gestation. In the control group, it had been found out that more than forty percent (43.3%) is at32-<36 weeks of gestation. According to their sex it had been found out that more than half (53.3%) of them were males in the study group while more than thirty percent (63.3%) were females in the control group. As regards birth weight, it had been found out that forty percent (40.0%) of premature infants was 1200 – 1500gms in the study group and thirty percent (30%) of them in the control group while there was twenty percent (20%) 1800 -2000gms in the study group of premature infants. As regards to admission weight, it showed that more than thirty percent (33.3%) was from 1500 to 1800gms while only (13.3%) ranged from 1800 to 2000gms in the study group. It was observed that regarding diagnosis had showed that more than three quadrant (76.7%) of the premature infantswere diagnosed with jaundicein the study group, while half (50%) of the premature infants in control group were diagnosed with jaundice. The same table also showed that regarding residence, it had been found out that two thirds (60%) came from urban areas in the study group while more than one third (36.3%) in the control group belonged to rural areas. In the study group, forty percent (40%) of them came from rural areas and more than sixty percent (63.4%) of them were in the control group. Regarding the type of delivery, the majority of both groups were delivered caesarian section.

Table (2):- Showed that Percentage distribution of premature infant according to clinical manifestation assessment at day one and day seven of massage therapy in study and control groups. As regarding of cyanosis in day one it was founded that more than fifty percent (53.3%) present in study group on the seventh day only (6.7%) absent of cyanosis with there was moderate significance deference ($p<0.0$) at day one and day seven and control group was founded that more than fifty percent (56.7)in day one , on the seventh day it was founded that more than forty percent (46.7%) with no Statistical significance deference ($p>0.05$) at day one and day seven. while poor sucking in the study group was founded that there was more than forty percent (43.3 %) present in first day while on seventh day only (10.0%)present in

seven day of massage there was moderate significance deference (p<0.0) at day one and day seven and control group was founded that forty percent (40.0%)in day one , on the seventh day it was founded that more than thirty percent (33.3%) with no Statistical significance deference (p>0.05) at day one and day seven. As regarded tachycardia in the study group was founded that there was more than thirty percent (33.3 %) present in first day while on seventh day only (6.7%)present in seven day of massage there was moderate Statistical significance deference (p<0.0) at day one and day seven of massage therapy, and control group was founded that more than thirty percent (36.7%) In day one, on the seventh day it was founded that more than quadrant percent (26.7%) with no Statistical significance deference (p>0.05) at day one and day seven. As regarded apnea in the study group was founded that there was more than fifty percent (53.3 %) present in first day while on seventh day only (13.3%)present in seven day of massage there was Statistical significance deference (p<0.0) at day one and day seven of massage therapy, and control group was founded that fifty percent (50.0%) in day one , on the seventh day it was founded that (60.0%) with no Statistical significance deference (p>0.05) at day one and day seven.

Table (3):- showed that mean and standard deviation of premature infant according to investigation assessment at one and seven day in study and control group it showed that there was no significance deference (p>0.05)between study and control group in day one regarding the PaO_2, $PaCo_2$ and Total bilirubin , while there was Statistical significance deference (p<0.0) in PaO_2&$PaCo_2$In day seven in study and control groups except total bilirubin there was no significance deference (p>0.05) .But there was no Statistical significance deference (p>0.05) in day one in study and control groups.

Table (4):- Mean temperature of premature infants were measured from day one to day seven in the study and control groups., it was found out that Mean±SD of first day of massage was (36.8±0.5) in the study group and (36.9±0.4) in the control group and mean±SD (37±0.2) in the seventh day in study group of massage therapy. Whereas there was no significant statistical difference (p=> 0.05) in the control group (36.9±0.5)while the daily temperature was measured between the study and control group during one week. As illustrated in figure (5).

Table (5):- Mean temperature of premature infants was measured from day one to day seven of massage therapy in the study. It was found out that the mean and standard deviation in the first day before massage, it was (36.8±0.3) in study group, while after

massage it was (36.8±0.5).There was no significant statistical difference before and after massage. Whereas in the seventh day of massage, it was (37±0.2)before massage in the study group, while it was (37±0.2) after massage. There were no significant statistical differences before and after massage therapy.

Table (6): - Mean pulse rate of premature infants were measured from day one to day seven in the study and control groups.. It was found out that the Mean±SD of first day of massage was (125 ±14) in study group, while in the control group it was (124±17)in the seventh day of massage therapy. The mean±SD was (138±12) in the study group while in control group it was (132±15).There were no significant statistical differences (p=> 0.05) between the study and control group during the first four days of massage therapy. While there were significance statistical differences (p=> 0.05) of premature infant of the fifth, sixth and seventh day in the study and control groups.

Table (7):- showed that mean of pulse rate of premature infants was measured from day one to day seven in the study group. It was found out that the mean and standard deviation of day one before massage was (124 ±16) in study group, while after massage it was (125 ±14). There were no significant statistical differences before and after massage. Whereas in the seventh day of massage, it was (138±16) before massage in study group. After the massage it was (138±12). There were no significant statistical differences before and after massage.

Table (8):- showed thatthemean respiration rate of premature infants were measured from day one to day seven in the study and control groups. It was found out that the Mean±SD of the first day of massage was (38±5.5) in study group, while in the control group it was (38±9.2).In the seventh day of massage therapy the mean±SD was (39±5) in the study group while in the control group it was (31±7.5). There were no significant statistical differences (p=> 0.05) between the study and control group during first the fifth day of massage therapy. While there were significant statistical differences (p=> 0.05) of premature infant in the sixth and seventh days of massage in the study and control groups.

Table (9):- Mean respiratory rate of premature infants was measured before and after massage from day one to the day seven in the study group it was founded mean and standard deviation of day one mean and standard deviation of first day before massage (37±5.2) in study group, while after massage was founded (38±5.5)there was no statistical differences between before and after massage. While the seventh day of massage it was founded before massage (36±5.3) in study group, while after massage was founded (39±5)there was statistical differences between before and after massage.

Table (10):- showed that comparison between vital signs variation of studied premature infants before and after massage therapy, regarding the temperature variation it was founded that Mean±SD before massage was (36.8±0.5) and after massage was (37±0.2)there were statistical significance differences ($p<0.05$) . As regarded pulse rate it was founded that Mean±SD before massage was (125±14.7) and after massage was founded (138±12.2)there were statistical significance differences($p<0.05$) and respiration rate was founded that Mean±SD before massage was (28±5.5) and after massage was (39±5)there were moderate significance differences ($p<0.01$)before and after massage therapy. As illustrated in figure(8).

Table (1):Percentage distribution of premature infants is related to bio socio demographic characteristics in study and control group.

Characteristics of premature infants	Study group(n=30)		Control group(n=30)	
	No.	%	No.	%
Gestational age				
28 - <32	6	20.0	7	23.3
32- <36	15	50.0	13	43.3
36-<37	9	30.0	10	33.3
M±SD	**31.6±2.8**		**31.1±2.1**	
Sex				
Male	16	53.3	11	36.7
Female	14	46.7	19	63.3
Birth weight (gms)				
- 900- <1200	5	16.6	7	23.4
-1200-<1500	12	40.0	9	30.0
-1500-<1800	7	23.4	6	20.0
-1800-<2000	6	20.0	8	26.6
M±SD	1150.5±258.4		1154.5±262.1	
Admission weight (gm)				
- 900- <1200	7	23.4	8	26.6
-1200-<1500	9	30.0	9	30.0
-1500-<1800	10	33.3	8	26.6
-1800-<2000	4	13.3	5	16.6
M±SD	1144.8±257.3		1154.5±262.1	
Diagnosis				
Jaundice	23	76.7	15	50.0
Respiratory distress	7	23.3	15	50.0

Residence				
Rural	12	40.0	19	63.4
Urban	18	60.0	11	36.6
Type of Delivery				
Normal Vaginal Delivery	1	3.3	3	10.0
Cesarean Section	29	96.7	27	90.0

Table (2):- Percentage distributions of premature infant according to clinical manifestation assessment at one and seven day of massage therapy in study and control group.

Clinical manifestation	Study group (n=30)					Control group (n=30)				
	1st day		7th day		P. value	1st day		7th day		P. value
	No.	%	No.	%		No.	%	No.	%	
Cyanosis										
Present	16	53.3	2	6.7	<0.001**	17	56.7	14	46.7	0.772
Absent	14	46.7	28	93.3		13	43.3	16	53.3	
Poor sucking										
Present	13	43.3	3	10.0	<0.001**	12	40.0	10	33.3	0.451
Absent	14	46.7	27	90.0		18	60.0	20	66.7	
Tachycardia										
Present	10	33.3	2	6.7	0.021*	11	36.7	8	26.7	0.729
Absent	20	66.7	28	93.3		19	63.3	22	73.3	
Apnea										
Present	16	53.3	4	13.3	0.014*	15	50.0	12	40.0	0.827
Absent	14	46.7	26	86.6		15	50.0	18	60.0	

* Statistically significant difference (p<0.05)** Statistically significant difference (p<0.01)

Table (3):- Mean investigation assessment of premature infant at one and seven day of massage therapy in study and control group.

	Study (n=30)	Control (n=30)	P. value
	Mean±SD	Mean±SD	
Day one			
PaO_2	62.1±8.3	62.8±7.8	0.737
$PaCo_2$	48.2±3.7	47.9±4.1	0.767
Total bilirubin	16.1±1.4	16.3±1.5	0.595
Seven day			
PaO_2	79.4±5.6	71.3±6.7	<0.001**
$PaCo_2$	41.3±2.6	43.8±5.5	0.028*
Total bilirubin	5.4±2.1	5.6±1.9	0.701

* Statistically significant difference (p<0.05)** Statistically significant difference (p<0.01)

Table (4):-Mean temperature of premature infants was measured from day one to day seven in the study and control groups.

Temperature	Study Group (n=30)	Control Group (n=30)	P. value
	Mean±SD	Mean±SD	
1st day	36.8±0.5	36.9±0.4	0.473
2nd day	36.9±0.3	36.9±0.4	0.970
3rd day	36.9±0.3	36.9±0.5	0.835
4th day	36.9±0.2	36.9±0.3	0.705
5th day	36.9±0.2	36.9±0.4	0.717
6th day	37±0.2	36.8±0.5	0.126
7th day	37±0.2	36.9±0.5	0.597

Ns: No statistically significant difference (p>0.05)

Table (5):- Mean temperature of premature infants was measured from day one to day seven of massage therapy in the study.

Temperature	Before massage therapy	After massage therapy	P. value
Day one	36.8±0.3	36.8±0.5	0.999
Day two	36.8±0.5	36.9±0.3	0.228
Day three	36.9±0.2	36.9±0.3	1.000
Day four	36.9±0.2	36.9±0.2	1.000
Day five	36.9±0.2	36.9±0.2	1.000
Day six	37±0.2	37±0.2	1.000
Day seven	37±0.2	37±0.2	1.000

* Statistically significant difference (p<0.05)Ns: No statistically significant difference (p>0.05)

Table (6):- Mean pulse rate of premature infants were measured from day one to day seven in the study and control groups.

Pulse	Study Group (n=30)	Control Group (n=30)	P. value
	Mean±SD	Mean±SD	
1st day	125 ±14	124±17	0.157ns
2nd day	131±13	124±16	0.084ns
3rd day	133±12	126±16	0.069ns
4th day	134±11	127±16	0.084ns
5th day	137±12	128±17	0.039*
6th day	138±11	130±17	0.042*
7th day	138±12	132±15	0.048*
P. value	<0.001**	0.072	

Ns: No statistically significant difference (p>0.05)* Statistically significant difference (p<0.05)

Table (7):- **Mean pulse rate of premature infants was measured from day one to day seven in the study group.**

Pulse rate	Before massage therapy	After massage therapy	P. value
Day one	124 ±16	125 ±14	0.740
Day two	126±13	131±13	0.057
Day three	131±15	133±12	0.463
Day four	133±13	134±11	0.679
Day five	134±12	137±12	0.214
Day six	137±11	138±11	0.650
Day seven	138±16	138±12	1.000

Ns: No statistically significant difference (p>0.05)

Table (8):-Mean respiratory rate of premature infants were measured from day one to day seven in the study and control groups.

Respiratory rate	**Study Group (n=30)**	**Control Group (n=30)**	**P. value**
	Mean±SD	Mean±SD	
1st day	38±5.5	38±9.2	0.131
2nd day	39±5.5	39±9.1	0.133
3rd day	39±5.3	39±8.6	0.124
4th day	41±5.3	40±8	0.086
5th day	42±5	41±9.1	0.463
6th day	36±4.8	31±7.4	0.003**
7th day	39±5	31±7.5	0.001**

Ns: No statistically significant difference (p>0.05)** Statistically significant difference (p<0.01)

Table (9):- **Mean respiratory rate of premature infants was measured before and after massage from day one to day seven in the study group.**

Respiration	Before massage therapy	After massage therapy	P. value
Day one	37±5.2	38±5.5	0.353
Day two	38±5.7	39±5.5	0.374
Day three	39±6.2	39±5.3	0.995
Day four	39±5.7	41±5.3	0.072
Day five	31±4.8	42±5	0.310
Day six	32±4.6	36±4.8	0.001**
Day seven	36±5.3	39±5	0.005**

Ns: No statistically significant difference (p>0.05)* Statistically significant difference (p<0.01)

Table (10):- Comparison between vital signs variation of studied premature infants before and after massage therapy (n=30).

Vital signs	Before massage	After massage	P. value
Temperature	36.8±0.5	37±0.2	0.046*
Pulse	125±14.7	138±12.2	0.001**
Respiration rate (RR)	38±5.5	39±5	<0.001**

* Statistically significant difference (p<0.05)

Discussion:

Premature infant massage is beneficial and gratifying for the infant and family. It produces numerous positive emotional and behavioral effects in infants, such as enhances sleep quality, improvement in circulation and improvement in immunological responses. Also, the massage facilitates the mother–infant relation and helps reduce anxiety for both. The first communication that parents can create with their infant by means of touch, and massage, is one of the most suitable ways of touching an infant. Therefore, premature infant massage is important because infants interpret touch as physical evidence that they are loved (**Cetinkaya&Basbakkal 2012)**

The first part that explored in the present study was the socio-demographic characteristics of premature infants it included gestational age, sex, birth weight (gms), admission weight (gm), residence, diagnosis and type of delivery.

The findings of the present study show the socio-demographic characteristics of the studied premature infants according to their gestational age, it was found out that half (50%) of the premature infant their

gestational age was32-<36 weeks of gestation, the same mentioned by**Tekgündüzet al., (2014)** who reported that the infants' average birth weight and their average gestational age.

The current study shows that more than half of premature infants were male in the study & control groups respectively. This finding is congruent with **Lee (2005)** who evaluates the effect of infant massage on weight gain, physiological and behavioral responses in premature infants, the children, and point of view and reported that, there were less than half of them boys and more than half of them girls who received massage therapy.

In the present study, it is concluded that caesarean section (CS) is the most common method of delivery; it can lead to many health problems including preterm delivery and low birth weight; it is also in agreement with **Lee, (2005)& Hyde and Berrington(2012)**who mentioned that infants born by cesarean section have a significantly different physiology at birth compared to those born by vaginal delivery. The finding is also consistent with **Choi et al., (2015**) who mentioned that the most common as delivered cesarean section compared to those born by normal vaginal delivery. This is may be due to the most common premature infant is born by caesarean section due to maternal and newborn problem.

As regards the characteristics of the studied infants, the result of the current study reveals that the temperature variation during one week between the study and control group of premature infant has no significant difference. This finding is opposite to (**Leduc Det al., 2009)**who said that the finding with greater increase in temperature had been noted in premature infants who received massage therapy and was most likely due to the therapist's hands transferring heat to the infant or may be due to the massage facilitates neurological regulation of temperature. This is may be due to premature infant had a little of subcutaneous fat that leading to facilitated heat loss to surround environment.

The present thesis explores that there is significant difference as regards the pulse variation during one week between the study and control group of premature infant. These results agree with**Field et al., 2008&Diego et al2014** who mentioned that physiologic conducted parameters included heart rate variability (HRV) showed significant improvements. But this result is opposite to that of (**Lee 2005)** who stated that there were no significant differences in heart rate after massage. However, this is may be due tofrequency of massage improving the circulation is reflected in the pulse variation.

The present study shows that respiration rate variation during one week between the study and control group of premature infant with

has significant difference. This finding is in agreement with **De Almeida et al., (2014)**who said that regarding the effect of applying massage therapy on pre-mature neonates' physical and physiological states pre and post, results of the study demonstrated that, were statistical significant differences concerning heart rate, temperature and occurrence of apnea respectively. There is a highly statistical and significant difference regarding respiratory rate before and after applying the massage therapy. This is may be due to the effect of massage therapy on premature infants that enhances oxygen saturation can lead to improve respiration.

In this study, however, it is observed that clinical manifestation assessments are found in day one and day seven of the massage therapy in the study and control group. As regarding of apnea, cyanosis it reflected that there is moderate significant difference at one day and seven day. These results were agreed with **Baghcheghieta l., (2007)** who found out positive significant relation between touching an infant and increased oxygen saturation.The effect of massage therapy on premature infant that enhanced oxygen saturation that leads to improve cyanosis

The present study noticed that, clinical manifestation assessments are founds in day one and day seven of massage therapy in study and control group. As d to tachycardia it reflected that there is significant difference in day one and day seven. This finding agreed with **Hardin (2009)** who argued that decreased oxygen saturation and pulse rates in preterm neonates were exposed to massage. Similarly, **(Field et al., 2010**) showed that the pressure utilized those infants who received moderate pressure stroking giving greater weight gain and increasing cardiac vagal activity. This is may be due to daily massage therapy to premature infants increase cardiac output that leads to the improvement of tachycardia.

The present study showed that, investigation assessment in day one and day seven of massage therapy in study and control group is no significant difference ($p>0.05$) in day one regarding the PaO_2, $PaCo_2$, while there was significance difference ($p<0.0$) in PaO_2&$PaCo_2$ in day seven in the study and control group. This finding is in agreement with **Livingston et al., (2009)**who mentioned that the significant differences in oxygen saturation were found assessed the effects of touch and massage on medically fragile infant groups. The same explanation mentioned by**Verklan (2010)** who found out that massaging the skin leads more oxygen to enter the lungs and the oxygen transportation increases. This process finally leads to an improvement in the mean oxygen saturation.This is may be due to, the therapeutic benefits of massage therapy on

premature infant enhance circulation that can lead to improve oxygen saturation.

As regards the relation between the gestational age and birth weight of premature infant in the study group, the research revealed that there is highly significant statistical difference.

Conclusion:

Premature infant who exposed to massage therapy experienced better weight gain and short duration of stay at NICU compared to premature infant who received routine hospital care.

Recommendations:

Nurses in neonatal intensive care unit should receive training program related to massage therapy to improve their practice regarding general condition two times of premature infants during hospitalization.

Further studies are required to evaluate alternative methods to meet the needs of premature infants during transition from intra utrine life to extra utrine life.

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