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EFFECT OF NEONATAL MASSAGE ON WEIGHT GAIN AND PHYSICAL RESPONSES AMONG PRETERM BABIES IN SELECTED HOSPITAL IN FUJAIRAH, UNITED ARAB EMIRATE

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ABSTRACT: *Background: The prevalence of preterm birth in UAE has increased to around 10 per cent of all deliveries in the UAE. Preterm neonates are more prone to complications; achieving optimal weight is one of the factors that affect the length of hospital stay which is taking into consideration in the discharge of preterm infants from the hospital. Aim: To assess the effect of neonatal massage on the weight gain and physical responses among preterm neonates in Fujairah hospital. Methods: This study is a quasi-experimental design in Neonatal Intensive Care Unit. Forty three neonates who met the inclusion criteria, were divided into two groups of experimental (n = 24) and control (n = 19) selected using consecutive sampling. Both groups received routine care, the experimental group received the massage for 15 minutes daily for 10 days, Results: Male neonates were (58.1%) than female (41.9%), the percentage birth weight in the control group was 1- 1.5kg (58.3%) while it was 1.5-2.0 kg (41.7%) in the experimental group. Neonatal massage showed a positive effect of 266.68 grams at the end of 10 days of study, the experimental group gained between 143.3g-266.67g (54.1%) while the control group gained between 20g-143.33g (15.7%), it significantly improved physical responses (Heart Rate and Respiratory Rate) with P value below (<0.05) level while there was no statistically significant differences in the temperature, oxygen saturation and body activity Conclusion: Neonatal massage has significant difference in weight gain, improved heart and respiratory rate while no significant effect in the temperature and oxygen saturation. The study recommends that, neonatal massage should form part of the routine care for preterm neonates to increase the weight and other responses which will shorten the length of stay in the hospital and prevent neonatal morbidity and mortality*

KEYWORDS: neonate preterm, massage, weight, physical responses

INTRODUCTION

Preterm birth is defined as a delivery or birth at a gestational age less than 37 weeks another criterion used is a weight of less than 2500g at birth (Quinn, 2016). According to the World Health Organization (WHO, 2017), newborn deaths form an increasingly large percentage of overall child deaths even as both figures continue to fall. With prematurity accounting for 35 per cent of newborn deaths globally, preventing deaths from prematurity is more imperative than ever before. The prevalence of preterm birth in UAE has increased to around 10 per cent of all deliveries in the UAE are premature (Ali Zain, A. 2016).

Overall percentage of neonatal admission in NICU is increasing because of neonatal and maternal complications. Preterm and low birth weight neonates are more prone to the following complications: chronic lung disease**,** pneumonia**,** apnoea and bradycardia**,** infection**,** jaundice**,** intraventricular hemorrhage (IVH), inability to maintain body temperature **,** immature gastrointestinal and digestive system**,** anaemia**,** patent ductus arteriosus (PDA)**,** retinopathy of prematurity (ROP)**,** necrotizing enterocolitis (NEC) and **s**epsis. Weight loss is the most common complication of preterm neonates with low birth weight. The physical and psychological wellbeing of a child depends on the correct management of events in the prenatal period and early childhood period. Various modalities of treatments are available for improving the weight of preterm neonates, massage is one among the alternative therapies for weight gain (Massaro, 2009).Neonatal massage has been practiced worldwide for centuries in many countries, as it provides greater advantages which can be practiced by parents as well as medical professionals. Several interventions have been designed to promote preterm infant weight gain including massage therapy (National Center for Health Statistics, 2011).

Massage is the manipulation of the body's soft tissue for the purpose of normalizing the tissues and it has effects on the whole body by decreasing muscular tension and flaccidity in musculoskeletal system, Moreover it increases blood flow in circulatory system, lymph in lymphatic system, it stimulates or sedates the nervous system and enhance tissue healing of the skin. As such massage has been recommended as an intervention to promote growth and development of preterm and low-birth weight neonates (Aly, Murtaza.2013).

There are two types of massage; tactile stimulation and kinesthetic stimulation. Tactile stimulation means placing the infant in prone position with head turned to one side and stoking each area of the body with moderate pressure using the flats of the fingers of the both hands. Kinesthetic stimulation means placing the infant in supine position and moving each area of the body for one minute. Kinesthetic is divided into six flexion and extension movements lasting about 10 seconds each. The cycle consists of a typical 15 minutes of massage in the following steps; first: 5 minutes tactile stimulation, second: 5 minutes kinesthetic stimulation and third: 5 minutes tactile stimulation.. The massage can be performed by both mother or trained professionals. Massage is a safe, inexpensive treatment modality for healthy, preterm newborn, that may offer benefits of growth and development for newborn, and lead to shorter hospital stay (Rad, Haghshenas, Javadian,, Hajiahmadi,2015).

Preterm neonates who are admitted in NICU have low birth weight and have problem gaining weight rapidly to meet with development of the organs and survival**.** New intervention by massage can help to gain the weight in short time and improve the physiological and behavior response. Neonatal massage with kangaroo mother care for 15 minutes, twice daily for 15 days was significant for neonatal massage ($p<0.001$)and physiological(heart rate, oxygen saturation ,Respiratory rate) and behavioral status improved after the intervention (Afroz & Patil, 2017).There is limited literature that target the effect of massage on preterm neonatal in the Arab countries despite the increase in preterm birth (Ministry of Health Statistic, 2017) In spite of being a very vital aspect of the health and development of preterm babies there is no such study conducted so far in UAE that highlighted the effect of massage on preterm babies. Therefore the

study was conducted to assess the effect of massage (tactile and kinesthetic stimulation) on the weight gain and physical responses (heart rate, oxygen saturation) on the neonate

Statement of the Problem

According to WHO (**2018)**15 million babies are born preterm every year, the prevalence of premature neonates in the UAE is increasing hence the need for admission to NICU for the weight gain. A lot of effort is needed to achieve the desire weight, new intervention is neonatal massage which can help with weight gain within a short time & improve the physiological and behavior disturbance due to separation from the mother for a long time. This study assessed the effect of massage (tactile and kinesthetic stimulation) on the weight gain and physical responses (heart rate, oxygen saturation) and behavioral responses of the neonate.

Aim

The aim of this study is to evaluate the effect of massage (tactile and kinesthetic stimulation) on the weight gain, and physical responses (heart rate, oxygen saturation) of the neonate.

Objectives

1. To assess weight, physiological and behavior responses among preterm neonates in experimental and control group before and after intervention.
2. To compare the weight, physiological and behavior responses among preterm low birth weight neonates in experimental and control group.

Research Questions

1. What is the effect of massage on weight, physiological and behavior responses among preterm low birth weight neonates?
2. What is the comparison between the weight and physiological responses of preterm neonates with selected demographic variables among experimental and control group?

Hypothesis

1-H1.There is significant increase in weight among preterm babies who had neonatal massage than the control group at 0.05 level of significant.

2-H2.Neonatal massage will significantly improve physical responses in preterm babies than control group at 0.05 level of significant.

LITERATURE REVIEW

Effect of massage on weight gain

A single-blind randomized controlled clinical trial conducted by Shaeri , Armanian , Rarani , Valiani (2018), on preterm infants in a neonatal intensive care units in selected hospitals of Isfahan showed that the difference was statistically significant ($p < 0.05$). Abdominal massage affected the weight gain of preterm infants by improving signs of feeding tolerance, stimulating the parasympathetic nervous system, increasing bowel movements and increasing insulin release. Thereby improving weight gain and reduction in the length of hospital stay. Several studies addressed the effects of infant massage on preterm infants' weight gain, there are many variation terms of the massage technique, infants' characteristics, application of different oils and the study duration (Pepino & Mezzacappa, 2015; Salam et al 2015, , Diego, Field & Hernandez-Reif, 2010b, Kale, Naveenkumar, Jain and Siddiqui,2017).

Several studies conducted by Rad, Haghshenas, Javadian, Hajiahmadi and Kazemian (2015) also stated that massage therapy promotes weight gain in very low birth weight neonates and earlier discharge according to a study Both groups received standard care while the case group received the massage therapy 3 times daily for 15 min for a period of 7 days. Average weight of neonates between two, difference became significant after 4th day at ($P = 0.000$). The mean duration of hospital stay in the massage group was (34/1 days ± 7/5) less than the control group (41/7 days ± 9/1) significantly ($P = 0.007$).

Another study by Prince and Prince (2016) and Taheri, Goudarzi, Shariat, Nariman & Matin 2017) on preterm weight revealed that Olive Oil massage increases the weight gain of the pre-term neonates more than the normal care. Sunflower oil massage done daily increased weight gain fast due to decrease absorption of fatty acid and less water loss from the body with the short hospital stay. Other studies from the past few decades have confirmed the effects of massage therapy on weight gain in preterm newborns, use of coconut oil massages twice daily that was then continued by mothers at home for the first month of life (Salam, Darmstadt, & Bhutta, 2015, Jabraeile, Rasooly, Farshi, & Malacouti, 2016 and Johari, Haghgou, Daemi, Rezaeiyan T & Mosala ,2016) collaborate the result of this study that effect of massage therapy on weight gain of LBW neonates in NICUs of Hamedan City hospitals as significant. Massage therapy can be recommended as the special and complementary care for LBW neonates.

Non-blinded trial study was conducted by Khan R, Malik I, Avtar R, Khurana R, Bharadwaj V, & Singh A. (2015) on preterm neonates who were admitted in the N.I.C.U of an India hospital, The weight of every subject was checked and recorded at 1st,7th and 28th post-natal days The mean increase in the weight after 28 post-natal days was shows that oil massage has a good effect on weight gain in neonates.

Effect of massage on physical and physiology responses.

Ramezani, Baniasadi & Baneshi,(2017) in a quasi-experimental study design in Kerman, Iran shows that statistical analyses did not show a significant difference between oxygen saturation across the intervention days ($F=2.87$, $P= 0.13$) while significant differences was observed in the

respiratory rate (F=2.87, P= 0.001) and heart rate (F= 2.25, P=0.03) while Afroz & Patil2(2017) revealed in a comparative study that the pre and post treatment values of heart rate, respiratory rate, peripheral capillary oxygen saturation and temperature, show extremely significant difference in the intervention along with Kangaroo mother care and that it is effective in improving vitals (heart rate, oxygen saturation, and respiratory rate) and behavior of low birth weight infants. Bayomi & El-Nagger (2015) study in Saudi Arabia, revealed that Statistical significance at P _≥ .05, highly statistically significant on premature neonates' physical, physiological and behavioral states, regard to respiratory rate (_2 = 36.34 at P .00), crying and type of feeding respectively (_2 = 33.16, 34.13 at P .01), heart rate, temperature and occurrence of apnea (_2 = 23.32, 26.31 and 32.17 at P .05) & sleeping (_2 = 25.67 at P.05).also length of hospitalization was decreased.

A quasi- experimental design study conducted by Mahmud, Dabash, Ahmed, Kame &Ismail(2016) showed that the intervention group gained significantly more total mean weight gain (254.70± 29.16g) compared with the control group (110.20± 50.98g) after the study period. Neonatal Oil Massage Therapy might be used as an effective, natural, and safe non-medical intervention for increasing anthropometric parameters and improving behavioral state of LBW neonates.

THEORETICAL / CONCEPTUAL FRAMEWORK

A conceptual frame work is constructed with concepts, which are the mental images of phenomenon. These concepts are connected together to express the relationship between them while a model is used to denote symbolic representation of the concepts (Polit, 2017).

Ludwig general system theory

General system consists of concepts namely: input, throughput (process), output and feedback: the inputs are what is in the system and the outputs are the results obtained after running an entire process or just a small part of a process, the intervention.
Input are neonates' profile or characteristics, gestational age, birth weight, gender, mode of delivery, and age at the onset of the study.
Throughput (Process) is the neonatal massage carried out daily on the preterm neonate once a day every day during 10 days.

Output show the end result of the process phase as revealed by evaluating the outcomes in term of change in weight and physical response in the experimental group among preterm babies.

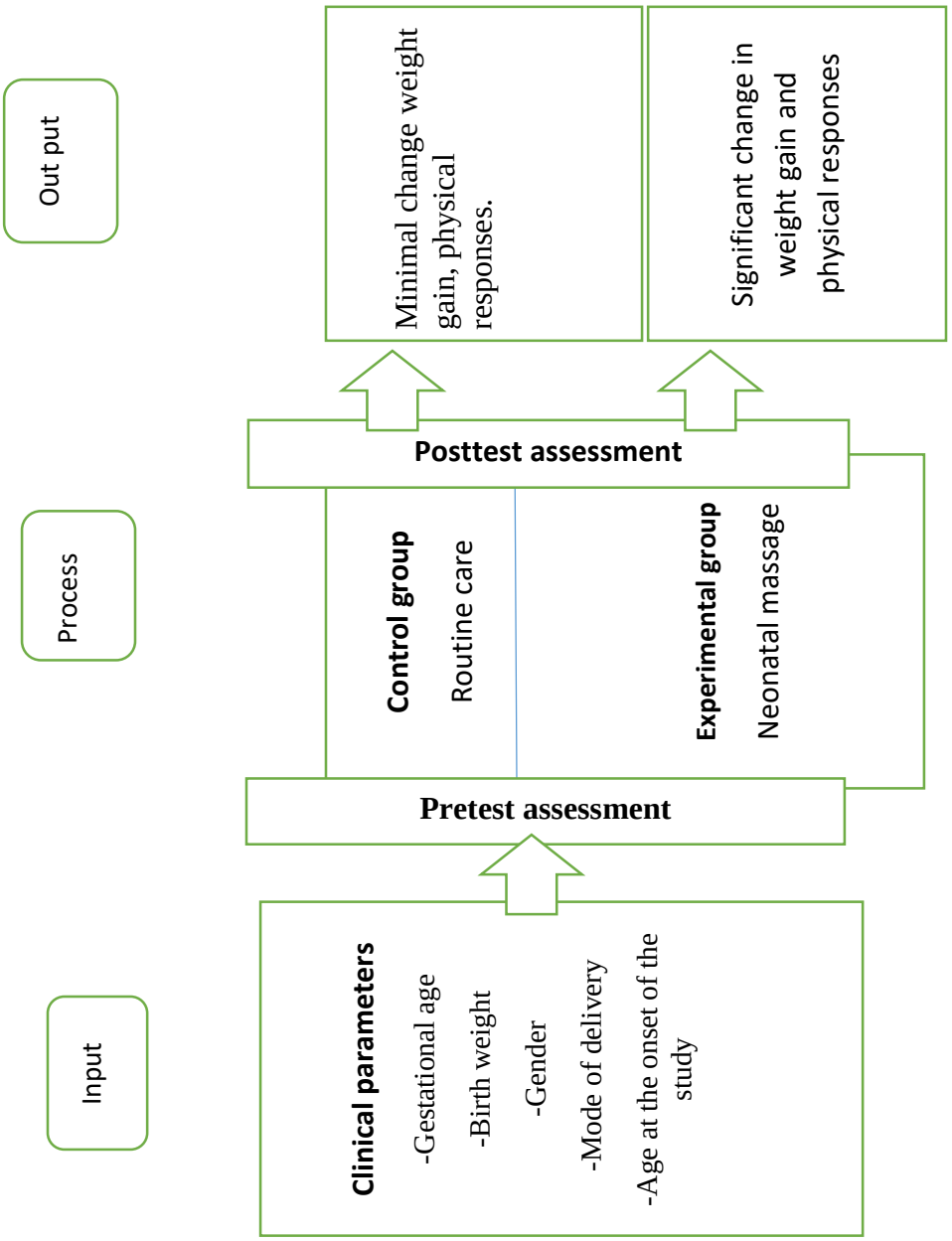

Figure 1. Conceptual framework base on General System Theory (Ludwig, 1972) adapted for the study on neonatal massage for weight gain and physical responses among participant

METHODOLOGY

Research Design
A quasi experimental design was used to assess the effect of nursing intervention (massage) on weight gain and physical response.

Setting
The study was conducted in NICU of Fujairah Hospital, United Arab Emirate, NICU has 18 bed capacity with 20 admission per month.

Population
Preterm neonates admitted to NICU in Fujairah government hospital with less than 35weeks of gestation age and birth weight less than 2 kilogram.

Sampling
Neonates who were admitted to NICU in Fujairah Hospital, United Arab Emirates and fulfill the inclusion criteria. The sample size of 43 was calculated using Raosoft online sample size calculation: confidence level = 95%, margin of error = 5%. Consecutive sampling was used to assign babies using the neonate's registration number. Registration number ending with odd were selected as control group while all even were in experimental (intervention) group.

Data collection instrument
The instruments used are: Demographic data about the preterm neonate: Physiological and physical assessment: and Massage procedure after pilot testing. The reliability of the tool was obtained by using inter rater method. With value of coefficient was 0.93.

Data Analysis:
The collected data were analyzed based on objectives by using both descriptive and inferential statistics using statistical package for social science (SPSS) version 23 and level of significance P 0.05 and confidence interval of 95% for the analysis T test was used to determine the association

RESULTS/FINDINGS

Hypothesis:
1-H1.There is significant increase in weight among preterm babies who had neonatal massage than the control group at 0.05 level of significant.
2-H2.Neonatal massage will significantly improve physical responses in preterm babies than control group at 0.05 level of significant.
3-H3.Preterm babies who received neonatal massage would have high behavior responses than those in the control group at 0.05 level of significant.

DEMOGRAPHIC CHARACTERISTICS		Experimental		Control	
Variables		**Frequency**	**Percentage %**	**Frequency**	Percentage %
Gestational age (weeks)	**1- 30 - < 32**	14	58.3	5	26.3
	2- 32 - < 34	6	25	6	31.6
	3- 34 - ≤ 36	4	16.7	8	42.1
Birth weight (kg)	**1- 1.000 - < 1.500**	14	58.3	5	26.3
	2-1.500 ≤ 2.000	10	41.7	14	73.7
Gender	**1- Male**	14	58.3	11	57.9
	2- Female	10	41.7	8	42.1
Mode of delivery	**1- Normal Vaginal delivery**	4	16.7	7	36.8
	2- Cesarean section	20	83.3	12	63.2
Age at the onset of the study	**1- 1- < 7**	8	33.3	12	63.2
	2- 7- < 14	5	20.8	5	26.3
	3- 14- < 21	9	37.5	2	10.5
	4- 21< 28	2	8.3	0	0
Age at the end of 10 days	**1- 1- < 7**	8	33.3	12	63.2
	2- 7- < 14	5	20.8	5	26.3
	3- 14- < 21	9	37.5	2	10.5
	4- 21< 28	2	8.3	0	0

Table 1: Demographic characteristics of the neonates

Table 1 shows the percentage distribution of the demographic characteristics of preterm neonate with low birth weight in experimental and control group among which, the following results are shown: Majority of the neonates fall with gestation age 30 <32 weeks with 1.000 <1.500kg (58.3%) respectively 58.3% are male with 83.3% delivered by cesarean. The highest age of 10days 37.5%cooured at 14<21 weeks.

PHYSIOLOGY AND PHYSICAL RESPONSES

This includes the Weight at the onset of the study (kg), Weight increase at the end of the study (kg), Color, Heart Rate (b/min), Respiratory Rate, Temperature, Oxygen saturation, .

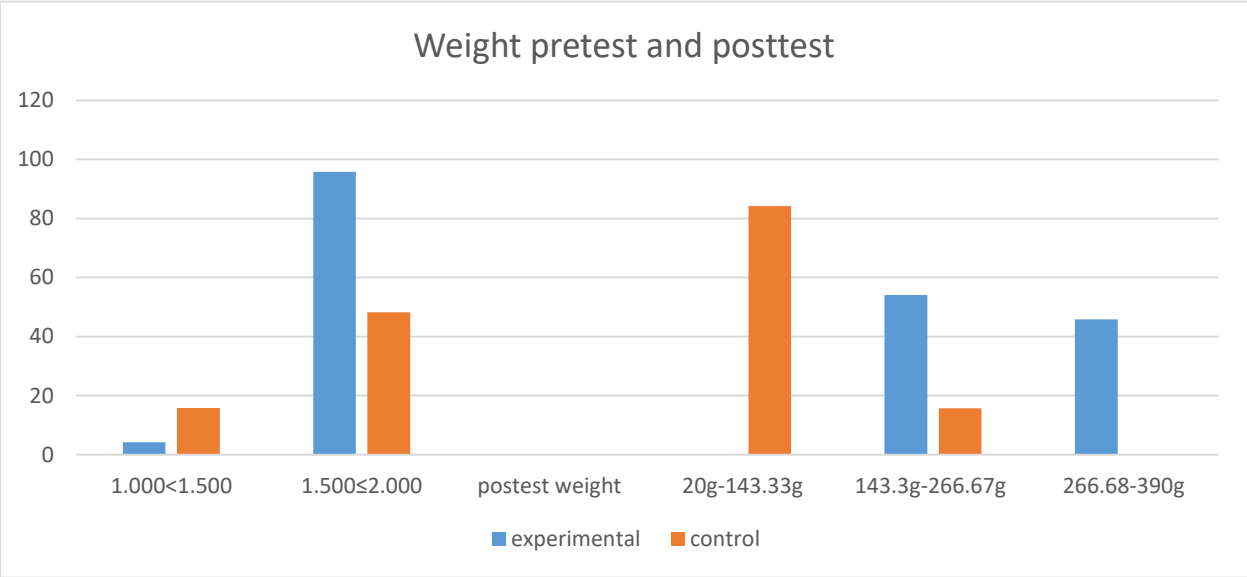

Figure 1: Weight pretest and posttest

The figure above shows that majority of neonate's weight at the onset of the study range from 1,500 kg to 2,000 kg (95.8%), for the experimental and control group (84.2%). The weight increase at the end of 10 days of study, the experimental group gained between 143.3g-266.67g (54.1%) while the control group gained between 20g-143.33g (15.7%).

COMPARISON OF THE WEIGHT AND PHYSIOLOGICAL RESPONSES OF PRETERM NEONATES WITH SELECTED DEMOGRAPHIC VARIABLES

Variable	Group	M ± SD	t	P
Weight at the onset of the study (kg)	Experimental	1.95±0.204	1.398	0.201
	Control	1.84±0.374		
Weight increase at the end of the study (kg)	Experimental	2.45±0.508	9.309	0.001**
	Control	1.15±0.376		

Significant at P<0.001 level

Table 2 Comparison of weight between the experimental and control group.

The finding of the study shows a statistically significant difference with increase in the weight of preterm infants who were massaged from the control group who received only routine care. The value of P was found to be 0.001 which a statistically significant as P <0.05.

Variable		M± SD	Day 1 Control	Day 10 Experimental
Heart Rate	**Pre**	**M± SD**	148.12±9.29	150.98±9.64
	Post	**M ±SD**	139.97± 14.91	144.15±12.03
		t	2.91	2.75
		P	0.01**	0.01**
Respiratory Rate	**Pre**	**M ±SD**	56.81±4.40	55.76±3.83
	Post	**M± SD**	55.65±6.01	53.94±4.23
		t	0.97	1.97
		P	0.33	0.05*
Temperature	**Pre**	**M ±SD**	36.71±0.17	36.74±0.20
	Post	**M± SD**	36.80±0.17	36.77±0.15
		t	-2.455	-.592
		P	0.02*	0.56
Oxygen saturation	**Pre**	**M ± SD**	98.29±1.62	98.29±1.57
	Post	**M± SD**	98.24±1.35	94.49±14.68
			0.17	1.67
		P	0.87	0.10

Significant at P<0.05 level

Table 3: Comparison of physical responses between experimental and control group

The above table shows that the effect of neonatal massage significantly improved Heart Rate and Respiratory Rate with no significant with P value below <0.05 level .There was no statistically significant differences in the temperature and Oxygen saturation in both groups

DISCUSSION

The discussion is based on the hypothesis

First hypothesis

H1.There is significant increase in weight among preterm babies who had neonatal massage in the experimental group than the control group.The finding of the study shows that weight increase in the experimental group due to massage more significant than control group who only received routine care as P 0.001. A single-blind randomized controlled clinical trial study conducted by Shaeri , Armanian , Rarani & Valiani , 2018 & Rad, Haghshenas, Javadian, Hajiahmadi and Kazemian, 2015), with gestational age was between 28-32 weeks and birth weight was 1,000-1,800 g. It was concluded that neonatal/ abdominal massage affect the weight gain of preterm infants by improving signs of feeding tolerance, stimulating the parasympathetic nervous system, increasing bowel movements and increasing insulin release and reduce the length of hospital stay. Other studies conducted by Johari, Haghgou, Daemi, Rezaeiyan T, and Mosala (2016)& Kale, Naveenkumar, Jain and Siddiqui, (2017) both randomized clinical trial to determine the effect of massage therapy on weight gain of LBW neonates in NICUs of Hamedan City hospitals shows that weight gain in the experiment group was significantly higher than the control group and effective in prevention of neurologic and developmental problems in infants. a quasi- experimental design study conducted by Mahmud, Dabash, Ahmed, Kame &Ismail (2016) shows the intervention group gained significantly more total mean weight compared with the control group after the study period, Massage therapy can be recommended as the special and complementary care for LBW neonates.

Second hypothesis

H2.Neonatal massage will significantly improve physical responses in preterm babies than control group. Effect of neonatal massage significantly improved physical responses in preterm infants compared to the control group. Paired t-test was calculated shows that Heart Rate, Respiratory Rate have significant difference while Temperature and Oxygen saturation are not significant. These findings are consistent with the findings of Afroz & Patil (2017), results shows improvement in the heart rate, respiratory rate, peripheral capillary oxygen saturation and temperature, which could be as a result of increased blood supply to all organs during neonatal massage The findings of this study is not in agreement with findings of Ramezani, Baniasadi & Baneshi, (2017) which did not show a significant difference between oxygen saturation

Implications to Nursing

Nursing research

- There is need of an intensive and extensive research in the area of effect to emphasize the importance of applying massage that is effective, safe and non-invasive intervention in all NICUs as standard of care.

- Results of this study can encourage health care professionals to utilize the intervention in increasing the weight of preterm terms neonates and reduce length of hospital stay by neonatal massage.

Nursing practice

- Nurses can assume this role by incorporate massage in the routine care of preterm neonates in NICU as an effective and safe noninvasive intervention. .
- Inculcate teaching program on the massage technique, as evidence based practice for evaluating the massive developmental needs of preterm babies and reduction of hospital stay
- Encourage mothers to apply massage pre discharge through teaching sessions and using booklet, massage guidelines to improve mothers – infant bonding

CONCLUSION

The present study shows the effect of massage for preterm neonates who's admitted in NICU, in Fujairah hospital, there was significant weigh gained in the experimental group.The study also supported the fact that there was high significant difference in physical (Heart Rate, Respiratory Rate, with no significant difference in Temperature and Oxygen saturation).There was also a significant difference in the effect of massage on the behavior between pre and post, while no effect of massage on body activity in both the experimental and control groups.Finding of the study help to spread the positive message about the neonatal massage in the care of preterm neonates among the health care provider in NICU and the mothers at home.This study was based on Ludwig general system theory. This theory has helped the investigator to plan the intervention and assess the effect of neonatal massage on weight and physical responses of the neonate .finding of this study supports the Ludwing general system theory of intervention of throughout (intervention) on the output.

Recommendations/Future research

Based on the findings of the study the following recommendations are made:

- Further studies involving all seven Emirates with larger sample size and over a longer period to verify the effects of neonatal massage on weight and physical responses.
- A comparative study can be conducted with the use of this noninvasive method of preterm management using a larger sample and in a different settings.

Completing interest:

The authors declare that they have no competing interest.

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References

Afroz, S. G., & Patil, N. (2017). *Effectiveness of Massage Therapy as an Adjunct toKangaroo Mother Care on Physiological and Behavioural Status of Low Birth Weight Preterm Infants*. Indian Journal of Physiotherapy and Occupational Therapy - An International Journal, 11(2), 103.

Ali Zain , A.(2017,November 16). Premature birth may affect baby's development, according to experts. khaleejtimes. Retrived from https://www.khaleejtimes.com.

Aly ,F.F, Murtaza G (2013) *Massage Therapy in Preterm Infants*. Pediat Therapeut 3:155-158.

Bayomi, O. R., & El-Nagger, N. S. (2015). *Effect of applying massage therapy on physical, physiological and behavioral states of premature neonates.* Journal of Nursing Education and Practice, 5(10

CDC - NCHS - National Center for Health Statistics. (2011, September 26). Retrieved from http://www.cdc.gov/nchs/.

Diego, M., Field, T., Hernandez-Reif, M. (2010). *Vagal activity, gastric motility and weight gain in massaged preterm neonates*. J Pediatr., Vol .147,No.50-55.

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

Johari ,S.Haghgou H.A,. Daemi ,M.,Rezaeiyan ,T & Mosala Nejad Z. (2016) *The Effect of Massage on Weight Gain of Low-Weight Hospitalized Infants: A Randomized Clinical Trial.* Physical Treatments. 5(4):205-210.

Kale.A.V, Naveenkumar.K., Jain.A, Siddiqui.S & Haseeb.M, (2017).*Effect of oil massage therapy in low birth weight preterm neonates.* MedPulse – International Medical Journal, Volume 4, Issue 3,.

Khan ,R.Malik,I., Avtar, R,.Khurana R, Bharadwaj V, & Singh A.(2015). *Evaluation of effect of massage with or without oil on the weight gain of low birth and very low birth weight babies*. Webmed Central PAEDIATRICS ;6(9):WMC004981.

Mahmud.H.S, Dabash.S.A, Ahmed.E.M, Kame.R.M &Ismail.S.S. (2016).*Effects of Oil Massage Therapy on Anthropometric Parameters and Behavioral State of Stable Low Birth Weight Neonates*. International Journal of Research in Applied, Naturaland Social Sciences (IMPACT: IJRANSS) ISSN(P): 2347-4580;ISSN(E): 2321- 8851 Vol. 4, Issue 6, Jun 2016, 33-42.

Masters, K.(2015).Nursing Theories A framework for Professional Practice.2th ed. Jones &Bartlett learning.

Pepino, V.C & Mezzacappa, M.A (2015.)*Application of tactile/kinesthetic stimulation inpreterm infants*: a systematic review PEDATRIC (RIO.J)242(3):1-21.

Polit, D &Beck,C(2017).Essentials of Nursing Research: Appraising Evidence for Nursing Practice. .8th edition.wolter Kluwer health. Lippincott Williams &Wilkins.

Prince D, Prince J. (2016). Effectiveness of oil massage on weight gain among pre-term neonates in selected pediatric hospitals, Hyderabad. Webmed Central Nursing 2016; 7(7): WMC005167.

Quinn,J. Munoz,F,M. & Gonik,B.(2016)*Preterm birth: Case definition & guidelines for data collection, analysis, and presentation of immunization safety data*. Vaccine 34 (2016) 6047–6056.

Ramezani. T, Baniasadi.H, & Baneshi.M,R,(2017) .*The Effects of Massage on OxygenSaturation of Infants with Respiratory Distress Syndrome Treated with Nasal Continuous Positive Airway Pressure.* British Journal of Pharmaceutical Research 16(5): 1-7,; Article no.BJPR.32751 ISSN: 2231-2919, NLM ID: 101631759.

Rad ZA, Haghshenas M, Javadian Y, Hajiahmadi M & Kazemian F. (2015).*The effect of massage on weight gain in very low birth weight neonates.* Journal of Clinical Neonatology Published by Wolters Kluwer, 5:96-9.

Salam, RA., Darmstadt, GL.,& Bhutta, ZA. (2015). *Effect of emollient therapy on clinical outcomes in preterm neonates in Pakistan: a randomized controlled trial*. Arch Dis Child Fetal Neonatal Ed., 100:210-5.

Sayed, A. M., Youssef, M. M., Hassanein, F. E., & Mobarak, A. A. (2015). *Impact of tactile stimulation on neurobehavioral development of premature infants in assiut city*. *Journal of Education and Practice*, *6*(8), 93-101.

Shaeri M, Armanian AM, Amini Rarani S, Valiani M,& Ghadami A.(2018). *Effects of Abdominal Massage on the Weight Gain of Preterm Infants Hospitalized in SelectedHospitals of Isfahan, Iran: A Randomized Controlled Clinical Trial.* Int J Pediatr2018; 6(9): 8153-60. Statistic: Ministry of Health and prevention, 2018.

Taheri, P. A., Goudarzi, Z., Shariat, M., Nariman, S., & Matin, E. N. (2017). *The effect ofa short course of moderate pressure sunflower oil massage on the weight gain velocity and length of NICU stay in preterm infants*. Infant Behavior and Development, 50, 22-27.

WHO. (2017, February 19). *Preterm birth*. Retrieved from http://www. who.int/en/newroom/fact-sheets/detail/preterm-birth.