



## Assessment of Nurses' Performance Regarding Massage and Positive Body Touch of Preterm and Low Birth Weight Infants at NICU

Asmaa Ismail Al-bayaidah\* Prof Dr.Ghada Mohamed Mourad \*\* Prof Dr.Safaa Salah Ismail \*\*\*

MSc in Pediatrics Nursing, Princess Mona Collage of Nursing, Mut'ah University\*

Professor of Psychiatric /Mental Health Nursing, Faculty of Nursing, Ain shams University\*\*

Professor of Pediatric Nursing, Dean of Faculty of Nursing, Helwan University\*\*\*

### Abstract

**Background:** Nurses works at NICU should advocates for preterm and LBW infants to ensure that these infants receive the best possible care and that their needs are met. **Aim of the study:** This study was conducted to assess nurses' performance regarding massage and positive body touch of preterm and low birth weight infants at NICU. **Research design:** A descriptive research design was used in this study. **Setting:** The study was conducted at Neonatal Intensive Care Unit in Pediatrics Departments Children's Hospital affiliated to Ain Shams University Hospitals. **Subjects:** 30 nurse working at the previous mentioned setting. **Data Collection Tools:** Tools of the study consisted of two tools, tool (1) A Structured Questionnaire sheet to assess nurses' knowledge regarding massage and positive body touch (2) Observational check lists to assess studied nurse's level of practices regarding massage and positive body touch of preterm and low birth weight infants at NICU. **Results:** less than quarter of the studied nurses had satisfactory total level of knowledge regarding massage and positive body touch. Furthermore, less than quarter of the studied nurses, were having total competent practice regarding massage and positive touch skills. **Conclusion:** It can concluded that three quarter of the studied nurses, had incompetent performance level regarding massage and positive body touch of preterm and low birth weight infants at NICU . **Recommendation:** Periodical educational programs for the nurses to enhance their knowledge and practice regarding positive touch and massage of low birth weight and preterm in order to improve their performance level.

**Key words:** Massage, Neonatal Intensive Care Unit, Nurses, Positive Body Touch

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## Introduction

Low birth weight infants are newborns who have a lower body weight than the standard average for their gestational age. These babies are often smaller and lighter, potentially leading to health challenges and face a range of medical complications due to their underdeveloped size and require extra attention from medical professionals to ensure their well-being (**Bartick & Stuebe, 2017**).

A significant risk factor for low birth weight (LBW) in Egypt is poverty, along with maternal smoking and limited educational achievement (**ELhawary et al., 2020**). During this time, the emphasis was directed towards low birth weight as a critical factor in determining a newborn's probability of survival and the potential for healthy growth and development (**Kargbo et al., 2020**).

Approximately one out of every seven infants is born with low birth weight (LBW), accounting for more than 20 million infants or 15.5% of all live births annually. The LBW is more prevalent in developing countries, where over 95% of LBW infants are born. The incidence of LBW in developing countries is around 16.5%, which is almost double the incidence in developed countries, which is around 7.0%. However, there are significant variations in the incidence of LBW between countries and regions (**Blencowe et al., 2019**).

Egypt was ranked as the 97<sup>th</sup> globally in terms of under-five mortality rates. Despite a continuous decrease in neonatal mortality rates from 1990 to 2013, the national neonatal mortality rate remained high where 11 neonatal deaths per 1000 live births were reported in 2013. The prevalence of preterm birth in the country was 12.8% in 2015. According to a single-center cross-sectional retrospective analysis, the rate of prematurity was 15.7%, with the majority 75%, being late preterm infants born between 34 and 36 weeks of gestation (**Khasawneh & Khriesat, 2020**).

Preterm infants refer to infants who are born before completing the full term of pregnancy and come into the world earlier than anticipated in the pregnancy timeline. Due to their premature arrival, these newborns might confront a variety of health challenges resulting from their incomplete development and often face unique health challenges due to their underdeveloped



organs and systems. Also these babies requiring specialized medical care and attention to support their overall well-being (**Pal et al., 2020**).

These preterm infants are prone to complications such as respiratory difficulties, an elevated vulnerability to infections due to their delicate immune responses and delays in their physical and cognitive development as a result of being born prematurely or under the average weight. Effectively managing these issues demands specialized medical treatments and careful monitoring (**Bartick & Stuebe, 2017**).

Preterm infants may encounter complications in the gastrointestinal tract, kidneys, or liver, and may struggle to maintain appropriate levels of sugar and electrolytes in their bloodstream. They are also more prone to developing anemia, which sometimes necessitates blood transfusions for treatment. It is clear that infants with low birth weight experience higher rates of hospitalization and more prolonged hospital stays compared to those with a normal birth weight (**Machado et al., 2021**).

Massage is characterized as a physical treatment of bodily tissues by using repetitive pressure and gentle stroking to enhance overall physical and mental health. It is an important developmental requirement for every newborn, and is particularly advised for preterm and low birth weight infants (**Akbani, 2020**). According to research, insufficient massage and positive body touch that is experienced by many

preterm infants in intensive care units can potentially slow down their recovery (**Campbell & MeganLizelle, 2019**).

The massage improves circulation and sooth the peripheral and central nervous system (**Jalali, 2021**). Several benefits have been associated with infant massage, including the reduction of stress-related symptoms and decreased levels of plasma cortisol concentration in infants (**Anggarini et al., 2020**).

Massage is effective in reducing stress when applied to preterm or low birth weight infants, (**Karkhaneh et al., 2020**). In many regions, infant massage is regarded as a child care technique. Nonetheless, there is limited research conducted on the use of infant massage with healthy or



medically stable preterm and/or low birth weight infants. Although the data on the beneficial effects of infant massage mainly originate from these few studies (**Hanson, 2019**).

The nurse should prepare the environment before initiation of massage thus a room with light, warm temperature, and low noise levels is preferable (**USAID, 2019**). Massage should be given between feeds, ideally 45 minutes to one hour after a feed so as to avoid regurgitation or vomiting of the feed (**Akbani, 2020**).

The nurse should cover the complete body, beginning with the head, neck, trunk, and extremities, with a firm stroke with flat fingers utilized during massage therapy with moderate pressure being demonstrated to be superior to light pressure massage in terms of weight gain (**Aziznejadroshan et al., 2020**).

The positive touch aims to reduce environmental stress and enhance the preterm infant's adaptation to life outside the womb. The care is delivered by a multidisciplinary team, with parents encouraged to participate and empowered to contribute to the optimal care of their child. Positive body touch and massage are key components of developmental care (**Blencowe et al., 2019**).

The nurses in providing care to preterm and low birth weight infants as a part of standard nursing practice is a crucial factor in determining the likelihood of their survival. As the foremost member of the neonatal healthcare team, the nurse's contribution is of utmost importance in ensuring effective and optimal neonatal outcomes, making the nurse's role a critical component in the management of preterm and NICU infants (**Scheepers et al., 2020**).

### **Significant of the study:**

According to the global report, about 2.9 million preterm die in the first month of life, of which preterm births, complications during pregnancy, and sepsis are the leading causes of death (**Blencowe et al., 2019**). Particularly, adverse birth outcomes contributed to more than 75% of these deaths occurred in the first weeks of life (**Tamirat et al., 2021**). The adverse birth outcomes are defined by the World Health Organization as events of low birth weight, preterm birth, stillbirth, or perinatal deaths (**Bililign, 2018**).



Egypt is not far from the a Bove adverse birth outcomes. According to Healthy Newborn Network in 2015, the prevalence of preterm birth rate 13%. The following year El-Gilany and colleagues in their study on incidence and occupational risk factors of preterm delivery among working mothers, a single center study in Egypt, showed that, the prevalence of preterm was 24.3% (El-Gilany et al., 2016).

While the joint UNICEF and WHO study of global, regional, and country estimates of LBW, the incidence of LBW in the Egypt 12% (Taha et al., 2020). But in 2019, infant mortality rate in Egypt was 17.3 deaths per 1,000 live births (World Health Organization, 2019). This is unacceptable and more realistic effort is required in this area so as to lower the mortality resulting from preterm and low birth weight, this demands evidence-based, cost-effective care during this period of life (Jebessa et al., 2021).

Since weight gain is the most consistent parameter associated with touch and massage therapy in infants, its effect has been documented in a study which found that, apart from weight gain, other benefits of touch and massage is improvement of sleep-wake pattern, since infants who receive massage therapy appear more alert and spend less time in sleep, improved scores on mature habituation, orientation, motor, and range of state behavior, reduced level of energy expenditure, and decrease in infant mortality (Chen et al., 2021).

From the researcher point of view, it is important to investigate this study to assess nurses' performance regarding massage and positive body touch of preterm and low birth weight infants at NICU. This study will help impart knowledge on nurses working at NICU with the aim of reducing morbidity and mortality among infants born prematurely and those who are low birth weight infants.

**Aim of the Study:** This study aims to assess nurses' performance regarding massage and positive body touch of preterm and low birth weight infants at NICU.

**Research question:** What is nurse's performance regarding massage and positive body touch of preterm and low birth weight infants at NICU?



## Subjects and Methods

The subjects and methods for this study were portrayed under the four main designs as following:

- I. Technical design.
- II. Operational design.
- III. Administrative design.
- IV. Statistical design.

### 1- Technical design:

The technical design for this study was included research design, setting, subjects and tools of data collection.

- **Research design:**

A descriptive exploratory study design (Case control study) was utilized to achieve the aim of this study

- **Research setting:**

This study was conducted at Neonatal Intensive Care Unit in Pediatrics Children's Hospital affiliated to Ain Shams University Hospitals.

- **Subject:**

A purposive sample consisted of 30 nurses who were working at the above mentioned setting under the following inclusion criteria:

- Both gender
- Regardless their ages
- At least one year of experience at NICU.

### Tools for Data Collection

The tools of data collection were designed by the researcher in the light of the relevant review of literature and written in simple Arabic language. The data was collected using the following two tools.

**Tool (I): - A Structured interview Questionnaire sheet:** It was developed by the researcher and it consisted of 3 parts:



**Part I-** it concerned with characteristics of the studied nurses (age, educational level, gender, marital status, occupation, years of experience and number of training courses regarding massage and positive body touch of preterm and low birth weight infants).

**Part II-** it concerned with characteristics of the studied infants (gender, diagnosis, weight at birth, date of birth and admission, gestational age, length and birth order).

**Part III-** It concerned with assessment of the studied nurses' knowledge regarding massage and positive body touch that consisted of twenty questions in the form of open and closed ended questions distributed in two parts as the following:

Part A: it included 10 open ended questions to assess the studied nurses' knowledge regarding massage of preterm and low birth weight infants which includes: definition, importance, indications, frequency, benefits, precautions, steps, time, obstacles and complications.

Part B: it contains 10 open ended questions to assess the studied nurses' knowledge regarding positive touch of preterm and low birth weight infants which included: definition, importance, indications, frequency, benefits, precautions, steps, time, obstacles and complications.

#### **Scoring system:**

The total score of knowledge was 40 grades (2 grades for complete answer, 1 grade for incomplete correct and zero for incorrect or unknown answer) and then categorized into:

- $\geq 75\%$  satisfactory when the total grades were  $\geq 30$  grades.
- $< 75\%$  unsatisfactory when the total grades were  $< 30$  grades.

#### **Tool (2): - Observational check list**

**Tool (II):-** Observational check lists that were adopted from **Chandra, (2018) & Hanson, (2019)**. It was used by the researcher to assess the studied nurse's level of practices regarding massage and positive body touch of preterm and low birth weight infants at NICU. It included 2 parts:



**Part I:** Observational check list to assess the studied nurses' level of practice about massage of preterm and low birth weight infants at NICU. It contained 15 steps.

#### **Scoring system:**

Each practice item done correctly was scored one and not done or done incorrectly was scored zero. The total numbers of steps in the observational check list were (15). Total score was (15) and then converted into percentage and categorized as the following:

Complement practice  $\geq 85\%$  ( $\geq 13$  grades).

Incompetent practice  $< 85\%$  ( $< 13$ grades).

**Part II:** Observational check list to assess the studied nurses' level of practice about infant positive touch of preterm and low birth weight infants at NICU. It contained 12 steps.

#### **Scoring system:**

Each practice item done correctly was scored one and not done or done incorrectly was scored zero. The total numbers of steps in the observational check list were (12). Total score was (12) and then converted into percentage and categorized as the following:

- Complement practice  $\geq 85\%$  ( $\geq 10$  grades).
- Incompetent practice  $< 85\%$  ( $< 10$ grades).

**Operational design:** The operational design included preparatory phase, validity and reliability, pilot study, field work and limitation of the study.

#### **The preparatory phase:**

Prepared the study tools based on review of literature and theoretical knowledge of various aspects of the study using books, articles, internet, periodicals, magazines in order to assess the nurses needs and develop data collection tools.

#### **Tools Validity and Reliability:**

**The content validity** of the tools by inspecting the items to determine whether the tools measure what supposed to measure. The stage developed by a jury of 7 experts from different academic categories (4assistant professors and 3 Lecturers) of Pediatric Nursing at the Faculty of





Nursing, Helwan University. The expertise reviewed the tools for the format, simplicity, consistency, clarity, accuracy and relevance and minor modification was done.

### Testing reliability

The reliability of the data collection tool scales was assessed using internal consistency method.

The two scales showed good reliability as shown by their Cronbach's alpha coefficient below.

	No of Items	Cronbach's Alpha
Massage and Positive touch knowledge scale	20	0.824
Massage and Positive touch practice scale	37	0.864

### Ethical Considerations:

The ethical research consideration in this study was included the following: The research approval was obtained from the Ethical Committee of the Faculty of Nursing, Helwan University before starting the study. The researcher was clarified the aim of the study to nurses who agreed to be included in the study. The researcher was assured maintaining anonymity and confidentiality of the subjects' data. The researcher obtained informed consent from the participants included in the study prior to data collection. Participants were informed about their rights to participate or withdraw from the study at any time without any reason.

### Pilot study:

Before performing the actual study, a pilot study was carried out for 5 nurses (10%) of studied nurses at NICU to test clarity, applicability of tools used in this study. Some modifications on tools were done based on pilot study results.

### Administrative design:

Approval to carry out this study was obtained from Dean of Faculty of Nursing –Helwan University. An official permission was taken from the hospital administrators at which the study



was conducted, explaining the purpose of the study and requesting the permission for data collection from the studied nurses.

### Statistical design:

Data entry and statistical analysis were done using SPSS 25.0 statistical software package. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables, and means and standard deviations and medians for quantitative variables. Cronbach's alpha coefficient was calculated to assess the reliability of the tools through their internal consistency. Qualitative categorical variables were compared using chi-square test. Whenever the expected values in one or more of the cells in a 2x2 tables. statistical significance was considered at  $p\text{-value} < 0.05$ .

### Results

**Table (1)** As regard studied nurses' age table (1) cleared that more than one third of them in age group  $20 < 30$  years, more than half of them (56.7%) were married and all of them were females. While more than half of them (56.7%) were in technical degree and the majority of them (86.7%) not attended any previous training about massage and positive touch of preterm and low birth weight infants. Also 40.1%, 96.7% and 46.7% of them had  $\geq 10$  year of experience, staff nurses respectively and not had children.

**Table (2)** As regard studied infants table (2) cleared that, more than two thirds of infants (66.7%) were females and more than quarter (26.7 %) of them was suffered from Tetralogy of Fallot and more than one third of them birth weight (33.3%) were between 2260: 2499 kgm. Also more than half of them (56.7%) were 42 cm in length. Regarding infants order in family, more than one third of them (43.3%) was 2<sup>nd</sup> order .

**Table (3)** Shows nurses' level of knowledge about massage of the results reveal that 100 %, 96.7% 96.7%. 96.7%, 96.7%, 96.7%, 96.7% and 96.7% of the studied nurses had in correct answer or unknown about appropriate pattern, definition, importance, reasons, benefits precautions, obstacles and complication.

**Table (4)** Shows nurses' level of knowledge about positive touch ,the results reveal that 100% of studied nurses had in correct answer or unknown about definition, importance, appropriate number, precautions, types, obstacles and complication.

**Table (5)** shows nurses level of practice about massage of the results reveal that 83.3, 83.3 and 80.0 % of studied nurses had in correct practice about check if the infant is calm or restless,, Repeat steps 1-5 and cleaning hand.

**Table (6)** shows nurses' level of practice about positive touch, the results reveal that 73.3%, 70.0 and 70.0 % of studied nurses correct practice about Ensure that the environment is quiet, check the infant is calm and warm the hand by rubbing them together when you are near the infant.

**Table (1): Distribution of the studied nurses regarding their personal characteristics (n=30)**

Characteristics of nurses	No	%
<b>Age</b>		
20<30	13	43.3
30<40	10	33.3
40≤50	7	23.3
Mean ±SD= 35.25±14.25		
<b>Marital status</b>		
Single	13	43.3
Married	17	56.7
<b>Gender</b>		
Female	30	100.0
<b>Education level</b>		
Bachelor	5	16.7
Technical nursing diploma	16	53.3
Diploma of nursing school	9	30.0
<b>years of experience</b>		
<1	10	33.3
1<5	4	13.3
5<10	4	13.3
≥10	12	40.1
Mean ±SD= 9.52±21.15		
<b>Position</b>		
Staff nurse	29	96.7
Head nurse	1	3.3
<b>Number of children</b>		

No children	14	46.7
1:2	10	33.3
≥ 2	6	20.0
<b>Previous training about massage and positive touch of preterm and low birth weight infants:</b>		
Yes	4	13.3
No	26	86.7

**Table (2): Distribution of the studied infants regarding their characteristics (n=30)**

Characteristics of infants	No	%
<b>Gender</b>		
Male	10	33.3
Female	20	66.7
<b>Diagnosis</b>		
Atrial Septal Defect	1	3.3
Dyspnea	4	13.3
Hernia	3	10.0
Intestinal obstruction	4	13.3
Pneumonia	5	16.7
Respiratory Distress Syndrome (RDS)	3	10.0
Tetralogy of Fallot (TOF)	8	26.7
<b>Age per day</b>		
<b>0-10</b>	18	60.3
10-20	2	6.7
20-28	10	33.3
<b>Weight \ gm</b>		
1000-1250	6	20.0
1260-1500	3	10.0
1510-1750	2	6.7
1760-2000	5	16.7
2010-2250	4	13.3
2260-2499	10	33.3
<b>Length \ cm</b>		
46	11	36.7
42	17	56.7
36.5	2	6.7
<b>Order</b>		
1 <sup>st</sup>	7	23.3
2 <sup>nd</sup>	13	43.3
3 <sup>rd</sup>	8	26.7
4 <sup>th</sup>	2	6.7

**Table (3): Distribution of the studied nurses' knowledge regarding massage of preterm and premature infants (n=30).**

Items of the body massage	Complete answer		In-Complete answer		In Correct answer or unkwon	
	No	%	No	%	No	%
Definition	0	0	1	3.3	29	96.7
Importance	0	0	1	3.3	29	96.7
indications	0	0	1	3.3	29	96.7
Frequency	1	3.3	1	3.3	28	93.3
Benefits	1	3.3	0	0	29	96.7
Precautions	1	3.3	0	0	29	96.7
Types	0	0.0	0	0	30	100
Appropriate pattern	0	0	3	10	27	90.0
Obstacles	0	0	1	3.3	29	96.7
Complications	0	0	1	3.3	29	96.7

**Table (4): Distribution of the studied nurses' knowledge regarding positive touch of preterm and premature infants (n=30).**

Items of positive body touch	Complete answer		In-Complete answer		In Correct answer or unkwon	
	No	%	No	%	No	%
Definition	0	0.0	0	0.0	30	100
Importance	0	0.0	0	0.0	30	100
Indication	0	0.0	1	3.3	29	96.7
Frequency	0	0.0	0	0.0	30	100
Benefits	0	0.0	1	3.3	29	96.7
Precautions	0	0.0	0	0.0	30	100
Types	0	0.0	0	0.0	30	100
Appropriate pattern	0	0.0	3	10.0	27	90.0

Obstacles	0	0.0	0	0.0	30	100
Complications	0	0.0	0	0.0	30	100

**Table (5):** Distribution of the studied nurses practice regarding massage practice of preterm and premature infants (n=30).

items	Done		Not- Done	
	No	%	No	%
Check if the infant is calm or restless	5	16.7	25	83.3
Cleaning hands	6	20.0	24	80.0
Hand warming	7	23.3	23	76.7
Lay the child asleep on his stomach	7	23.3	23	76.7
6Smears from the beginning of the head to the end, then vice versa	8	26.7	22	73.3
6Swabs , starting from the neck to the shoulder, then vice versa	11	36.7	19	63.3
6Swabs from the shoulder to the wrists , then vice versa, passing through the back of the arms	13	43.3	17	56.7
6Swabs from the pelvis to the ankles , then vice versa, passing on the back of the two legs	10	33.3	20	66.7
6Swabs from the pelvis to the ankles , then vice versa, passing on the back of the two legs	11	36.7	19	63.3
Turn the child over so that he is in a supine position	9	30.0	21	70.0
6Times bending and straightening both arms separately while fixing them along the collarbone	7	23.3	23	76.7
6Times bending and straightening the legs separately, while fixing them along the pelvic bones	8	26.7	22	73.3
6Times bending and straightening the legs together at the same time while holding the ankle joint	7	23.3	23	76.7
Then turn the baby over to sleep on the tummy again	8	26.7	22	73.3
Repeat steps 1-5	5	16.7	25	83.3

**Table (6): Distribution of the studied nurses' practice regarding positive body touch practice of preterm and premature infants (n=30).**

Steps	Done		Not- Done	
	No	%	No	%
Ensure that the environment is quiet.	8	26.7	22	73.3
check the infant is calm	9	30.0	21	70.0
cleaning hands	10	33.3	20	66.7
Warm the hands by rubbing them together when you are near the infant	9	30.0	21	70.0
contain the child	11	36.7	19	63.3
Putting the hand on the child in the position	12	40.0	18	60.0
Plump quietly	16	53.3	14	46.7
Start by offering your finger in the baby's palm ,for him to hold.	12	40.0	18	60.0
Hold the child's head with both hands	12	40.0	18	60.0
DGive the child periods of rest during t application procedure	11	36.7	19	63.3
Non food suckling	9	30.0	21	70.0
Check that too much stimulation can lead to stress	10	33.3	20	66.7

\*: Significant at  $P \leq 0.05$

## Discussion

Massage therapy has gained recognition as a valuable intervention for promoting the well-being of low birth weight infants. These infants often face a range of challenges due to their underdeveloped systems and susceptibility to health complications. Gentle and structured massage can provide various benefits. The massage therapy can aid in weight gain, improve digestion, enhance sleep patterns and reduce stress in premature and low birth weight infants (Rad et al., 2016).

Positive body touch, characterized by gentle and nurturing tactile interactions, holds profound importance for the development and well-being of low birth weight infants. Positive touch, such as skin-to-skin contact, has been shown to offer a range of benefits. Positive body touch plays a



significant role in establishing the crucial bond between caregivers and infants. This emotional connection not only aids in reducing stress and promoting relaxation but also contributes to the infant's cognitive and emotional development (Lee et al., 2019).

### Part I: Personal characteristics of studied nurses

In relation to nurses' characteristics, the present study revealed that more than half of the nurses had a technical degree. The data also highlights a substantial percentage of nurses with extensive experience, with fewer than half of them having more than 10 years of experience and majority work as staff nurses in NICU. This result is in accordance with Needleman, (2016) revealed that there is a significant correlation between the years of experience of nurses and improved infants outcomes including reduced mortality rates, decreased length of hospital stay and lower rates of complications and the nurses with higher levels of knowledge and experience were more likely to adhere to evidence-based practices, leading to better patient outcomes. Also Sermeus et al., (2011) revealed that, lower qualifications are also associated with higher rates of side effects and longer length of stay.

Also majority of nurses had not attended any previous training. This result is in accordance with Li-Ying et al., (2016) who revealed a positive association between nurses who actively pursued knowledge enrichment and improved patient care metrics. Nurses who participated in regular workshops, attended conferences and pursued additional certifications demonstrated greater competence in handling complex medical situations, leading to reduced medical errors and enhanced patient safety. Possibly indicating the need for further emphasis on continuous professional development and in need for more knowledge and new skills.

### Part II: Personal characteristics of studied infants:

The current study also revealed that more than quarter of them was suffered from Tetralogy of Fallot, this is in congruent with Jelly et al. (2018), who stated that congenital heart disease including Tetralogy of Fallot (TOF) is the most prevalent form of primary congenital disability in newborns and is the leading cause of death in children with congenital malformations. It occurs in approximately 0.8% of live births.





Also, more than third birth weights were between 2260: 2499. This result is supported by **Zhang et al., (2018)**, who stated that, low birth weight is a critical indicator of a newborn's health and development and it plays a significant role in determining the need for NICU admission.

### **Part III: Nurses' knowledge about infant massage and positive touch:**

As regards Nurses' knowledge about massage and positive body touch; the current study revealed that there was poor nurses' knowledge regarding massage and positive touch of preterm and low birth weight infants. These findings is similar of **that Lerthamte et al., (2011)**, who revealed that nurses who participated in an educational program about infant massage showed significant improvement in their knowledge of infant massage. Because the educational program provided nurses with the opportunity to learn about the benefits of infant massage and how to perform it safely and effectively.

Investigating nurses' level of practice about massage, the current study results revealed that, there was unsatisfactory knowledge in nurses' infant massage skills. This result is consistent with **Page et al., (2000)**, who concluded that nurses who have expertise and have demonstrated new skills related to neonatal care should be given enough time and are more likely to achieve high levels of productivity.

Also this finding supported by **Khan et al., (2019)**, who stated that, NICU nurses who participated in an educational program about infant massage showed significant improvement in their skills in performing infant massage. Because the educational program provided nurses with the opportunity to practice their skills under the supervision of an experienced instructor.

### **Conclusion:**

The nurses' performance was unsatisfactory regarding massage and positive body touch of preterm and low birth weight infants at NICU.

### **Recommendations:**

Based upon the results and the forgoing conclusion of the current study, the following recommendations are suggested:

- New interventions in order to improve their performance level.



- Long-term follow-up to the preterm/low birth weight infants of the experimental group should be done to compare their physical growth, behavioral development and educational achievements with their peers at different growth and developmental stages.
- Further studies should be conducted to study the effect of positive touch and body massage on:
  1. Ventilated neonates and those on CPAP.
  2. Extremely low birth weight infants.
  3. Neonates receiving oxygen support and during resuscitating the preterm/low birth weight infants.
  4. Full term infants.

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