

Effect of Using Feeding Protocol on Feeding Performance for Post-Operative Infant with Cleft Lip or Cleft Palate

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Abstract: Protocol of feeding is an important stage of infant development a careful and sensitive approach. Aim: The aim of the current study was determine the effect of using feeding protocol on feeding performance for post-operative infant with cleft lip or cleft palate. Subjects and method: A quasi experimental research design was utilized. The current study was conducted at Pediatric Surgical Unit of Tanta University Hospital and Pediatric Surgical Unit and Neonatal Intensive Care Unit at Specialized Hospital of Children at Benha which Affiliated to the Ministry of Health. The sample consisted of 60 children. The following tools were utilized for data collection, questionnaire sheet, feeding assessment sheet, Observation measurement of oral feeding by using Early Feeding Skills assessment schedule, infant with cleft lips and\ or palate oral feeding readiness assessment scale, infant breast feeding behavior scale, anthropometric measurement and feeding protocol design for the study group. Results: The study revealed that there were statistically significant differences between before feeding protocol and after regarding feeding skills. Conclusion: Using of feeding protocol create positive feeding experiences while assisting infants to achieve full oral feeding and attempt to prevent the development of oral aversive behaviors. This reduces the transition time from tube to oral feeding and improve rate of growth. Recommendations: Nursing education can support the mother with initiating and maintaining successful breastfeeding of infant and should receive continued support after discharge from the hospital.

Keywords: feeding protocol, cleft lip/ palate, feeding performance.

I. Introduction

Clefts lip and palate (CL/P) are group of disorders affecting the structure of the face and oral cavity, they are relatively common birth anomalies which complicate infant feeding and may do the breast feeding impossible **Lewis CW, et al (2017)**. At the point when a congenital fissure (CL) occur, the lip is not adjacent, and when a congenital fissure (CP) occur, there is correspondence between the oral and nasal cavities. Clefts can run in seriousness from a basic indent in the upper lip to a total opening in the lip reaching out into the floor of the nasal cavity and including the alveolus to the sharp foramen. So also, CP may include only the delicate sense of taste or broaden somewhat or totally through the hard and delicate palates (**Young G1998**).

Infant with CL/ CP frequently exposed to feeding difficulties that put the infant to the risk of malnutrition. The parents have negative experience toward these problems that associated with development of problematic behaviors in the child **McGuire, E, (2017)**. Feeding troubles in infant with congenital fissure are frequent and appear at infant birth due to debilitation of sucking and swallowing mechanism. The use of appropriate feeding methods for the different kind of cleft and time of the infant' life is of most extreme significance for their full advancement (**Amstalden, et al, 2007**).

The time of surgical repair is more basic in light of the association of many factors as facial development, dental impediment, and speech. That is vital concentrate on the medical and nursing issues for these infant and their families confront **Lewis C, et al (2017)**. Surgical repair of cleft lip and palate are performed at 3 months and around 12 months of age, separately, and in addition optional alveolar bone unite is done in the vicinity of 9 and 12 years old (**Rullo, R., et al, 2014**).

One in 700 infants is conceived with CL/P world over **Cleft palate Assossation (2017)**. The CDC assesses that roughly 7,088 infant are conceived every year with a cleft. Prevalence varies by ethnicity, nation and financial status **CDC, (2015)**. **Mulliken J (2003)** stated that through assessed number of newborn children with CL/P, roughly 50% have consolidated CL/P (CLP), though 30% have segregated CP, and 20% have confined CL; CL reaching out to incorporate the alveolus happens in around 5% of cases. Clefts are normally unilateral, however in roughly 10% of cases; clefts are two-sided (**Phua YS, de Chalain T, 2008**).

Trettene Ados S, et al, (2013), stated that the child was able to feed with less difficulty, as the oral structures were repaired immediate postoperative period, the conduct regarding feeding also varies, according to the protocols used by the different departments and according to the type of cleft post cleft-lip repair feeding techniques can vary considerably, usually immediate return to breastfeeding, bottle to suction abstinence for up to six weeks.

Nonnutritive sucking used during gavage feeding and in the transition from gavage feeding to breast feeding \ artificial feeding to Facilitate the development of sucking behaviors and improves digestion of enteral feeding (**Fazeh A, Fariba Y, Farin S, 2015**).

The role of nursing in the care of infant and or their families after repair of cleft lip or palate are includes family education and care assistance with infant feeding, learning to breastfeed may take a long time and will most likely to require some assisted techniques on lactation aids. The infant uses a lot of energy for breast feeding and he needs more kilojoules to keep growing well these extra kilojoules could be from expressed breast milk given by a special cup or feeder and a nipple shield or a combination of these (**Australian Breastfeeding Association, 2015**).

Successful and effective transition to oral feeding after surgical repair is vital for growth, comfort, bonding, and promoting normal oral motor development. Infants need lactation support and tips for repositioning the infant to promote normal feeding. Infants after surgical repair need individualized assessment and close follow-up to ensure growth is optimized (**Pediatric Cleft and Craniofacial Center, 2017**).

The infant should be held so that the CL is arranged toward the highest point of the breast, an infant with a [right] CL may feed all the more productively in a cross-support position at the correct breast and a "football/twin style" position at the left breast, the mother may block the CL with her thumb or finger or potentially support the baby's cheeks to diminish the width of the parted and increment conclusion around the nipple. For two-sided CL, a "face on" straddle position might be more viable than other breastfeeding positions (**Maserai A, Offer D, Habel A, 2007**). For infant with CP or CLP positioning should be semi-upright to lessen nasal disgorging and reflux of breast milk into the Eustachian tubes, a "football hold"/twin might be more powerful than a cross-support position (**Reid J, 2006**).

Mizuno K, (2001) mentioned that supporting the infant's chin to stabilize the jaw during sucking as well as supporting the breast to remains in the infant's mouth. **Mizuno, Ueda and Kani, (2002)** added that if the cleft is huge the breast descending to stop the areola being pushed into the cleft. Mothers may need to physically express the breast drain into the child's mouth to make up suction and pressure and to invigorate the let-down reflex.

Significance of the study:

The lack of studies in the field of feeding behaviors in infant after cleft lip and/or palate repair, and evaluations of the responses of parents to feeding behavior problems in these children, the researchers designed this protocol to determine effect of using feeding protocol on feeding performance for post-operative infants with cleft lip or cleft palate.

Aim of the study was to:

Determine the effect of using feeding protocol on feeding performance for post-operative infant with cleft lip or cleft palate

Research hypothesis:

Implementation protocol of feeding on feeding performance for post-operative infants with cleft lips or cleft palate will give positive effect on infant that reduce the transition time from the tube to oral feeding and improve rate of infants.

Operational definition:

Feeding protocol:

Oral feeding protocol intervention for the transition from gavages feeding to oral feeding had to vary from and be a change in practice from the traditional feeding method. The feeding protocol had to include criteria for the initiation of oral feeding and the systematic progression of oral feeding until all oral feeding was achieved.

An overview of the oral feeding practice guideline:

Non-oral stages:

- Pre-oral stimulation stage
- Non-nutritive sucking stage

Nutritive sucking stages:

Stage I: Minimal oral intake (<10% oral)

Stage II: Moderate oral intake (10 to <80% oral)

Stage III: Full oral intake (>/80% oral)

Feeding performance:

Feeding performance which evaluated on the basis of competence (defined by rate of milk intake, mL/min) and overall transference (percent ingested volume/total volume ordered).

II. Subject and Methods

Research design

Quasi- experimental research design was utilized

Settings: the study was conducted at

- Pediatric Surgical Unit of Tanta University Hospital.
- Pediatric Surgical Unit and Neonatal Intensive Care Unit at Specialized Hospital of Children at Banha which Affiliated to the Ministry of Health.

Subject

Sixty infants with cleft lips / or cleft palate. The sample was selected randomly

The infant enrolling in the study had the following criteria:

Age ranged from 3 to 12 months

Both sexes

Post-operative correction of cleft lips or palate

Free from other congenital malformation

Free from gastrointestinal and neurological problems

Tools of data collection

The data was collected by using the following tool:

-Five tools were used for this study, which were developed by the researchers:

Tool I: Interviewing schedule was cover two main parts:-

Part (1): Socio-demographic data for infants with cleft lips or cleft palate and feeding assessment such as; age /month, gender, birth orders and diagnosis.

Part (2): Feeding assessment: it included types of feeding of infant (breast or bottle feeding or complementary feeding or gavage feeding), amount of feeding / 24 hour, duration of feeding, position of infant during feeding and problems of feeding such as suffocation, regurgitation.

Part (3): Socio-demographic data of mothers such as; age in years, educational level, occupation, and their residence

Tool II: Observation measurement of oral feeding by using Early Feeding Skills assessment schedule:

Early feeding skills assessment schedule (EFS): observational measure of oral feeding skill that can be used from the time of initiation of oral feeding through maturation of oral feeding skill. The initial section, "Oral Feeding Readiness," is designed to assess whether the infant has sufficient energy for feeding. It included five skill domains; an optimal state, energy for feeding and has adequate baseline oxygen saturation, attention toward feeding and ability to hold body in a flexed position. "Oral Feeding Recovery," is used to evaluate the impact of the feeding on the infant's state of alertness, energy level, and physiologic system (**Brigit M, carter R, 2012**).

Tool III: infant with cleft lips and\ or palate oral feeding readiness assessment scale:

Infant oral feeding readiness assessment scale) POFRAS) is comprised of three main categories with items that consist of:

- 1) Oral posture (lips and tongue posture);
- 2) Oral reflexes (rooting, sucking, biting and gag reflexes)
- 3) Non-nutritive sucking (tongue movement, tongue cupping, jaw movement, sucking strain, sucking and pause, maintenance of sucking/pause, maintenance of alert state and stress signs).

Infant's performance in each item is assessed from zero to 2 (**Suzanne M, et al, 2005**).

Tool IV: Infant Breastfeeding Behaviors Scale (IBFBS).

The PIBBS can be used to describe the development of breast feeding behavior of infants (**Hed berg, 1999**). IBFBS has been specially developed (rooting, areolar grasp, latch, sucking, longest sucking burst and swallowing) are assessed with a score being attributed to each item⁽³⁾

Tool (V): Anthropometric measurement includes: weigh and length of infant with cleft lips or palate daily

Part (1): Estimation of daily weight percentile of infant from one day to one week

-Estimation of daily length percentile of with cleft lips or palate daily from one day to one week

Part (2): Measuring vital signs: It included assessment of temperature, pulse and respiration

Method

1-An official permission to conduct the study was obtained from the administrators responsible for Pediatric Surgical Unit at Tanta University Hospital and Pediatric Surgical Unit and Neonatal Intensive Care Unit at Specialized Hospital of Children at Benha which Affiliated to the Ministry of Health.

2-Tools were used in this study: Interview schedule was developed by the researchers based on maternal socio-demographic data (Tool I).

- Early feeding skills assessment: it was used as observational measure of oral feeding skill that can be used from the time of initiation of oral feeding through maturation of oral feeding skill (Tool II).

-Ethical considerations:

Infant privacy and confidentiality of their information obtained from the record and their mothers was considered. Nature of the study and their right to withdraw from the study at any time

-Pilot study: was carried out on 6 infants to test validity and reliability of the study tool. Accordingly, the required changes were done. The sample which was included in the pilot study was excluded from the study sample

The study was conducted through three phases:

a- Assessment Phase:

- Initial interview with infant mothers individually to obtain information included in the structure interview schedule and the time took 30 minutes

- Assessed infant general condition.

- Assessed infant feeding pattern.

- Assessed early feeding skills

- Assessed infant oral feeding readiness & feeding behavior.

b- Implementation Phase

Implementation of the feeding protocol for infants included was implemented on five months from November to March; which included:

- Assessed infant gain weight.

- Monitoring of infant vital sign.

- Measurement of anthropometric measurement such as weight, length and chest circumference

-Using measures to improve sucking by using developmental care, minimize negative stimulation and promoting nonnutritive sucking, physiological stability for the transition to full oral feeding

Overview of the oral feeding practice guideline,

Non-oral stages

Pre-oral Stimulation Stage

Non-nutritive Sucking Stage

Nutritive Sucking Stages

Stage I: Minimal oral intake (<10% oral)

Stage II: Moderate oral intake (10 to <80% oral) +3

Stage III: Full oral intake (>80% oral)

Feeding practice guideline:

Pre-oral Stimulation Stage aimed to minimize negative oral stimulation, Promote behavioral organization and Establish and maintain mother's milk supply by use developmental care interventions to facilitate midline position a flexion which promotes hand to mouth experience and behavioral organization, Skin-to-skin care (Kangaroo care), Positive experiences to the facial area as tolerated by infant. Discuss with parents realistic expectations for initiation and progression of feeding tube feeding only.

Role of Nonnutritive sucking:

Nonnutritive sucking (NNS) was found to decrease significantly the length of hospital stay of infant according to Cochrane met analysis 32.

Nutritive Sucking Stage I: Minimal Oral Intake (<10% oral intake within a 24 hour period) aimed to oral practice only, Quality and ambiance was more important than quantity taken and experience was positive for infant and caregiver. Infant was able to take small amounts of feeding orally in a controlled setting by Intervene to prevent distress through Minimize distracting stimuli. Aid infant to awake state and Skin-to-skin care (Kangaroo care), Feedings should not be pushed, External pacing– to aid or prevent disorganized and Breastfeeding: Nuzzle at breast: encourages infant to root, smell, touch, taste, or latch.

Nutritive Sucking Stage II: Moderate Oral Intake (10% to <80% oral feedings in a 24 hour period) aimed to assess the transition to full oral feeding by supporting endurance, skills and physiologic stability and Quality and ambiance was still more important than quantity taken by infant to awake state. NNS may help with state control and SSB coordination, Feedings should not be pushed. When a breastfeeding infant becomes more consistent with positive breast feeding experiences, consider test weighing as this was the only accurate way to determine intake .Watch for distress/ disengagement cues closely and assessed infant's readiness to continue feeding, if infant demonstrates disengagement cues, remainder of feeding should be tube fed. Watch O2 and External and self- pacing may still be indicated, particularly in the first few sucks of a feeding, and necessary for mothers with strong milk ejection

Nutritive Sucking Stage III: Full Oral Feeding ($\geq 80\%$ oral feedings in a 24 hour period) aimed to Full oral feeding that supports growth Feeding and experience is positive to infant and caregiver through Continue side lying and external pacing as required .If infant demonstrated disengagement cues, delay feeding until infant cues again , Encourage breastfeeding mothers to spend long blocks of time in nursery to facilitate feeding for 48 hours before discharge , and Before discharge, the infant should be transitioned to the nipple and feeding regime that parents are planning to use at home. Setting the stage for optimal feeding performance including: provide an appropriate setting for the observation, select an optimal feeding, assess the baseline condition of the infant and provide developmental feeding support was done immediately after implementation of feeding protocol.

Evaluation phase: The infant feeding practice were evaluated after feeding protocol and evaluate the transition from tube feeding to breast /artificial feeding.

Statistical Analysis:

Statistical presentation and analysis of the present study was conducted, using the mean, standard chi-square. Threshold of significance is fixed at 5% level (P-value). Significant when the probability of is less than 5% ($P < 0.05$).

-Non-significant, when the probably of error is more than 5% ($P > 0.05$).

The smaller the P-value obtained, the more significant are the result.

III. Result

Table (1): showed that the distribution of infant according to socio-demographic characteristics and feeding assessment. It was observed that 48.3% of infants ranged from 3-6 <month while 33.3% ranged from 6-<9 .more half of them 68.3% were males while 31.7% were females. It was noticed that 48.3% first birth order and 28.3% were the second birth order regarding diagnosis it was observed that 61.7% had cleft lips while 38.3% had cleft palate. According to feeding assessment, it was observed that all of the infant receiving gavages feeding. As regards amount of feeding / hours that 58.3% % of them receiving 10-<15 cc while 25% of them receiving 15- <20 cc/hrs. According to feeding type 51.3% of them took breast and 8.3% of them took artificial milk.

Table (2): showed that the Percent distribution of mothers according to socio-demographic characteristic, it was found that 38.4 % of them were aged >30, while 33.3% of them were aged <20y year. Regarding to educational level of the mothers that 46.7% of them were illiterate, while 8.3% was highly educated. According to mothers' occupation, it was found that the majority of them (90%) were house wife, while 10% of them were manual worker. It was noticed that 78.3% of the mothers from the rural area while 21.7% of them from the urban area.

Table (3) : showed that the percent distribution of infant according to oral feeding readiness which assessed for their readiness to begin oral feeding through their ability to hold body in a flexed position, awake state ,demonstrating ability for feeding , attention is directed toward feeding and baseline oxygen saturation >95% was to all of the sample were represent 100% respectively.

Table (4) showed that oral posture which subdivide into two parts lip posture and tongue posture in which lip posture before non-nutritive sucking present 61.7% were half- open of total number, while 28.3% were closed and only 10 % of them open, while after nonnutritive sucking it was observed that the majority of them (93.2%) closed, were 3.4% were open and 5% were half open. Regarding to tongue posture 61.7% was elevated during feeding and 38.3% were flat during feeding. After Non- nutritive sucking present 85.0% tongue posture elevated and 15.0% flats. As this table also shows oral reflexes which subdivide into four parts rooting reflex, sucking reflex, biting reflux and gag reflex in which rooting reflex before Non-nutritive sucking represent 53.3% were rooting, while 31.7% were weak and only 15.0 % of them only absent.

Regarding to sucking reflex before NNS 83.3% were weak sucking and 16.7% were present. After Non-nutritive sucking 90.0% sucking reflex was present and 10% were weak. According to biting reflex before Non-nutritive sucking 55% of them were weak, while 43.3% were present and 1.7% were absent, After NNS it was observed that the majority (83.3%) present were 5% weak and only 1.7% absent. Finally gag reflex part which present 90% present and only 10% had weak gag reflex .while after Non-nutritive gag reflex 96.6% were present and 3.4% were weak.

Table (5): showed that the percent distribution of infants according to Non –Nutritive sucking, tongue movement before Non –nutritive sucking 83.0% had adequate movement of total number, while 17.0% were altered during Non –nutritive sucking, After Non –nutritive sucking the majority of them 93.0% were adequate, and only 7.0% were altered sig <0.001. Regarding tongue cupping during Non –nutritive sucking 93.3% were present, and, 6.7% were absent. While After Non –nutritive sucking 96.7% were present, and 3.4% was absent. While Jaw movement before Non –nutritive sucking 83.3% were adequate and 16.7% were altered. While after Non –nutritive sucking had 96.7% were adequate, and 3.4% were altered. According to sucking strain before Non –nutritive sucking strain present 48.3% were weak, while 3.3% were present, and only 1.7% were absent to sucking strain. While after NNS sucking strain present 86.4%, were 11.9% had weak, with 1.7% only absent.

Effect of Using Feeding protocol on Feeding Performance for Post-Operative Infant with Cleft Lip or

Sucking and pause before Non –nutritive sucking present 68.3% were <5, while 30% ranged between 5-8, and 1.7% >8. After Non –nutritive sucking 58.2% were present >8, while 35% had ranged between 5-8, and were 6.7% had <5. Maintenance of rhythm reveals that 86.7% were arrhythmic of suck, while 11.7% were rhythmic and only 1.7% was absent. After Non –nutritive sucking 80% were rhythmic, while 15.0% arrhythmic and 5.0% absent. Maintenance of alert state before Non –nutritive sucking were 88.3% maintained alert state, while 11.7% not able to maintained alert state. After Non –nutritive sucking 96.7% were yes able to maintain alertness during non –nutritive sucking and 3.4% were no.

Table (6): Pointed to the distribution of infants according their ability to maintain physiologic stability. While assessing six point's which present 100% of them never occurred respectively; heart rate rises 15 b/m above infant base line, uses accessory breathing muscle, color change during feeding and Nasal Flaring .only 3.4% was presented with heart rate drop below 100 beats per minutes and only 1.7% for oxygen saturation drop below 90%.

Table (7): illustrated that the ability of them to maintain awake state after feeding which assessed for 4min were 12.0% able to maintain awake state in 1st minute, 43.0% were in 2nd minute while 30.0% in 3rd minute and only 15.0% in 4th minute.

Table (8): showed that the Percent distribution of infants according to infant breast feeding behaviors scale ; obvious rooting behavioral represent 92% of them, while 8% were showed some rooting behavioral. All of them were have ability to started feeding with breast feeding inside the baby mouth and some of areola. Regarding to latch on 68% of them latch on for 6-10minute while 32% latch on for <5minute. According to longest sucking bursts 78% were 6-10 consecutive sucking, while 20% 11: 15 consecutive sucks and only 2% of them 16:20 consecutive sucks. Swallowing was not notice in 80.0% of them, while 12% was occasional swallowing notice were.

Table (9): showed that the anthropometric measurement it was observed that weight of the infants were increased from the first day reaching to the 7th day after post-operative of the study . As regard to the length and chest circumference it was observed that no statistical difference between 1 to 7 day of the study post-operative from the first day to 7 day. Table (10): As regard the vital signs, the present study revealed that most of them (93.0% & 90.0% respectively) have normal temperature and respiration before feeding while after feeding 97.3% was normal temperature and respiration respectively, as regard heart rate more than half (67.0%) have pulse rate between 110-<120b/m before feeding while half (50%) have 120b/m after feeding process.

Table (1): Percentage Distribution of Infants according to Socio-Demographic Characteristics and Feeding Assessment.

Socio-demographic characteristics	(n=60) No	%
Age (months)		
3-<6	29	48.3
6-<9	20	33.3
9-<12	11	18.4
Gender		
Male	41	68.3
Female	19	31.7
Diagnosis		
Cleft lips	37	61.7
Cleft palate	23	38.3
Birth orders		
First	29	48.3
Second	17	28.3
Third and more	14	23.4
Types of feeding		
Gavage feeding	60	100.0
Breast feeding	0	0.0
Artificial feeding	0	0.0
Complementary	0	0.0
Feeding position		
Sitting position	8	13.3
Lying position	10	16.7
Side lying with Holding on lip	42	70.0
Feeding amount		
<10 cc	10	16.7
10-<15 cc	35	58.3
15- <20 cc	15	25.0
>20cc		
Time of feeding		
<10 minutes	16	26.7
10-<15 Min	36	60.0
15-<20 Min	8	13.3
> 20 Min		

Table (2) Percentage Distribution of Mothers according to Socio-Demographic Characteristic.

Socio-demographic characteristics of the mothers	(n=60) No	%
Mother age		
<20y	20	33.3
20-24	8	13.3
25-29	9	15.0
>30	23	38.4
Education		
Illiterate	28	46.7
Preparatory	20	33.3
Secondary	7	11.7
University	5	8.3
Occupation		
House wife	54	90.0
Worker	6	10.0
Residence		
Rural	47	78.3
Urban	13	21.7

Table (3) Percentage Distribution of Infants according to Early Feeding Skill Assessment.

Oral Feeding Readiness	(n=60) No	%
Able to hold body in a flexed position	60	100
Awake state	60	100
Demonstrate energy for feeding	60	100
Attention is directed toward feeding	60	100
Baseline oxygen saturation>95%	60	100

Table (4) Percentage Distribution of Infants according to Oral Posture and Reflexes.

Oral posture	Before (n=60)		After (n=60)		X2	P
	No	%	No	%		
Lip Posture						
Open(0)	6	10	2	3.4	6.266	>0.001
Half-open(1)	37	61.7	3	5		
Closed(2)	17	28.3	55	93.2		
Tongue Posture:						
Elevated(0)	37	61.7	51	85.0	1.32	>0.005
Flat(2)	23	38.3	9	15.0		
Rooting reflexes						
Absent(0)	9	15.0	6	10.0	30.46	>0.001
Weak(1)	32	53.3	19	31.7		
Present(2)	19	31.7	35	85.3		
Sucking Reflux						
Absent (0)	0	0.0	0.0	0.0	30.63	>0.001
Weak (1)	50	83.3	6	10.0		
Present(2)	10	16.3	54	90.0		
Biting Reflux						
Absent(0)	7	1.7	7	1.7	24.83	>0.001
Weak(1)	27	45.0	5	5.0		
present(2)	26	43.3	50	83.3		
Gag Reflux						
Weak (1)	6	10.0	2	3.4	7.55	>0.005
Present(2)	54	90.0	58	96.6		

Table (5): Percentage Distribution of Infants according to Non – Nutritive Sucking before and after feeding post-operative

Non nutritive sucking	Before(n=60)		After (n=60)		X2	P
	No	%	No	%		
Tongue Movement						
Altered(1)	10	17.0	4	7.0	1.203	>0.005
Adequate(2)	50	83.0	56	93.0		
Tongue cupping during feeding						
Absent(0)	4	6.7	2	3.4	.500	>0.005
Present(2)	56	93.3	58	96.7		
Jaw Movement						
Altered(1)	10	16.7	2	3.4	9.60	>0.001
Adequate(2)	50	83.3	58	96.7		
Sucking Strain						
Absent(0)	25	41.7	6	10.0	46.48	>0.001
Weak(1)	23	38.3	23	38.3		
Strain(2)	12	19.0	31	51.7		

Effect of Using Feeding protocol on Feeding Performance for Post-Operative Infant with Cleft Lip or

Sucking and Pause						
<5(0)	41	68.3	4	6.7		
>8 (1)	18	30.0	21	35.0	20.11	>0.001
5to8 (2)	1	1.7	35	58.3		
Maintenance of Rhythm of sucking						
Absent(0)	1	1.7	3	5.0		
Arrhythmic (1)	52	86.7	9	15.0	60.00	>0.001
Rhythmic(2)	7	11.6	48	80.0		
Maintenance of alert state						
No	7	11.7	2	3.4		
Yes	53	88.3	58	96.7	32.17	>0.001

Table (6) Percentage Distribution of Infants according to Ability to Maintain Physiologic Stability.

Ability to Maintain Physiologic Stability	Never		Occasional	
	No	%	No	%
O2 saturation drop below90%	59	98.3	1	1.7
Heart rate drop below100 beats per minutes	58	96.6	2	3.4
Heart rate rises 15 b/m above infant base line	60	100	0	0
Uses accessory breathing muscle	60	100	0	0
Color change during feeding	60	100	0	0
Nasal Flaring	60	100	0	0

Table (7) Percentage Distribution of Infants according to Oral Feeding Tolerance.

able to maintain awake state	No	%
1min	7	12.0
2min	26	43.0
3min	18	30.0
4min	9	15.0

Table (8) Percentage Distribution of Infants according to Infant Breast Feeding Behaviors Scale.

	No	%
Rooting		
Did not root(0)	0	0.0
Showed some rooting behavior(1)	5	8.0
Showed obvious rooting behavior(2)	55	92.0
Areola grasp (how much of breast inside the baby mouth)		
None, the mouth only touched the nipple(0)	0	0.0
Part of the nipple(1)	0	0.0
The whole nipple, not the areola(2)	0	0.0
The nipple and some of the areola	60	100.0
Latched on		
Latched on and fixed(0)	0	0.0
Latched on for <5minutes(1)	19	32.0
Latched on for 6-to10minutes(2)	41	68.0
Latched on for >11-15minutes	0	0.0
Sucking		
No sucking or licking(0)	0	0
Licking and tasting but not sucking(1)	0	0
Single suck, occasional short sucking bursts (2-9suck)(2)	35	58
Repeated sucking bursts, occasional long bursts (>10sucks)(3)	25	42
Longest Sucking burst		
5-consecutive sucks(1)	0	0.0
6-10 consecutive sucks(2)	47	78.0
11-15 consecutive sucks(3)	12	20.0
16-20 consecutive sucks(4)	1	2.0
21-25-consecutive sucks(5)	0	0.0
Swallowing		
Swallowing was not notice(0)	48	80.0
Occasional swallowing was notice(1)	7	12.0
Repeated swallowing was notice(2)	5	8.0

Table (9) Percentage Distribution of Infants according to Anthropometric Measurement

Anthropometric measurement	Day1		Day2		Day3		Day4		Day5		Day6		Day7	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Weight														
< 6 Kg	29	48.3	29	48.3	27	45.0	27	45.0	27	45.0	25	41.6	25	41.6
6-<8 Kg	20	33.3	20	33.3	22	36.6	22	36.6	22	36.6	24	40.0	24	40.0
8->10Kg	11	18.4	11	18.4	11	18.4	11	18.4	11	18.4	11	18.4	11	18.4
Length														
50->55cm	29	48.3	29	48.3	29	48.3	29	48.3	29	48.3	29	48.3	29	48.3
55-< 60 cm	31	51.7	31	51.7	31	51.7	31	51.7	31	51.7	31	51.7	31	51.7
Chest Circumference														
35->40 cm	49	81.6	49	81.6	49	81.6	49	81.6	49	81.6	49	81.6	49	81.6
40-<45 cm	11	18.4	11	18.4	11	18.4	11	18.4	11	18.4	11	18.4	11	18.4

Table (10) Percentage Distribution of Infants according to Measurement of Vital Signs before and after Feeding.

Vital Sign	Before feeding (n=60)		After feeding (n=60)	
	No	%	No	%
Temperature				
Normal	56	93.0	58	97.0
Subnormal	4	7.0	2	3.0
Respiration				
Normal	54	90.0	58	97.0
Subnormal	6	10.0	2	3.0
Heart rate				
110-<120b/m	40	67.0	25	42.0
120-1b/m	15	25.0	30	50.0
>150b/m	5	8.0	5	8.0

IV. Discussion

Protocol of feeding is an important stage of infant development a careful and sensitive approach is required in order to progress the infant feeding skills post-operative with cleft lips or cleft palate alongside their neurological development to avoid potential aversive feeding behavior in the future and support breast feeding skills (Maastrup, et al, 2014).

As regards nonnutritive sucking of the infant feeding, the present study revealed that after using nonnutritive sucking, the majority of them maintain alertness state, this can be explained that the effect of nonnutritive sucking that help in control and make coordination of sucking, swallowing, and breathing. This finding is agreement with Andrews, (2003) who reported that nonnutritive sucking results in lower activity levels that conserve energy there promoting weight gain , increasing the duration of inactive alert and causing faster return to quiet sleep (Augsornwan D, et al; 2013).

The finding of the present study revealed that after feeding protocol and using Non –nutritive sucking the majority of them had adequate tongue and jaw movement in addition to tongue cupping during feeding. This finding is agreement with Wagner, (2002) who mentioned that successful coordination of feeding is also dependent on the adequate development of structures of the upper airway including the lips, palate, jaw, tongue, and pharynx.

The functional developed of sucking is dependent on the presence of adaptive and protective reflex this correct post operative operation the present study revealed that rooting , sucking and gag reflex are present with majority of the studied infants after using non nutritive sucking (Gewolb, 2001).

Regarding Early Feeding Skills Assessment for assessing infant readiness and tolerance of feeding of studied infants, the present study showed that all of them (100%) represent oral feeding readiness through ability to hold body in a flexed position , maintaining an awake state, demonstrate energy for feeding with sufficient attention and baseline oxygen saturation . This finding is agreement with Suzanne, (2010) who mentioned that the infant 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. Arvedson et al ;(2010) stated that Physiologic stability related by sufficient oxygen saturation of hemoglobin and supports these behaviors post operative infant with cleft lips or palate

Regarding to early feeding skill assessment of studied infants , as regards the ability to organize oral-motor functioning of studied infants with post operative cleft lips or palate , the present study illustrated that the infants during feeding the tongue descend to get areola at sustaining onset, ability to start sucking in an arranged and smooth rhythm immediately after catching the nipple, sucking pressure, ability to engage in long suck breath , This finding concurrence with Catherine, (2010) who mentioned that oral-motor organization reflects the development of the oral-motor structures for feeding. An infant who has achieved sufficient oral-motor development for oral feeding will seek the nipple when his lips are stroked, position his tongue to accept the nipple into his mouth, and accomplish a

nutritive sucking rhythm (McG, 2009). The infants achieve oral motor function when develop their abilities to remain engaged in feeding, organize oral-motor functioning, coordinate swallowing with breathing, and maintain physiologic stability Gewol et al, (2001) Beaumont,(2008).

Physiologic organization and breathing balance reflect the infant's ability to maintain physiologic stability without excessive work of breathing. The researches assess the infant's color, oxygen saturation, heart rate, respiratory rate, and exertion of breathing prior and then after the feeding and contrast those with the infant's base line. The finding of the present study demonstrated that the majority of infant had the ability to maintain physiological stability most of the feeding, this may be due increase development of thermoregulation, heart, respiratory & circulatory system additionally coordination of sucking- swallowing and breathing (McG, 2009).

Human milk is the best type of milk feeding for infants and provides them with several non-nutritive advantages. Breast milk contains immune properties, and factors which promote gut maturation, resistant properties, Sheena, (2013). Breastfeeding can start initially after CL repair and may be slightly more advantageous than spoon feeding. Breastfeeding can initiate 1 day after CP repair without complication to the surgical site. In a study of CP regarding postoperative care after palatoplasty, pediatric surgeons allowed mothers to breastfeed immediately after surgery (Gopinath V. Muda 2005). Breastfed infant had significantly greater weight gain and shorter length of hospital stay. Children fed with a spoon were more irritable, required more analgesic drugs and had higher hospital costs(Ize-Iyamu, Saheeb, 2011) There was a relationship between the amount of oral pressure generated during feeding and the size/type of cleft and development of the infant with CL are more likely to breastfeed than those with CP and CLP. Some infants with small clefts of the soft palate generate suction, but others with larger clefts may not generate suction (Maserai 2007, Mizuno 2002).

The current study showed that majority of studied infants showed obvious rooting behavior prior to feeding , All of them had ability to grasp areola including the nipple and some of the areola during feeding , this can explained as increased the ability to coordinate suck- swallow – breathing pattern . This finding is agreement with Hedberg (1996) who demonstrated that infants were early initiated of breast observe the first contact at the breast for 36 infants bursts of less than or equal to ten sucks and maximum burst of greater or equal to 30 sucks was observed (Silva EB, et al; 2009)

V. Conclusion

Utilizing of feeding protocol and non-nutritive sucking provide rules for mothers and post-operative infants with cleft lips or palates for the initiation and management of oral feeding and create positive feeding experiences while assisting infants to achieve full oral feeding and attempt to prevent the development of oral aversive behaviors. This reduces the transition time from tube to oral feeding and improve rate of growth

VI. Recommendation

1- Non-nutritive sucking can be performed at either the breast or via a pacifier. NNS during gavage feeding improves digestion of enteral feedings and facilitates the development of sucking behavior and enhances the transition from gavage to breast/bottle-feeding of post-operative infants with cleft lips or palates.

2-Nursing education can support the mothers with initiating and maintaining successful breastfeeding of infant and should receive continued support after discharge from the hospital.

Recommendations for future research:

Healthcare professionals working with mothers who wish to breastfeed their infants with CL/Palates is the absence of confirmation on which to base clinical decision. Very much planned, information driven examinations that report sustaining achievement rates, administration methodologies, and outcomes for infants with CL/P are imperative. Furthermore, the researchers must generalize their result by clearly describe their sample and feeding protocol techniques.

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