

***Effects of Reflexology strategy on the Mothers Breast Milk Volume and Their Premature Weight Gain***

***Abstract***

**Background:** Reflexology means the application of the manual the pressure to specific points of the feet called "reflex points" that are believed to correspond to other parts of the body. The study aimed to assess the effect of reflexology strategy on the mother's breast milk volume and their premature weight gain.

**Design:** An experimental design was used to conduct the study. A convenience sample of 120 Primiparous mothers and their preterm infants was chosen based on systematic simple random.

**Methods: Three tools** were designed by the researchers to collect the necessary data to implement the reflexology strategy framework. 1.Structured interview questionnaire sheet, 2.Assessment observational checklist sheet for Premature using 2 scales: A. Transitioning from tube feeds to oral feeds, B. The Preterm Infant Breastfeeding Behavior Scale, three Evaluation Phase observational checklist based on Mother-Infant- Breastfeeding Progress Tool (MIBPT):

**Statistical Analysis:** The collected data were coded, analyzed, figured and tabulated using frequencies and percentage, mean, standard deviation & chi-square tests.

**Results:**

There were a statistically significant difference and marked improvement in reflexology group total scores of feeding performance ( $P < 0.001$ ) after intervention for 6 weeks approved of reflexology strategy. Reflexology group majority (88.3%) demonstrated good breastfeeding as compared to (55.2%) in the study group.

**Conclusion:**

The present study highlights the effect of reflexology strategy on the mother's satisfaction, breast milk volume, and their premature weight gain. On the other hand, intervention accelerates the early transition of premature from the tube feeding to breastfeeding and discharge from the hospital.

***Recommendation:***

In-service education program could be designed and implemented in the pediatric field to enable the nurses to apply reflexology strategy to improve empower early transitioning of the preterm from tube feeds to breastfeeding and early discharge. Reflexology strategy is non-pharmacological, simple, noninvasive and cheap technique would be welcomed by the nurses, physicians and mothers.

**Keywords: Effects - Reflexology strategy - Breast milk volume The premature -Weight gain**

***1.Introduction***

In [1], and [2] endorsed breastfeeding for the first six months of life and continue receiving breast milk for at least the first year and beyond. [3]States pediatricians and other health care professionals with guidelines and approvals on the profits of breastfeeding for infants, mothers, and the community. According to [4] affirm that every year about 820000 infants would be saved if breastfeeding scaled in Universal level. Under six months of age, only 40% of infants are exclusively taking breastfeeding. [5] According to the plan of the organization for the year, 2021, breastfeeding mothers will increase to 81.9% and 25.5% for breastfeeding exclusively through 6 months infants.

As known to health professionals that most lactation problems associated with premature infants are related to mothers stress, which can threaten internal homeostasis in the body. Mothers fear, and anxiety may cause physiological stresses and also, lead to the production of adrenalin; adrenaline affects lactation by suppressing oxytocin secretion [6].

One of the techniques to initiate the lactation is reflexology. It is a systematic practice stimulation by applying pressure to the feet and hands utilizing specific thumb, finger and hand techniques based on

a system of zones and reflex areas that reflect an image of the body on the feet and hands with a premise that such works effects a physical change in the body [7].

Reflexology is considered as a part of Egyptian culture from 2330 BC. At the late 14th century, reflexology was already applied throughout Europe with another name; zone therapy[8] It is believed that energy runs through the body in channels known as meridians and that massage of the feet stimulates these energy channels, promoting healing and relaxation. Every part of the foot corresponds to an area of the body, and massage of the feet stimulates the corresponding part of the body so that receiving a reflexology massage is regarded as the equivalent of a full body massage[9]. Generally, it affects the physiological and psychological stimulation points. In the pregnancy, labor and the postpartum period, it can be used for treating many physiological conditions such as nausea, pregnancy vomiting, constipation, edema, a headache, fatigue, low back pain and to help to breastfeed [10]. Reflexology has stimulating effects on the central nervous system (CNS) and mood-enhancing effects, and causes deep relaxation; hence, reducing mental stress and pressure and improving blood flow [8].

Moreover[11] concluded that full oral feeding is an important landmark for preterm babies and one of the major discharge criteria. Cue-based feeding protocols appear to accelerate the development of mature feeding skills. Cue based feeding is a method that combines the use of non - nutritive sucking (NNS) to promote awake behavior for feeding. Monitoring the premature behavioral is very crucial to identify readiness for feeding to adjust frequency, duration, and volume of oral feedings. In this stream [12] and[13] informed that infant on cue-based feeding, against the physicians' orders, feeding

can demonstrate a higher level of neurological maturity and improved behavior state organization. [14]

Added that cue-based feeding enhanced infants' nutrient intake and weight gain. The practice of Reflexology in pediatric researches is needed to empower Egyptian mothers of premature babies to learn the new safe and inexpensive skill and add to the positive experience before discharge from the hospital and ensures adequate breast milk supply for their babies.

### ***1.1 Significance of the problem***

Mothers of premature babies experienced a significant challenge to establish the lactation process due to long term care at the neonatal units. The effect reflexology strategy on the lactation process is studied but still lack of evidence to support its effect on increasing breast milk volume. Trying in the present study to use of reflexology as a new nursing strategy to add sound research findings that hope to enhance the maternal role during the lactation process and improve premature body weight gain

### ***1.2 Aim of the study:***

The study aimed to assess the effect of reflexology strategy on the mother's breast milk volume and their premature weight gain through:-

1. Determine the facilitators of and barriers to breastfeeding during admission to the neonatal intensive-care unit.
2. Monitoring the ability of initiation of sucking using pacifiers and achievement of first sucking among preterm infants.

3. Evaluating the effect of foot reflexology strategy on the mother's breast milk volume and their Premature weight gain.

### **1.3 Research Hypothesis:**

1. Premature babies of primiparous mothers who will receive foot reflexology practice will have successful lactation and weight gain as compared to those who did not.
2. There is a significant difference in the mothers level of lactation between reflexology group and control group after reflex zone stimulation.

## **2. Subjects and Methods:**

### **2.1: Research Design:**

An experimental design was used to conduct the study.

### **2.2 Setting**

The study was conducted at the Neonatal Intensive Care Unit and Postpartum Unit in Ain Shams Maternity Hospital, Cairo, Egypt.

**2.3 Subjects:** A convenience random sample of 120 Primiparous mothers and their preterm infants was recruited from the previously mentioned setting. They were chosen in a systematic way (one by one), those who are admitted for the Neonatal Intensive Care Unit. Infants were divided into two groups: The study sample was assigned either to the experimental or control group.

Group I: the reflexology group (n = 60). Group II: the control group (n = 60).

### **2.4 The inclusion criteria were:**

1. Primiparous mothers had delivered cesarean section premature requiring intensive care admission.
2. Infants born  $\leq$  33 weeks and healthy preterm, the chronological age of 24 h or less, on Intravenous then tube-feeding, Apgar score of seven and above in the fifth minute, absence of acute respiratory distress, birth weight of 1400 g or higher, enjoyment of apparent health and not suffering from congenital anomalies and intracranial hemorrhage .

### **2.5 Tools of Data Collection:**

Four tools were designed by the researchers to collect the necessary data, which were:

- 1. Structured interview questionnaire sheet:** It was established by the researchers after appraising of national and international literature, it was used to collect data about the study subjects; it involved information on three parts related to:

*Part 1:* Mothers' socio-demographic characteristics such as age, education, residence and employment.

*Part 2:* Premature characteristics such as gender, gestational age, and weight.

*Part 3:* Mothers' knowledge regarding the facilitators of and barriers to breastfeeding during admission to the neonatal intensive - care unit. The questionnaire included 26 items, nine items assessing the mothers facilitating factors of breastfeeding practice and 11 items assessing the mothers inhibiting factors of breastfeeding practice of breastfeeding and six items examining the mothers satisfaction experience acquired during hospitalization period. Responses to each statement were scored as percentage for the yes or no.

#### ***2. Assessment observational checklist sheet for Premature using 2 scales***

***a. Transitioning from tube feeds to oral feeds :It developed by [11] :***

It includes 5 steps: Started by 1) kangaroo care, 2) non-nutritive sucking, 3) 1-3 Try breastfeed then bottle-feed, 4) try breast then gavage feeding on demand / cues per 3hrs, 5) Feeding on demand per cues. Quality of feeding should be rated after each feeds on 3 scores (poor, fair, and good)

**b. The Preterm Infant Breastfeeding Behavior Scale (PIBBS)**

It was developed by [15]: The scale included six parameters were developed to monitor the premature in rooting, areolar grasp, longest duration of latching on, sucking, the longest sucking burst, and swallowing. A scoring system was ranged from zero to six.

**3. *Evaluation Phase observational checklist based on Mother-Infant Breastfeeding Progress Tool (MIBPT):***

It was adapted from [16]. It was recognized that both the mother and premature contribute to the progress and achievement of the breastfeeding relationship. The tool consists of eight items which can be assessed by observing infant responsiveness to the feeding process.

**Content Validity:**

The validity of the framework tools was critically evaluated judgment by a experts panel of seven pediatric nursing professors and three physiotherapists. Clarity of sentences, the simplicity of content, scope and purpose, accessibility and clinical significance were used to evaluate the framework. After rigorous revision by the experts, the tool and guidelines were finalized based on their recommendations. (Validity value was 95%).

**Reliability:** of the tool 3 was ascertained by measuring the internal consistency of its items using Cronbach's Alpha test which were 0.988.

**Pilot Study:**

It was conducted by the researcher on 12 mothers and their premature (10% of the study sample) who fulfilled the defined criteria to ascertain the clarity and achievability of the tool. The pilot subjects were later excluded from the study sample. According to the pilot study results, the necessary modifications were done.

**Administrative Design and Ethical Considerations:**

Official permission was obtained from the Faculty Dean to conduct the study. Agreement to conduct the study was obtained from both Heads of the Neonatal Intensive Care Units and Postpartum unit, also primiparous mothers agreed to participate in the study was obtained. The aim of the study and procedures were explained to the mothers and nursing staff to attain their cooperation. They were informed about the threats and benefits, that their participation was entirely voluntary, their rights to drop out from the study at any time or choose not to answer the questions with no consequences on their hospital care. Confidentiality of the information was ensured.

**2.6 Procedures:**

Approval was obtained from the Head of NICU of the study setting and nurses working in the units to avoid mistakes and gain their help. The study was conducted in the period from January to December 2018.

The researcher and physiotherapists were available during morning, afternoon and night shifts alternatively.

The study was carried out where mothers and their preterm infants were randomized to a reflexology group (n



= 60) or control group (n = 60). Both genders were distributed equally. The reflexology group was initiated to oral feeding for 48 hours after achieving full tube feeding (120 Kcal /Kg/Day) and the feeding progression followed feeding protocol. The oral feeding management of the control infants was left to the unit staff for routine feeding and care. Oral feeding progress was monitored for each preterm infant for the achievement of selected feeding milestones: the achievement of first and all successful oral feedings for 6 weeks.

**Data collection: The implementation framework was carried out on three phases namely:-**

### ***2.6.1 Preparatory phase:***

The researcher designed and tested the proposed intervention scales after an extensive literature review (nursing textbooks, journals, the internet). Then, the final form of the proposed study tools was checked by a panel of experts for content validity and applicability. The researcher prepared the training places, teaching aids, and (media :pictures- Video) to simplify reflexology intervention. Schedule time of training with mothers on the basis time availability, shifts, and the resources available. It was taken for 3 weeks.

### ***2.6.2 Implementation phase:***

#### ***Orientation phase to the mothers on reflexology strategy intervention***

**(1) At the initial interview**, at the beginning, the researcher interviewed, welcomed mothers and presented the study objectives to them and getting the informed consent that reflexology strategy intervention will be performed (one session per day for 21 days). After that, the researcher collected mothers' socio-demographic characteristics and Premature characteristics. Subsequently the mothers were randomly divided into two groups of reflexology and control using Egyptian pound coin. The control group received routine hospital care. The reflexology group, the researcher enrolled mothers to schedule teaching sessions. Explained to the

mothers in a simple Arabic language how to do reflexology strategy, under supervision of physiotherapist colleagues, the mothers were asked first to wash her feet with warm or lukewarm water, then asked her to sleep in position, supine or sitting position. The physiotherapist starting a simple message at the calf to the ankle and moving on to the sole of the foot and finally the toes. Then alternated both sides of the ankle by keeping the sole of the foot supported with one hand for several times. These two techniques carried out to relax the feet's as a preparation for the practice of reflexology. After that, the researcher in a turning manner applied continuous pressure to kidney one, then the pituitary point in the middle of the toe was pressed followed by the points on the foot between the second, third, and fourth metacarpus were reflected with the clockwise rotating movement of the thumb. In total, reflexology for each foot separately lasted 15 to 20 min for a total of 30 - 40 min. Subsequently, after one hour the mothers 'squeezed' milk, using the electric breast pump, the milk amount was measured by using a baby milk bottle and recorded every day at 9 a.m. for two weeks in mothers card for each session. Ensure that mothers being successfully when reported that breasts are comfortable, softer after feeding no lumps, engorgement, or nipple soreness and able to let baby suckle until finished. Moreover, Mother feeling as thirst, uterine cramps, increased lochia, breast ache or tingling, relaxation, sleepiness, milk leaking from the opposite breast assured her that is a good sign of proper physiological manifestation of successful lactation. The interview was taken 40 minutes for each mother.

***2.6.2: Assessment observational checklist sheet for Premature Transitioning from tube feeds to oral feeds :***

**This phase carried out using Premature Transitioning from tube feeds to oral feeds scale developed by [11] and The Preterm Infant Breastfeeding Behavior Scale (PIBBS) developed by [15]:**

In the beginning, premature incubators for the reflexology groups were labeled by a special card into two different colors, which indicates that the infant is receiving the feeding protocol by the researcher. The mothers were encouraged to hold the premature baby in skin to skin contact(kangaroo care) for ten minutes before oral feeding to assess oral motor act during non-nutritive. The baby stimulation was carried out by gently stroking the bottom lip with a finger or pacifier, then moving intraoral to arouse the tongue in a gentle front to back movement until the finger/pacifier was prompting a nonnutritive sucking pattern for 10 to 15 minutes to assess the baby cues for breastfeeding then moving to nasogastric tube supplements until they received all of their feeds orally. The researcher assesses the baby normal signs as a baby bringing hands to the mouth, alert and fussing, sucking on fingers or pacifier, relaxed facial expression while awake calm faces, good tone and rooting. Disorganized sucking in a form of inconsolable crying, worried face, yawning, gaze averting, changing from awake to drowsy or sleepy state, poor tone, splaying fingers or putting hands in a stop position, pulling off nipple, tachycardia ,all were considered a sign of poor feeding cues and still in needs for more training.

During the assessment the researcher watches and listens for baby's cues asked the mother to hold, stroke, rock, talk to the baby and stimulates baby if sleepy, calms if fussy and scored the baby well readiness cues if he was being stirring, alertness, rooting, sucking, hand-to-mouth, vocal cues, cry. Concerning the position, the mother heartened to holds baby in good alignment, body slightly flexed; entire ventral surface facing mother's body; baby's head and shoulders supported to facilitate latch-on range of mother breast nipple takes all of the nipples and about 2 cm of the areola into the mouth; then suckle and demonstrating a recurrent burst-pause

sucking pattern. If the baby demonstrates rooting reflex well at breast, opens mouth wide, tongue cupped and covering lower gum, swallows audibly; milk observed in baby's mouth; the baby may spit up milk when burping; rapid "call-up sucking" rate (two sucks / second) changes to "nutritive sucking" rate of about one suck/second, all signs indicate that the baby was being good for lactation. Also, encourage the mother to hold breast to assist the baby as needed. Ending the session when the baby discharges breast spontaneously, appear satiated and may fall asleep.

Scores infants on the number of normal, disorganized patterns seen. Quality of feeding should be rated after each feeds on 3 scores (poor, fair, and good).

When evaluating the premature feeding behavior, the researcher was used (PIBBS scale) and explained the scale items and way of intervention to the mothers, as follows, she should start lactation process by handling baby in kangaroo position then provided nonnutritive sucking using finger gloves or pacifier to enhance lactation. Then assessment the infant readiness cues of breastfeeding carried out by stimulation of baby rooting reflex, sucking and swallowing, and monitor the baby expression. The mother established as a breastfeeding record after every feeding during the hospital period. Feeding bottles were used only when the mother milk not enough to allow full breastfeeding. The researcher assesses the cycles of breastfeeding sessions and gave scored for a period of 6 weeks. At the first week, the premature net weight gain in grams was measured by using electronic scale before and after each breastfeeding once a day at the same time 2 pm to confirm proper growth and weight gain was adequate before discharge from the hospital. Milk volume intake was measured in

centiliters from beginning to six weeks. A total of breastfeeding sessions was documented in the premature charts.

Scores infants on the amount of normal feeding achievements. Quality of feeding should be rated after each feeds on 3 scores (poor, fair and good) numbers and percentage. Each mother session was taken 30 to 40 minutes.

### **2.6.3: Evaluation Phase observational checklist based on Mother-Infant Breastfeeding Progress Tool**

**(MIBPT):** It was adapted from [16]:The researcher monitoring the progress and achievement of the eight items of which can be assessed by observing infant responsiveness to feeding process and breastfeeding relationship between mothers and their premature. As displayed in Fig ( 1).

Evaluation of the effect of reflexology strategy on weight gain and total premature scores was displayed in a table (4)&(5).Scores infants on the number of normal feeding achievement. Quality of feeding should be rated after each feeds on 3 scores(poor, fair and good)numbers and percentage.

Evaluation of mothers' knowledge regarding the facilitators of and barriers to breastfeeding and mothers satisfaction experience a period of hospital admission. The researcher started the questionnaires that included 26 items, nine items assessing the mothers facilitating factors of breastfeeding practice and 11 items assessing the mothers inhibiting factors of breastfeeding practice of breastfeeding and six items examining the mothers' satisfaction experience acquired during the hospitalization period . Responses to each statement were scored as a percentage for the yes or no.

### **2.7 Statistical Analysis:**

The collected data were coded, analyzed and tabulated using frequencies and percentage, mean, standard deviation & chi-square tests. Data entry and analysis were done by using the statistical package for the social sciences (SPSS Version 20).

### 3.Results:

**Table (1): Distribution of Mothers Characteristics Among Both Group.**

Items	Reflexology Group (n =60)		Control Group( n=60)		P value
	No.	%	No.	%	
<b>Mother Age</b>					
20-25	45	75.0	41	68.4	>0.05*
25-30	12	20.0	17	28.3	
30 and more	3	5.0	2	3.3	
<b>Educational Level</b>					
Diploma	30	50.0	28	46.7	>0.05*
University	27	45.0	32	53.3	
Postgraduate studies	3	5.0	0	00.0	
<b>Employment</b>					
Housewives	16	26.7	22	36.7	>0.05*
Free work	5	8.3	6	10.0	
Employment	39	65.0	32	53.3	

<b>Residence</b>					
Rural	12	20.0	16	26.7	>0.05*
Urban	48	80.0	44	73.3	

\* No significant difference between both groups. The majority (75.0 %) (68.0% 4) of mother age were ranged from 20-25 years, about half (50.0,%, 46,7 %) got diploma degree.

**Table (2): Distribution of Preterm Babies Characteristics for Reflexology group and control group.**

Items	Reflexology Group (n =60)		Control Group( n=60)		P value
	No.	%	No.	%	
<b>Gender</b>					>0.05*
<b>Boys</b>	33	55.0	31	51.7	
<b>Girls</b>	27	45.0	29	48.3	
<b>Gestational Age:</b>					>0.05*
>33 weeks	10	16.7	12	20.0	
34-36 weeks	45	75.0	40	66.7	
36 weeks or more	5	8.3	8	13.3	
X ± SD	34.5 ± 0.6		34.7 ± 0.5		

<b>Birth Weight:</b>					
1400 – < 1500 gm.	33	55.0	31	51.7	>0.05*
1600 - < 1700 gm.	17	28.3	19	31.6	
1700 gm. and more	10	16.7	10	16.7	
X ± SD	1622.6 ± 100.2		1631.7 ± 100.3		

\*: No significant difference between both groups. The mean gestational age of the preterm included in the study was  $34.5 \pm 0.6$  and  $34.7 \pm 0.5$  week. The mean birth weight was  $1622.6 \pm 100.2$  and  $1631.7 \pm 100.3$  gram

**Table ( 3 ) Monitoring Reflexology Group (n =60) and Control Group (n =60) Scores Percentage According to the Preterm Infant Breastfeeding Behavior Scale**

Weeks		33wks		34wks		35wks		36wks		37wks		38wks		39wks	
		Study	Control	Study	Control	Study	Control	Study	Control	Study	Control	Study	Control	Study	Control
Rooting	0	96.7%	96.7%	70%	90.0%	50.0%	86.0%	30.0%	66.0%	0.0%	0.0%	0.0%	9.9%	0.0%	0.0%
	1	3.3%	3.3%	30.0%	10.0%	20.0%	14.0%	10.0%	44.0%	0.0%	0.0%	0.0%	46.0%	0.0%	26.0%
	2	0.0%	0.0%	0.0%	0.0%	30.0%	0.0%	60.0%	0.0%	100%	100.0%	100.0%	44.1%	100.0%	64.0%
Areolar grasp	0	100.0%	100.0%	70.0%	100.0%	50.0%	80.0%	12.0%	60.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	1	0.0%	0.0%	30.0%	0.0%	20.0%	20.0%	36.0%	24.0%	0.0%	60.0%	0.0%	46.0%	0.0%	20.0%



	2	0.0%	0.0%	0.0%	0.0%	20.0%	0.0%	32.0%	16.0%	60.4%	40.0%	36.0%	44.0%	6.6 %	40.0%
	3	0.0%	%	0.0%	0.0%	0.0%	0.0%	20.0%	0.0%	40.0%	0.0%	64.0%	10.0 %	93.4%	40.0%
<b>Latching on (min)</b>	0	100.0%	100.0%	20.0%	2.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	1	0.0%	0.0%	80.0%	98.0%	50%	88.0%	22.0%	66.0%	0.0%	40.0%	0.0%	22.0%	0.0%	10.0%
	2	0.0%	0.0%	0.0%	0.0%	20.0%	12.0%	30.0%	44.0%	10.0%	60.0%	0.0%	46.0%	32.0%	34.0%
	3	0.0%	0.0%	0.0%	0.0%	30.0%	0.0%	70.0%	0.0%	90.0%	0.0%	93.0%	32.0%	96.7%	56.0%
<b>Sucking</b>	0	100.0%	100.0%	70.0%	100.0%	50%	92.0%	20.0%	80.0%	0.0%	76.0%	0.0%	0.0%	0.0%	0.0%
	1	0.0%	0.0%	20.0%	0.0%	30.0%	8.0%	30.0%	20.0%	00.0%	24.0%	0.0%	66.0%	0.0%	0.0%
	2	0.0%	0.0%	10%	0.0%	20.0%	0.0%	10.2%	0.0%	30.0%	0.0%	0.0%	44.0%	0.0%	20.0%
	3	0.0%	0.0%	%	0.0%	0.0%	0.0%	30.0%	0.0%	40.0%	0.0%	20.0%	0.0%	14.0%	34.0%
	4	0.0%	0.0%	%	0.0%	0.0%	0.0%	10.0%	0.0%	30.0%	0.0%	70.0%	0.0%	86.0%	46.0%
<b>Longest sucking burst</b>	0	100.0%	100.0%	90.0%	100.0%	60.0%	90.0%	0.0%	64.0%	0.0%	52.0%	0.0%	00.0%	0.0%	%
	1	0.0%	0.0%	10.0	0.0%	24.0	10.0%	24.0	36.0%	0.0%	28.0%	0.0%	10.0%	0.0%	0.0%

				%		%		%							
	2	0.0%	0.0%	0.0%	0.0%	16.0%	0.0%	44.0%	0.0%	0.0%	20.0%	0.0%	30.0%	0.0%	0.0%
	3	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	18.0%	0.0%	20.0%	0.0%	0.0%	30.0%	0.0%	0.0%
	4	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	14.0%	0.0%	10.0%	0.0%	0.0%	20.0%	0.0%	20%
	5	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	20.0%	0.0%	20.0%	10.0%	10.0%	30%
	6	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	80.0%	0.0%	90%	50%
Swallowing	0	100.0%	100.0%	70%	100.0%	50.0%	90.0%	30.0%	68.0%	0.0%	0.0%	0.0%	0.0%	0.0%	10.0%
	1	0.0%	0.0%	30%	0.0%	30.0%	10.0%	40.0%	32%	30.0%	60.0%	30.0%	64%	10.0%	50.0%
	2	0.0%	0.0%	0.0%	0.0%	20.0%	0.0%	30.0%	0.0%	74.0%	40.0%	70%	36%	90.0%	40%

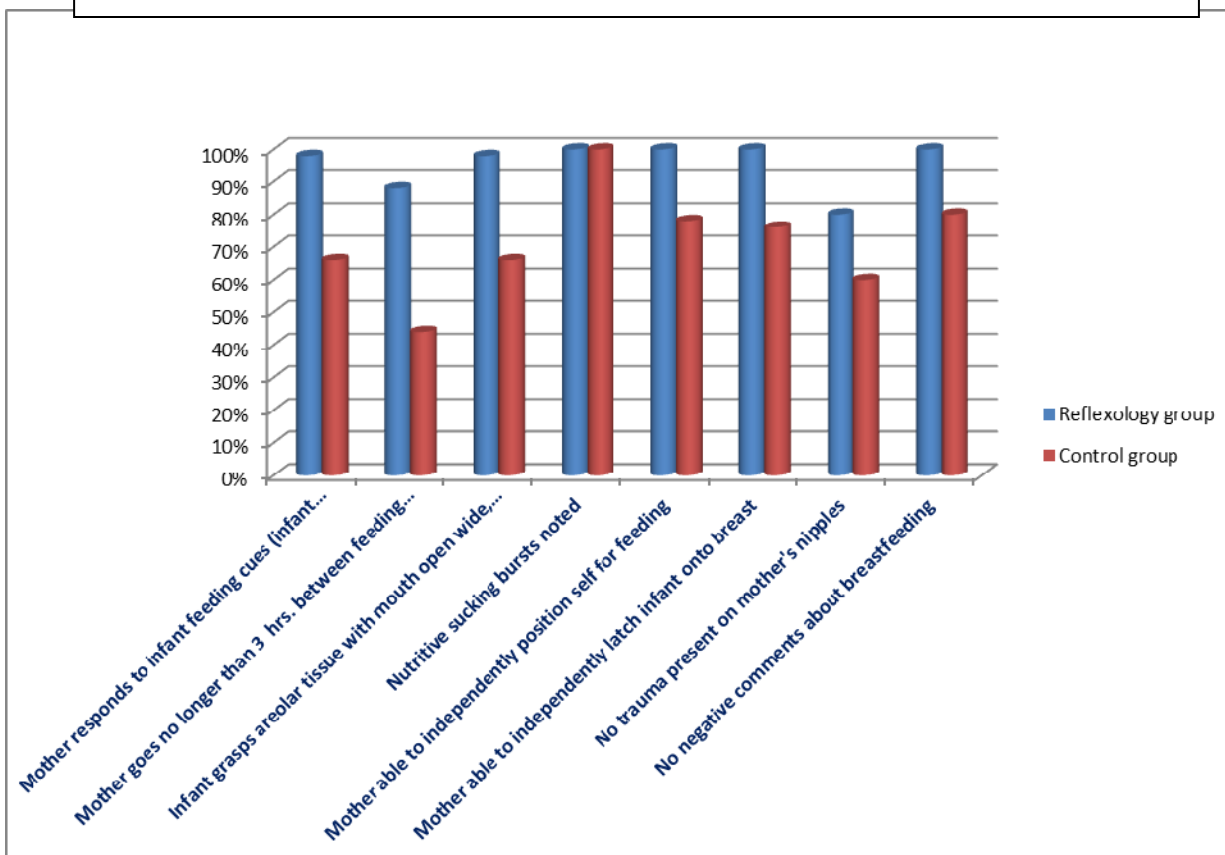
It is interesting to note in the table (3) that data on the effect of reflexology on the premature group was successful during the first oral feeding. The nonnutritive sucking skills were similar in both groups in 33 weeks, but in reflexology group, it was observed that from the week 34, there was slightly greater improvement and marked differences between both groups during feeding intervention session, the preliminary hypothesis that the assessment is better and the premature performance scores were higher among reflexology group on the nonnutritive rooting reflex, sucking finger gloves than the control group. This finding was also evident after inspecting the distribution of the scores, which were different between the groups. All premature (100%) after six weeks developed rooting

reflex as compared to 64.0% in control group. The situation among the control group was depressing where areolar grasp and latching on (min) were poor, where (40.0 %)(56.0 %) of babies don't able to grasp the breast areola and latching on (min) after 6 weeks post natal as compared to(93.4 % and 96.7%) on the reflexology group . In terms of feeding intake, it was clear that sucking and longest sucking burst, the babies in the control group did not exhibit any rhythmic alternation of sucking expression bursts and they did not generate any sucking burst and swallowing where the percentages of the control group were (46.0%,50% and 40%) consequently as compared to (86.0%,90.0 % and 90.0%) among the reflexology group,where the premature demonstrated a rhythmic alternation of suction, were able to maintain prolonged sucking which was longer when they were sucking mother breast than non-nutritive sucking rate.

**Fig ( 1 ) Assessment of Mother-Infant Breastfeeding Progress Percentage for both groups:**

The figure (1) indicate the great improvement percentage in mother-infant breastfeeding progress percentage between both groups, the majority (100%) of the mothers in the reflexology group reported that noted the premature performance to nutritive sucking bursts well, they became able to independently position self for feeding, and latch the infant onto breast and no negative comments about breastfeeding.

**Fig. 1: Assessment of Mother-Infant Breastfeeding Progress percentage for both groups**



**Table ( 4 ) Effects of Reflexology on the Mothers Breast Milk Volume and their Premature Weekly weight gain throughout the study Intervention.**

Weight Gain in Grams per weeks	Reflexology Group (n = 60)						Control Group (n = 60)						X <sup>2</sup> P
	34	35	36	37	38	39	34	35	36	37	38	39	
< 50 gm	20%		-	-	-	-	-	10.0%	90.0%	76.6%	40.0%	-	7.35 <0.001

		23.3%											
50– 100 gm.	-	76.6%	43.3	16.6%	-		--	-	10.0%	23.3%	40.0%	50.0%	9.25<0.001
100– 150 gm.	-	-	73.3%	40.1%	22.0%	10.0%	--	--	-	-	20.0%	20.0%	11.4 <0.001
150-200 gm	-	-	-	43.3%	88.0%	90.0%	--	--	-	-	-	30.0%	9.0 <0.001

Table (4) Summarizes the major observed differences and the success of starting oral feedings between both groups. it is obvious that there is a highly statistically significant difference between both groups ( $P < 0.001$ ) throughout the intervention of reflexology, where  $X^2$  were 7.35, 9.25, 11.4, and 9.0 respectively. It was found that premature gain weight increased from 50 – 100 gram. At 35week for the majority of the reflexology group(76.6%) compared to 10.0% among the control group. Furthermore, at the 36 weeks, the situation was a promising majority (73.3%) of the reflexology group gained weight from (100-150) gram per week as compared to 20.0% in the control group. From the 38 weeks, the situation was exceptional since the majority of the reflexology group(88.0%) gained (150-200) gram. Followed by 90% at the 39 weeks as compared to none and one- third respectively in the control group.

**Table (5) Assessment for Total Premature Feeding Scores After six weeks ( Transitioning from tube feeds to Breast Feeding) According Lubbe Scale.**

Premature Scores	Reflexology Group (n = 60)		Control Group (n = 60)		P
	NO	%	NO	%	
Poor	0	0.0	10	16.7	<0.01
Average	7	11.7	17	28.3	<0.001

Good	93	88.3	33	55.0	<0.01
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As regards the components of total scores of feeding performance after intervention Table (5) displays confirmations that the highest significant percentage difference ( $P < 0.001$ ) of reflexology sample. Reflexology intervention for mothers of premature during six weeks enhance breastfeeding ,it accelerates transitioning from tube feeds to breast feeding . Reflexology group majority (88.3%) demonstrated good breastfeeding as compared to (55.2%) in the study group.

#### **4. Discussion**

Acomparable two matched groups were recruited in this study to evaluate the effect of foot reflexology strategy on the mother’s breast milk volume and their premature weight. This was evident by the statistically that no significant difference between study and control group regarding the mother age, level of education, employment and their premature gender, gestational age and weight as clarified in (table 1 and table 2).

The present findings of the study confirmed the promising effects of reflexology strategy on the mother’s breast milk volume and their premature weight gain and specify that the majority of mothers perceived a supportive breastfeeding environment during hospital period of admission. Reflexology strategy is functioning tool in relaxing mothers, permitting a more nurtured body, mind, and spirit, which in turn aids in establishing and maintaining lactation. Reflexology strategy assistances in increasing milk production, mother's relaxation and stimulates lactation which is being identified by obtaining good latch and sucking for a long time while breastfeeding. Strengths of the study clarify that total scores of feeding performance after intervention for 6 weeks approved the highest significant

percentage difference ( $P < 0.001$ ) of reflexology strategy sample and it quicken transitioning from tube feeds to breastfeeding as shown in the table (5). These findings were in agreement with [17] who specified that mothers given reflexology during the postnatal period were able to breastfeed more quickly and with more pleasure. On the other hand [18] added that the progressive effects of reflexology confirmed by strong evidence of many literature reviews in the management of many health conditions and health professional should attain training and legal rules of practice to ensure public trust.

Furthermore [12] give attention to the rate the effectiveness of the feeding process as being as good, fair, or poor when the baby latches well, has good positioning, and sucks continuously (> 15 minutes).

The results of the present study (figure,1) revealed that the great improvement percentage in mother-infant breastfeeding progress percentage, the majority of the mothers (100%) in the reflexology strategy group reported that noted premature performance to nutritive sucking bursts well, they became able to independently position self for feeding, and latch infant onto breast and no negative comments about breastfeeding as pain or trauma, this in accordance with [19] who mentioned many reasons encouraging utilization of reflexology as skin touch by applying pressure on hands or feet activate large diameter fibers to close the pain gate due to release of endogenous endorphins of the body, remove fatigue and anxiety that reduce stress and pain. Besides [20] added that parents training on cue based feeding can empower parent-infant attachment, decrease emotional strain and improve overall intake as well as maintain consistency across feedings to promote successful progression of oral feedings even after hospital discharge.

According to the attentive data on monitoring reflexology group scores percentage according to the preterm infant breastfeeding behavior scale as displayed in the table (3), the results were promising during the first oral feeding among the reflexology group. All premature (100%) after six weeks developed rooting reflex as compared to 64.0% in the control group. The nonnutritive sucking skills were similar in both groups in 33 weeks, but in reflexology group, it was observed that from week 35, there was a slightly greater improvement and marked differences between both groups during the feeding session. Stress cues was common among the control group until the week 36, in connecting to the feeding process, most of them were coughing, pulling away from the nipple, do not root, non-touched the nipple, did not latch on at all, no sucking or licking, swallowing was not noticed increased work of breathing, facial grimacing, and the mothers were being anxious and felt upset, then the situation slightly improved in subsequent week. For reflexology group, the situation was encouraging and reassuring, they develop feeding cue earlier from 34 weeks, and progress subsequently most of them develop well rooting reflex, hold breast nipple, latch on for 15 minutes with long suck burst from 26–30 consecutive sucks and good swallowing. The researcher applied [21] scale to transitioning the preterm from tube feeds to oral feeds by encouraging and trained the mothers on reflexology group on kangaroo care, then non-nutritive sucking, to enhance breastfeeding process and assess their babies during the feeding, as well as, after every feed to determine how they are coping with the activity. Premature who do not latch well need continued assessment and support. This manner incongruent with [22] who identified that kangaroo care plays a role in the maturation of the autonomic nervous system and improves maternal-infant attachment and pain



response.[23] Added that pre-feeding oral stimulation plays an important role in developing breastfeeding rates.

The present study also revealed that there was a significant difference between the two (reflexology and control) groups in term of post-feed weight gain there was statistically significantly higher in reflexology group, which indicates that intervention of reflexology strategy has a positive effect on lactation as proven in Table (4).

From the 38 weeks, the situation was excellent since the majority of the reflexology group(88.0%) gained (150-200) gram. Followed by 90% in the 39 weeks as compared to none and one - third respectively in the control group. The researcher observed that other parameters like a premature number of urination and stools per day and satiety sleep hours after feeding were higher in the reflexology group, which again specify improved lactation. This result in agreement with [24] who reported that the application of reflexology plays a role in increasing breast milk secretion, early milk flow, and its prolonged duration. In addition to [25] who also confirm the easiness, acceptance and positive effect of foot reflexology on increasing mothers breast milk satisfaction. Furthermore, most mothers mentioned they gained pleasure with nursing care frequency, a stimulus for breastfeeding, social support, and good breastfeeding training are other factors have a positive impact on lactation and develop an experience that empowers self-confident, bonding relationship in lactating their premature after the intervention. These outcomes are in the same stream with international literature.

The discussion with the mothers to determine factors facilitating or inhibiting breastfeeding, expose the situation was upsetting, where only (10%) of the mothers in both groups attended antennal classes and none of them(0.0) received written information about the benefits of breastfeeding for the mothers and their infants and

they reported that about (42%) of hospital staff was willing to provide lactation care, only (22 %) of the mothers received training on kangaroo care and all of them (100%) of the mothers in both groups were sympathetically disturbed due to NICU admission separation due to prematurity. None of them(0.0%) lactate her infant first fed breast milk and the majority ( 78% ) terrible of being inadequate milk supply. In addition to the majority of the mothers (80 %) were anxious about providing an adequate milk supply,(88% ) stated that frequent infant's lethargy was the main problem and (86%)were afraid of the unexpected incidence of comorbidity. Moreover, (66%) of mothers were irritated due to lack of support from an expert lactation consultant. These results consider a red flag for poor caring breastfeeding environment in antenatal and postnatal units. This critical situation should find consideration from health care specialists.

Concerning the maternal experience satisfaction during hospitalization, the majority of mothers (100.0%) in the reflexology group were satisfied with the breastfeeding experience during the hospital stay. They emotionally felt support during feeding process, having been stimulated to implement skin contact with their infant and having received information on how to identify their infants hunger cues were reported by and conscious about feeding is benefits . But the situation in the control group was very disappointing. In this concern [26] Recommended the importance of providing maternal education on evaluation infant oral feeding cue, stress signals that arise during feeding and breastfeeding techniques, all this approves success of independent feeding as positive experience as possible.

Findings of this study supported the hypothesis and reflect that the use of reflexology strategy in the postnatal period gives the impression to demonstrate high levels of maternal and even staff satisfaction. Mothers in the

reflexology group had positive outcomes compared to those who did not. Reflexology strategy is a quite innovative area of care in the postnatal and pediatric field if applied by trained health professionals can help to empower the lactation process and early transition from none nutritive sucking to have a good initiation of breastfeeding, consequently early premature discharge.

### ***5. Conclusion***

The present study highlights the effect of reflexology strategy on the mother's satisfaction, breast milk volume, and their premature weight gain. On the other hand, intervention accelerates the early transition of premature from the tube feeding to breastfeeding and discharge from the hospital.

### ***6. Recommendation:***

According to the results of the present study and the mentioned studies, it can be recommended that:

1. In - service education, the program could be designed and implemented in the pediatric field to enable the nurses to apply reflexology strategy to improve empower early transitioning of the preterm from tube feeds to breastfeeding, and early discharge.
2. It is essential that mothers are given proper antenatal care and postnatal support to understand the value of breastfeeding and to do so successfully.
3. Reflexology strategy is non-pharmacological, simple, noninvasive and cheap technique would be welcomed by the nurses, physicians, and mothers.
4. Further researches, with different samples and application protocols of reflexology strategy, can be developed.

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