Early Feeding Skills among Preterm Neonates Received Verses Not Received Prefeeding Oral Stimulation Technique In Neonatal Intensive Care Units In Ismailia City

Hanaa Tharwat Mohamed El-Shahat[1], Gehan Ahmed ELSamman[2], Amina Mohamed Abd Elwahab[3], Manal Farouk Mohamed[4]

[1]*Assist lecturer, Pediatric Nursing, Suez Canal University*
[2]*Prof. Pediatric Nursing, Cairo University*
[3]*Prof. Pediatric Medicine, Suez Canal University*
[4]*Lecturer. Pediatric Nursing. Suez Canal University*
Corresponding author: Hanaa Tharwat Mohamed El-Shahat

Abstract:
Background: *The overall goals of oral stimulation are to maintain oral- motor skills, facilitate normal oral-motor developmental pattern, and enhance oral muscle tone and movement.* **Aim:** *was to assess of early feeding skills among preterm neonates received verses not received prefeeding oral stimulation technique in neonatal intensive care units in Ismailia city. Quazi- experimental design was used in this study.* **Setting:** *the study was conducted at neonatal intensive care unit of Suez Canal University Hospital in Ismailia city. A convenient sample of 60 preterm neonates, divided randomly into 30 preterm neonates received and 30 preterm neonates not received prefeeding oral stimulation technique. Two tools used for data collection:1) Biophysiological assessment record to assess personal data, physiological measurement and feeding performance of preterm neonates. 2) Early feeding skills likert scale to assess oral feeding ability of preterm neonates.* **Results:** *study results revealed that the majority of preterm neonates received prefeeding oral stimulation technique group had higher mean milk intake than the not received group. Preterm neonates not received prefeeding oral stimulation technique group had higher mean milk leakage and higher mean oral feeding duration than received group. There was statistical positive correlation between preterm neonates ' total score of early feeding skills and their gestational age in preterm neonates received prefeeding oral stimulation technique group.* **Conclusion:** *preterm neonates received prefeeding oral stimulation technique group started oral feeding early, had higher mean milk intake & had less mean milk leakage than preterm neonates not received. All preterm neonates in both groups had no adverse reactions during the study both before and after oral feeding.* **Recommendations:** *start oral stimulation technique for preterm neonates immediately after their admission to NICU before developing feeding difficulties and replication of the study on larger sample of the preterm neonates and in other study setting to generalizability the results.*
Keywords: *pre feeding Oral stimulation technique, nutritive sucking, nonnutritive sucking, preterm neonate.*

I.   Introduction

Preterm neonates develop the skills necessary to begin oral feeding as their health stabilizes (**Lau, 2014**). Feeding skill development corresponds to changes in an infant's brain, body, and experience (**Arvedson et al., 2010**). There are two factors affect progression in ability to feed orally: the neonate's state of health and oral feeding experience (**Peng, 2010**). Some infants adapt and improve in skill as the feeding progresses, the skills of some deteriorate as the feeding continues, and others maintain a more steady expression of skill throughout a feeding (**Garber, 2013**). As the infant acquires an oral feeding skill, coordination in applying it increases, feeding becomes more patterned, expression of the feeding skill is more consistent, and the infant adapts more smoothly to a change in task (**Lau & Smith, 2012**). Oral feeding skills have commonly been conceptualized by health care providers as an infant's ability to organize and coordinate oral-motor functions to efficiently consume enough calories for growth (**Arvedson et al., 2010**). Early feeding skills are much more complex than this, however. They also involve the infant's ability to (1) engage and remain engaged in a physiologically and behaviorally challenging task, (2) organize oral-motor movements so as to have long-term functional benefits, (3) coordinate breathing with swallowing to avoid prolonged apnea or aspiration of fluids, and (4) regulate the depth and frequency of breathing to maintain physiologic stability (**Fucile et al., 2012**).

The neonate demonstrates behavioral organization and energy for the work of feeding by attaining and maintaining an awake state, a flexed body posture with sufficient muscle tone, and interest in sucking **(Bingham et al., 2012).** Several studies have demonstrated that the infant's condition immediately prior to feeding affects feeding skill. The capacity to sustain a state of alertness for five minutes prior to feeding is associated with an ability to engage in a greater number of sucks and longer sucking bursts during the first five minutes of feeding **(Kish, 2013).** In addition, an infant who is able to achieve quiet awake state prior to feeding can take in a higher volume during the feeding **(Peng, 2010).** Oral-motor organization reflects the maturation and functioning of the oral-motor structures for feeding **(Briere et al., 2014).** An infant who has achieved sufficient oral-motor maturation for oral feeding will seek the nipple when his lips are stroked, position his tongue to accept the nipple into his mouth, and achieve a nutritive sucking rhythm **(Rocha et al., 2007).**

Coordination of swallowing with sucking and breathing reflects the neonate's skill at managing fluid while adequately protecting his airway. Neonates learn to swallow efficiently as they mature. Coordinated swallowing includes matching sucking pressure and burst length with efficient swallowing and also completing swallowing before initiating the next breath **(Lau & Smith, 2011).** Compared to mature feeders, preterm neonates who are learning to feed orally are less able to match the duration and strength of their sucking with their ability to swallow efficiently **(Goldfield et al., 2006).** Preterm neonates often suck in excess of their capacity to swallow, which places a large bolus of fluid in the mouth, requiring several swallows to clear and obstructing the airway for a prolonged period **(Thoyre & Carlson, 2003).** Apnea time during swallowing and the incidence of multiple swallows decreased as healthy preterm neonates matured. Preterm neonates continued to have longer swallowing apneic events at term than full-term neonates do **(Lau & Smith, 2012).**

Physiologic organization and breathing modulation reflect the neonate's capacity to maintain physiologic stability without excessive work of breathing **(Fucile, 2010).** Adequate oxygenation enables neonates to maintain behavioral organization **(Barlow, 2009).** It also provides energy for the physiologic work of effective and efficient feeding. Inadequate oxygenation is likely to contribute to the fatigue that preterm neonates experience during feeding and these result in shorter feedings, less caloric intake, and prolonged transition to full oral feeding **(Garber, 2013).**

II. Significance of the study

Safe and successful suckle feeding, via breast or by bottle, is one requirements for hospital discharge and an ultimate goal for preterm newborn feeding **(Fucile et al., 2011).** Thus, facilitating oral feeding skills and helping preterm newborns transit to full oral feeding are a key focus for the medical staff of neonatal intensive care units. Nurses can play an important role on enhancing oral feeding skills through oral stimulation during preterm newborn routine care. Also, the present study will provide evident data which will help the nurse to help the neonate to face less feeding problems. So that, this study will be conducted to assess early feeding skills among preterm neonates receiving verses not receiving prefeeding oral stimulation technique.

III. Aim of the study to

Assess early feeding skills among preterm neonates received verses not received prefeeding oral stimulation technique in neonatal intensive care units of Suez Canal University in Ismailia city.

IV. Research Objectives

1. Assess early feeding skills of preterm neonates received prefeeding oral stimulation technique group.
2. Assess early feeding skills of preterm neonates not received prefeeding oral stimulation technique group.
3. Determine correlation between personal characteristics of preterm neonates received and not received prefeeding oral stimulation technique groups and their score of early feeding skills.

V. Research hypothesis

1. Preterm neonates group received prefeeding oral stimulation technique will have higher early feeding skills than not received group.

VI. Subjects and Methods

6.1 Research design:
Quazi- experimental research design was utilized in the current study.
6.2 Subject:
A convenient sample of 60 preterm neonates who were divided randomly into two groups each group composed of 30 preterm neonates. One group received prefeeding oral stimulation technique and another group not received prefeeding oral stimulation technique.
6.3 Setting:
The present study was conducted at neonatal intensive care unit in the Suez Canal University.

6.4 Tools of data collection:

Two tools were used for data collection:

Tool I: Biophysiological assessment record. It composed of three parts (part I&II which developed by the research investigator).

Part (1): It included data about preterm neonate: sex, gestational age, postnatal age, diagnosis and duration of hospitalization

Part (2): It included the physiological measurement of the preterm neonate include pulse, respiration and presence of adverse reactions (apnea, bradycardia and oxygen desaturation) of the preterm neonates.

Part (3): About feeding performance. It adopted from **Fucile (2008)** to assess post feeding performance. It includes method of feeding, amount of milk taken, and amount of milk leakage during feeding and oral feeding duration.

Tool II: Early feeding skills likert scale: It adopted from **Suzanne et al. (2005).** It consists of two main parts:

Part (1): Oral feeding readiness: which consisted from 2 items to assess the preterm neonates' ability to hold the body in a flexed position with arm/hands toward midline and demonstrate energy for feeding.

Scoring system: Regarding ability of oral feeding readiness of preterm neonate scores: unable was giving one score, some able was giving two scores, and able was giving three scores. The total number of recorded items for each neonate was 12. The total ability of oral feeding readiness of preterm neonate scores was 36 scores. The scores of the items were summed up and the total divided by the number of the items, theses scores were converted into a percent score. The ability was considered low were ability score <33.3%, moderate were ability scores 33.3% - <66.7%, and high were ability scores 66.7>.

Part (2): Oral feeding skills: It consists from three sections as the following:

Section A: Coordinate oral-motor functioning:

It consisted from 2 items (assessing the preterm neonates' ability to open mouth when lips stroked at feeding onset and ability to maintain a smooth, rhythmic pattern of sucking).

Section B: Coordinate swallowing & breathing pattern:

It consisted from 2 items (assessing the ability to engage in long sucking and maintaining stability of sucking and swallowing interval).

Section C: Maintenance of physiological stability:

It consisted from 3 items (assessing the ability to maintain oxygen saturation and absence of behavioral stress cues in the first 30 seconds after each feeding; stops to breathe before behavioral stress cues appear and ability to clear breath sounds and no grunting breath sounds).

Scoring system: Regarding ability of oral feeding skills of preterm neonate scores: unable was giving one score, some able was giving two score, and able was giving three scores. The total number of recorded items for each neonate was 42. The total ability of oral feeding skills of preterm neonate scores were 126 scores; the scores of the items were summed up and the total divided by the number of the items, theses scores were converted into a percent score. The ability was considered low were ability score <33.3%, moderate were ability scores 33.3% - <66.7%, and high were ability scores 66.7>.

The response to early feeding skills likert scale was in form of unable, some able or able. It is recorded immediately after oral feeding twice daily (1st session& 2nd session) for three consecutive days for the two groups.

Oral stimulation technique

Prefeeding oral stimulation technique adopted from **Fucile (2008)** and **Hwang et al. (2010)**. Prefeeding oral stimulation technique conducted only for the received group before feeding twice daily in the morning shift at 9 am (session 1) and at 12 pm (session 2) for three consecutive days. The not received group exposed to the routine feeding in the hospital.

Table (1) Prefeeding Oral Stimulation Program

Structure	Stimulation steps	Frequency	Duration
Cheek	Compression from the corner of the lip toward the ear. Return to the corner of the lip (C-pattern).	8xeach cheek	2min
Lip	Move the finger from the corner of the lip to the other corner.	8xeach lip	2min
Gum	Compression from the center of the gum toward the back of the mouth.	4xeach gum	2min
Internal Cheek	Place the finger at the inner corner of the lips. Compress and move back toward the lateral molar. Return to the corner of the lip.	4xeach cheek	2min
Tongue	Push the border of the tongue.		1min

	Compress the hard palate and tongue.	8 time	2min
	Stroke the palate to elicit a suck.		1min
Pacifier	Place pacifier in the mouth		3 min

6.5 Validity and reliability:

The two tools were reviewed by 3 experts (2 in Pediatric Nursing, 1 in Pediatric Medicine) to test the content validity of the tools and clarify the sentences as well as appropriateness of content. The reliability of the tools was determined by using Cornbrash's Alpha: biophysiological measurement (Tool I) equal 0.793 and reability of the early feeding skills likert scale (Tool II) equal 0.939

1. Pilot study:

A pilot study was conduct on 10% of the sample. Those included in the pilot study were excluded from the sample.

2. Data collection procedure:

After obtaining permissions from the Director of the Hospital and Neonatal Intensive Care Unit of the previous mentioned hospital to proceed with the proposal study, the researcher initiated the process of data collection. The actual field work was carried out over a period of seven months from the beginning of July, 2016 to the end of January, 2017.The preterm neonates who fulfilled inclusion criteria were submitted randomly into two equal groups one of them was the received and the other was the not received group. Personal data was collected from the preterm neonates' file (Tool I, part 1). After changing neonatal diaper and the preterm neonate become in alert and quiet state, the preterm neonate's pulse, respiration and presence of adverse reaction (apnea, bradycardia and oxygen desaturation) (Tool I, part 2) was recorded from the monitor and documented by the research investigator immediately.

Prefeeding oral stimulation technique was carried out only for the preterm neonates in the received group twice daily in the morning shift at 9 am (1st session) and at 12 pm (2nd session) for three consecutive days. After finishing oral stimulation, the research investigator raised up the head of the preterm neonate and supports his cheek and jaw and feed the preterm neonate by bottle if the neonate is able, he will receive bottle feeding (artificial milk) orally and if the preterm neonate some able or unable he will continue feeding by gavage. The preterm neonates in the not received group don't receive any prefeeding oral stimulation and only get their routine feeding. Daily physiological measurement (tool I, part 2) was assessed immediately before and after the feeding for twice daily in the morning shift at 9 am (1st session) and at 12 pm (2nd session) for three consecutive days for the two groups. Oral feeding performance (tool I, part 3) and early feeding skills likert scale (Tool II, part 1&2) were recorded only immediately after the feeding twice daily in the morning shift at 9 am (1st session) and at 12 pm (2nd session) for three consecutive days for the two groups. The amount of milk leakage were measured by weighing a peace of cotton before putting it under the chin of the preterm neonate and the cotton weight again to measure the amount of milk leakage by using electronic pocket scale (figure 4). The amount was measured by centimeter (cm), each 1cm equal 1 gram (g).

3. Statistical design:

The collected data were organized, revised, tabulated and analyzed using number and percentage distribution. Statistical analysis was done by computer using statistical package of social science (SPSS) program, version 22. Proper statistical tests were used to determine whether there was a significant statistical difference between variables of the study. The following statistical techniques were used: Percentage, Mean score degree (X^-), standard Deviation (SD), Pearson Correlation coefficient (r), T-Test (T). Statistical significance was considered at $P < 0.05$

4. Ethical consideration:

All ethical issue was ensured to all preterm neonates during dealing and implementing the prefeeding oral stimulation for them. Consent was taken from parents of preterm neonates in the study after explaining the aim and nature of the study to them. Parents have a right to withdrawn their preterm neonates from the study at any time without any effect on the daily routine care. The investigator assured anonymity and confidentiality of the collected data which used for the research only. In addition the research investigator reviewed the related literature, figures and videos before conducting the oral stimulation technique.

VII.   Results:
Figure (1): Percentage distribution of preterm neonates' gestational age among received and not received prefeeding stimulation technique groups:
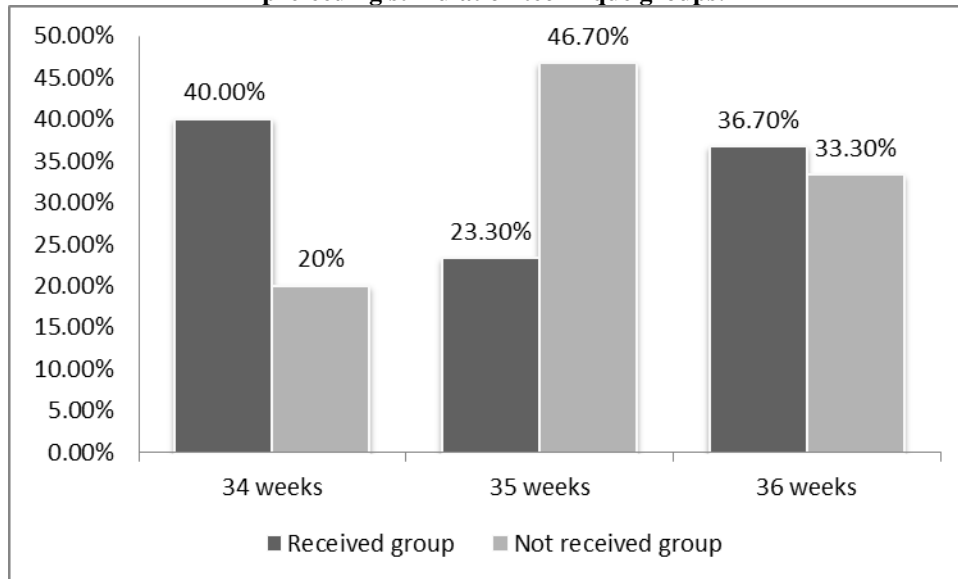
Figure (1): Shows that less than half (40%) of the preterm neonates in the received prefeeding oral stimulation technique group their gestational age was 34 weeks and less than one quarter of them (23.3%) their age was 35 weeks. While less than half (46.7%) of the preterm neonates not received prefeeding oral stimulation technique group their age was 35 weeks and less than one quarter of them (20%) their age was 34 weeks.

Figure (2): Percentage distribution of preterm neonates' diagnosis among the received and not received prefeeding stimulation technique groups:
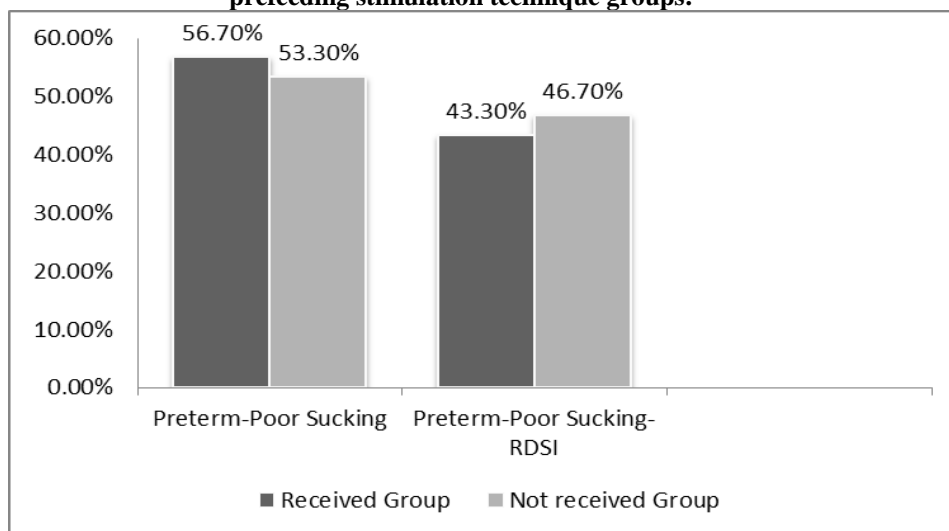
•RDSI: Respiratory distress syndrome.

Figure (2): More than half of preterm neonates in the received and not received prefeeding oral stimulation technique groups diagnosed as preterm with poor sucking (56.7%, 53.3% respectively). While less than half of preterm neonates in both groups diagnosed as preterm with RDS grade I (43.3%, 46.7% respectively).

Table (2): Mean total scores of early feeding skills among preterm neonates in the received and not received prefeeding stimulation technique groups

Early feeding skills Likert scale	Received group (n=30)		Not received group (n=30)		t/p
	No	%	No	%	
Oral feeding readiness					
Low ability (<33.3%)	0	0.0	0	0.0	
Moderate ability (33.3 %-< 66.7%)	5	16.7	16	53.3	
High ability(66.7 ≥)	25	83.3	14	46.7	
Min-Max	55.6-100.0		66.7-100.0		t=3.605
Mean±SD	72.2±9.7		82.2±11.7		P=0.000***
Ability to coordinate oral-motor functioning					
Low ability (<33.3%)	0	0.0	0	0.0	
Moderate ability (33.3 %-< 66.7%)	0	0.0	16	53.3	
High ability(66.7 ≥)	30	100.0	14	46.7	
Min-Max	58.3-100.0		66.7-100.0		t=5.136
Mean±SD	75.2±12.0		89.8±9.9		P<0.000***
Ability to coordinate swallowing and breathing pattern					
Low ability (<33.3%)	0	0.0	0	0.0	
Moderate ability (33.3 %-< 66.7%)	5	16.7	18	60	
High ability(66.7 ≥)	25	83.3	12	40	
Min-Max	55.6-100.0		66.7-100.0		t=3.605
Mean±SD	72.2±9.7		82.2±11.7		P=0.000***
Ability to maintain physiological stability					
Low ability (<33.3%)	0	0.0	0	0.0	
Moderate ability (33.3 %-< 66.7%)	0	0.0	0	0.0	
High ability(66.7 ≥)	30	100.0	30	100.0	
Min-Max	33.3-33.3		33.3-33.3		--
Mean±SD	33.3±0.0		33.3±0.0		
Total score					
Low ability (<33.3%)	0	0.0	0	0.0	
Moderate ability (33.3 %-< 66.7%)	5	16.7	20	66.7	
High ability(66.7 ≥)	25	83.3	10	33.3	t=4.088
Min-Max	52.1-100.0		58.3-100.0		P<0.000***
Mean±SD	65.5±11.8		79.3±14.3		

t: Student t-test Significant at   *P≤ 0.05   **P≤ 0.01   ***P≤ 0.000

Table (13): Shows that more than three quarters (83.3%) of preterm neonates received prefeeding oral stimulation technique group had high ability of oral feeding readiness and to coordinate swallowing and breathing pattern. While more than half (53.3%) of preterm neonates not received prefeeding stimulation technique group had moderate ability of oral feeding readiness and ability to coordinate oral motor functioning.

This table illustrates that all (100%) of preterm neonates received prefeeding oral stimulation technique group had high ability to coordinate oral motor functioning. While three fifths (60%) of preterm neonates not received prefeeding stimulation technique group had moderate ability to coordinate swallowing and breathing pattern. Concerning the ability to maintain physiological stability, the table shows that all (100%) of the preterm neonates in both groups had high ability to maintain physiological stability.

Regarding the total score of the preterm neonates' ability in early feeding skills likert scale, this table illustrates that more than three quarters (83.3%) of the preterm neonates received prefeeding oral stimulation technique group had high ability, while two thirds (66.7%) of the not received prefeeding stimulation technique group had moderate ability. There were statistical significant differences between two groups regarding oral feeding readiness (t=3.605, p=0.000), ability to coordinate oral motor functioning (t=5.136, p<0.000), ability to coordinate swallowing and breathing pattern (t=3.605, p=0.000), and total score (t=4.088, <0.000).

Table (3): Correlation between personal characteristics of preterm neonates received prefeeding oral stimulation technique & not received groups and their score of early feeding skills

Scores Personal Characteristics		Score of early feeding skills Likert scale							
		Oral feeding readiness		Ability to coordinate oral-motor functioning		Ability to coordinate between swallowing and breathing pattern		Total score	
		r	P	r	P	r	P	R	P
Gestational age (weeks)	Received	0.467	0.009**	0.402	0.027*	0.361	0.050	0.437	0.016*
	Not received	0.273	0.144	0.308	0.098	0.303	0.103	0.289	0.122
Postnatal age (days)	Received	0.247	0.189	0.280	0.134	0.270	0.150	0.193	0.308
	Not received	0.039	0.838	0.143	0.453	0.161	0.396	0.128	0.502

Table (3): Regarding relation between total score of oral feeding readiness of preterm neonates received prefeeding oral stimulation technique group and their personal characteristics, there was statistical positive correlation between oral feeding readiness' score and gestational age of preterm neonates received prefeeding oral stimulation technique neonates' ability to coordinate oral-motor functioning and their gestational age (r= 0.402, p=0.027). There was statistical positive correlation between preterm neonates' total score of early feeding skills likert scale and their gestational age (r= 0.437, p=0.016). There was no significant correlation between score of early feeding skills and gestational age and postnatal age among preterm neonates not received prefeeding oral stimulation technique group.

VIII.   Discussion
Early oral motor interventions are beneficial for enhancing oral feeding in preterm neonates **(Rocha et al, 2007).** Oral stimulation is the most commonly utilized and researched sensorimotor intervention to improve preterm neonates' oral feeding skills. The overall goals of oral stimulation are to maintain oral-motor skills, facilitate normal oral- motor developmental pattern, and enhance oral muscle tone and movement **(Fucile, 2010).** The present study aim was assess of early feeding skills among preterm neonates received verses not received prefeeding oral stimulation technique in neonatal intensive care units of Suez Canal University in Ismailia city.

Regarding preterm neonate's gestational age it was found that the highest mean age (35.1±0.7days) among the preterm neonates not received prefeeding oral stimulation technique group. This finding contraindicated with **Zayed (2013)** who conducted a study to assess the effect of pre-feeding sensorimotor stimulation strategy on enhancing oral feeding skills in preterm infants, and found that the highest mean age (31.57±2.99 days) was detected among preterm neonates received prefeeding oral stimulation technique group. Concerning diagnosis, it was found that more than half (56.7%) of the studied preterm neonates in received and not received prefeeding oral stimulation groups (53.3%) diagnosed as preterm and had poor sucking. This finding contradicted with many authers: **Zayed (2013)** who found that more than two fifths (46.7%) of the studied preterm neonates in the study group and the majority (73.3%) of the studied preterm neonates in the control group were preterm and had respiratory distress syndrome grade I. **Anand et al., (2009)** in their study about respiratory distress syndrome in neonates found that respiratory distress syndrome was the most common health problem in preterm neonates. Also; **Younis (2011)** conducted a study about effect of massage therapy on weight and duration of stay of low birth weight preterm neonates in some neonatal intensive care units at Shebin El-Koom Town and found that respiratory distress syndrome was the most common health problem in preterm neonates.

The finding of the current study showed that, more than three quarters of preterm neonates received prefeeding oral stimulation technique group had high ability of oral feeding readiness, while more than half of preterm neonates not received group had moderate ability of oral feeding readiness. From the researcher point of view this finding may be due to preterm neonates received prefeeding oral stimulation technique group exposed to prefeeding oral stimulation which lead to improvement in oral feeding readiness than preterm neonates not received group. The finding of the current study was in agreement with **Gennattasio et al., (2015)** who conducted a study about oral feeding readiness assessment in premature infants and mentioned that preterm neonates in the intervention group had better readiness to demonstrate oral feeding than control group. In contrast **Zayed (2013)** found that the majority of preterm neonates in the study group had moderate ability of oral feeding readiness by the end of study.

Regarding the ability to coordinate oral-motor functioning. The current finding clarified that, all preterm neonates received prefeeding oral stimulation technique group had high ability to coordinate oral motor functioning. While more than half of preterm neonates not received group had moderate ability to coordinate oral-motor functioning. This finding could be attributed to the fact that preterm neonates received prefeeding oral stimulation technique group had higher ability to coordinate oral-motor functioning due to prefeeding oral stimulation for 3 consecutive days. This finding was supported by **Bingham et al., (2012)** who conducted a study about relationship of neonatal oral motor assessment scale to feeding performance of premature infants and who found that preterm neonates in the intervention group had high levels of oral-motor coordination than preterm neonates in the control group.

In relation to preterm neonates' ability to coordinate swallowing and breathing pattern, the finding illustrated that, more than three quarters of preterm neonates received prefeeding oral stimulation technique group had high ability to coordinate swallowing and breathing pattern, while more than half of preterm neonates not received group moderate ability. From the researcher point of view improvement in preterm neonates in received group may be due to intervention which may enhance the maturation of central and/or peripheral neural structures, leading to improved sucking skills and coordination of the swallowing and breathing pattern. This finding goes in line with the study of **Fucile et al., (2012)** about oral and non-oral sensorimotor interventions facilitate suck-swallow-respiration functions and their coordination in preterm infants, and who found that preterm neonates in the study group had better ability to coordinate swallowing and breathing pattern than preterm neonates in the control group. Concerning the ability to maintain physiological stability, the study finding showed that, all of preterm neonates received and not received prefeeding oral stimulation technique groups had high ability to maintain physiological stability. The result of the current study was in contrast with **Mousa et al., (2017)** who conducted a study about the effect of non-nutritive sucking on transcutaneous oxygen saturation in neonates under the nasal continuous positive airway pressure (CPAP) and reported that using the non-nutritive sucking in preterm neonates under the nasal CPAP, can improve oxygenation in the intervention group.

On the other hand, concerning the total score of the preterm neonates' ability in early feeding skills likert scale. The present finding illustrated that more than three quarters of preterm neonates received prefeeding oral stimulation technique group had high ability, while two thirds of preterm neonates not received group had moderate ability. This finding could be due to the effect of prefeeding oral stimulation technique which enhanced the early feeding skills in preterm neonates received prefeeding oral stimulation technique group, while the moderate improvement in not received group may be due to increase in their age. The study was in agreement with many authers: **Lessen (2011)** who studied the effect of premature infant oral motor intervention on feeding progression and length of stay in preterm infants, and who found that the intervention enhance oral feeding skills and decrease hospital stay. **Danielle &Sheila (2017)** who conducted a study about oral feeding performance in premature infants stimulated by swallowing technical training and mentioned that intervention with swallowing training allowed good performance in oral feeding skills, as well as aiding the commencement of oral feeding and obtaining exclusive oral feeding in a short period of time. **Amer (2015)** who studied the effect of prefeeding oral stimulation program on preterm infant feeding performance, and reported that prefeeding oral stimulation program improve the feeding performance of inefficient feeders' preterm infants. **Lau et al., (2012)** who conducted a study about impact of nonnutritive oral motor stimulation and infant massage therapy on oral feeding skills of preterm infants, and clarified that nonnutritive oral motor stimulation and infant massage therapy accelerated the maturation of infants' oral feeding skills.

Regarding relation between total score of oral feeding readiness of preterm neonates received prefeeding oral stimulation technique group and their personal characteristics, there was statistical positive correlation between gestational age of received group with oral feeding readiness, ability to coordinate oral-motor functioning and total score of early feeding skills likert scale. From the researcher point of view this finding due to the increase of age leads to increase in feeding ability of preterm neonate. This finding was in agreement with **Raquel et al., (2017)** who conducted a study about relationship between oxygen saturation, gestational age, and level of oral feeding skills in preterm infants and who found that there was a significant correlation between gestational age and levels of oral feeding skills. In contrast of the study result **Amaizu et al., (2008)** who conducted a study about maturation of oral feeding skills in preterm infants, and reported that there was no significant correlation detected between preterm infants' total score of early feeding skills likert scale and their gestational age in the study group. There were no significant correlation between score of early feeding skills and gestational age and postnatal age among the control group. Also, **Amaizu et al., (2008)** who found that there was no statistical significant correlation between total score of early feeding likert scale of preterm infants in the control group and their socio-demographic characteristics.

IX. Conclusion
In the light of the current study, it can be concluded that, preterm neonate received prefeeding oral

stimulation technique had higher early feeding skills than preterm neonates not received group.

X. Recommendations

The researchers propose to encourage nurses to assess and record early feeding skills for preterm neonates in the neonatal intensive care units. Start oral stimulation technique for preterm neonates immediately after his admission to NICU before developing feeding difficulties. Encourage nurses to improve and update their knowledge and practice by organizing periodic training workshops for neonatal nurses about prefeeding oral stimulation technique.

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