

The Effect of Nursing Intervention on Eliminating Feeding Problems induced by Deficit Oral-Motor function among Children with Severe Head Injury

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Abstract: Addressing feeding problems induced by deficit oral motor activities is important for preventing or eliminating nutritional concerns among children with severe head injury. The aim of this study was to investigate the effect of nursing intervention on Eliminating Feeding Problems induced by oral-motor deficit among traumatic head injury of children. An experimental design (pre- post intervention) was used in a sample of 60 children admitted to Emergency hospital and Mansoura International hospital with severe head injury that were randomly selected. Interview questionnaire sheet including Pediatric feeding evaluation checklist (pre- post format) was used to collect the data. A serial of nursing intervention including modification of the manner of feeding, positioning and posture change for safe swallowing, oral-motor exercises and controlling of drooling were done by the researcher to correct the most evident feeding problems in spoon feeding, biting, chewing, swallowing and drooling induced by deficit oral-motor function. With the exception of biting skill ($t= 1.07, p 0.2$) a significant improvement are founded in the feeding domains of spoon feeding, chewing, cup drinking and drooling in the intervention group ($t= 3.66, 3.52, 1.34, 3.43$ and $p .001, .001, 0.18, .001$, respectively). It is concluded that nursing intervention for severe head injury children using a behavior modification program combining education and exercises has been shown to eliminate feeding problems and enhance oral-motor functions.

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Key words: Feeding problems, Oral motor deficit, Children, Severe head injury.

1. Introduction

Traumatic head injury is a major cause of disability, death and economic cost to our society. Children with severe head injury are often at high risk for several problems (Mckinlay *et al.*, 2010). About (100.000 to 200.000) pediatric head injuries occur per year in United States, males are more affected than females (DeMatteo, 2008). In a head injury the brain may hit the inside of the skull, this force can occur as a result of a car accident or a fall, a blow to the head can also cause it (Morgan *et al.*, 2001). The impact of head injury is presenting a variety of possible cognitive, communication, physical and behavioral changes (Blisset & Harris, 2007). In Egypt the pediatric population suffering from significant disability as a result of head trauma is about 2-3% of the population (WHO, 2003). Children with head injury appear to have similar physiologic disorders of feeding and swallowing problems.

Most children with severe head injury will have feeding difficulties in the early stages of recovery, this feeding difficulties result from an oral motor deficit that affect the musculature of the mouth including the lips, tongue, and jaw. Weakness of these muscles has a greatest impact on the ability to manipulate food in the mouth, including chewing and swallowing (Sliverman, 2010). Oral-motor problems

in children are easy to recognize when the child coughs and chokes while eating. The major factor of this problem is in the pathogenesis of under nutrition that usually correlates with the severity of motor impairment (Cecilia *et al.*, 2005). However, the majority of feeding problems present initially in more subtle ways, such as difficulty introducing spoon feedings or advancing texture, or limited variety of foods associated with absent or limited sensation. Children may present with inadequate lip closure, drooling and persistent tongue thrust, resulting in food loss through spillage (Morgan *et al.*, 2004).

Traumatic brain injury increases the metabolic response of body, therefore nutritional support due to hyper metabolism and increased protein catabolism are essential (Marchand & Motil, 2006). Issues of nutrition and hydration are particularly significant for the pediatric population. Adequate nutrition is extremely important for children to ensure sufficient growth and development of all body systems. Consequently, the presence of dysphagia in the pediatric population may have a negative impact upon physical and intellectual development (Arvedson & Brodsky, 2002). As the growth and maturation of oral-motor skills and swallowing parallel general neurological maturation, any disruption of neurological functioning, can occur subsequent to

traumatic brain injury and may compromise oral-motor or feeding development in a child (Arvedson, 2008)

According to the recommendations of the American Academy of Pediatrics, screening for nutrition risks and problems is an expected part of routine preventive health services (Rockvile, 2010). Comprehensive assessment of children with dysphasia and feeding disorders involves considerations of the broad environment, parent-child interactions, parental concerns and health status of the child. All of those factors must be taken into account by professionals in order to make optimal management decisions for every child to ensure that nutrition and hydration needs are met for adequate growth. Nurse must have adequate knowledge and skills about associated health conditions and specific feeding/swallowing issues (Ratanalert *et al.*, 2007). Safety is a major concern because the child may be at risk of choking or aspiration. An oral – motor assessment looking at the skill of the jaw, lips, tongue, and coordination of these muscles is very important to manage food (Carnby *et al.*, 2006). A specific intervention will vary according to the needs of the child, so that interdisciplinary management can enhance the lives of children.(Greer *et al.*, 2008). The aim of this study was to investigate the effect of nursing intervention on eliminating feeding problems induced by oral-motor deficit among severe head injury in children.

Research hypotheses

Children with severe head injury in the intervention group will have improvement in their feeding problems induced by oral-motor deficit function post nursing intervention than in the control group who receive routine hospital care.

2. Subjects and Methods:

Design

An experimental design (pre- post intervention) was used in this study.

Setting

The study was conducted in Emergency Hospital and Mansoura International Hospital, Neurosurgery department in Mansoura city, Al-Dakahleia governorate, Egypt . The first setting receive all types of emergency accidents throughout the week except two days of the week for the second setting. Permission to carry out the study was obtained from the director of the mentioned settings after explaining the purpose and significance of the study.

Subjects:

A sample of 60 children admitted with severe head injury was included in the study and were

randomly divided into intervention group and control group after taking a consent from their mothers to participate in the study. The intervention group receives the specific intervention while the control group receives the routine hospital care. All the participants selected through the following criteria: - All children presented with severe Traumatic Brain Injury (TBI) their Glasgow Coma Scale [GCS] (4–8) as diagnosed by a neurosurgeon on admission. Permission for subject inclusion was obtained from the supervising medical consultant and the child's parent(s)/guardian. Discharged from Intensive Care Unit (ICU) to ward level as their clinical condition were stable. Presence or deficit gag and swallowing reflex. Physician order to begin oral feeding. And their CT scan shows improvement with follow up with no complications or deterioration clinically.

Exclusion Criteria:

Children had a history of significant premorbid neurological, developmental, sensory, or structural deficits, or a significant history of nonspecific feeding /swallowing disorder. Children admitted with facial trauma or mandible fractures. and children with fractured cervical spine.

Tool of data collection:

Interview questionnaire sheet was used to collect data that contain two parts:

Part I:

Socio demographic characteristics of the child that was designed by the researcher include information about age, sex, causes of head injury, score of GCS on admission. Socio- demographic characteristics of the mothers such as education, occupation and residence.

Part II:

Pediatric Feeding Evaluation Checklist (pre-post format): Adopted from Abou-El saad & Abdelatif (2008) that was modified by the researcher to assess children neuromuscular response during eating in relation to spoon feeding, biting, chewing; cup drinking and drooling . The neuromuscular response ranging from adequate (good muscle control during eating and drinking with absent food and fluid loss),to poor(week muscle with inadequate neuromuscular response during feeding and drinking) and absent (unable to open, hold food or fluid with presence loss of food and fluids) . Regarding degree of drooling, it ranges from no drooling to mild drooling (to lips only), moderate drooling (lip and chin) and severe drooling (clothing soiled).Each neuromuscular response tack a score of 2, 1, 0 respectively, while drooling score were 3,2,1,0 respectively. The tool was tested for content validity by five specialists in pediatric nursing and neurosurgery and the reliability was assured using Cronbach's coefficient alpha 0.83

Procedure

Informed consent was obtained from each mother\ guardian for participation in the study after explaining the aim of the study assure confidentiality of data and their right's to accept or refuse participation in the study.

Acceptance was obtained from ethical committee from Faculty of Nursing at Mansoura University to carry out the research.

Each child with his or her mother were interviewed individually after discharging from ICU to neurosurgical ward to start oral feeding, the child oral motor feeding capabilities was assessed using pediatric feeding evaluation checklist to assess spoon feeding ability, neuromuscular eating response (biting, chewing), neuromuscular cup drinking response and drooling degree .

Each child in the intervention group was enrolled in a serial of intervention to correct the most evident breakdown of his\her feeding problems. This intervention conducted by the researcher 5 days weekly, each session consumed 30 minutes that provided regularly for a month. The mother\ guardian was included in the intervention sessions to do it for their child through the rest days of the week, that include:

- 1- Modification of the manner of feeding through: Scheduling of meal time at constant time; Pacing during meal times for regulating the time interval between bites and swallow; Nature of food: concerning volume, starting with small amount and increased gradually. And regarding consistency: pureeing of solid foods, such as vegetables, Yogurt, bananas and biscuits can also used; Adaptive feeding utensils: varieties of specially adapted utensils were used according to the skills needed; And environmental modification (verbal, tactile) by reducing or increasing visual and auditory stimulation such as using colored articles, loud voice or calm environment
- 2- Positioning and posture changes for safe swallowing using either; adapted chairs, the optimal body position used was an upright 90-degree sitting position with hips, knee and ankles flexed at a 90-degree angle and feet flat on a surface. The chin was slightly flexed with arms and hands near midline of the body. Or sitting the child on the mother lap, a mother usually feeds a child who is very young by making him sit on her lap and place her arm around his neck so that his head is kept straight and facing forward.
- 3- Oral- motor exercises: a type of exercise done by the researcher after reviewing the related literature and assessment of jaw stability,

movement, tone and movement of the lips, cheeks and tongue to facilitate chewing, biting and swallowing(Bowen, 2005 and Cecilia *et al.*, 2005) sensorimotor exercise session lasted 7-10 min/day that include: Massaging of the cheeks and lips gently in a circular movement using middle and index fingers to enhance relaxation of the facial musculature; Tapping and quick stretch of the jaw by gentle pushing his chin upward to improve the function and increase the tone; Tongue stimulation by making pressure on the middle of the tongue or lateral sides of tongue can facilitate intrinsic and extrinsic lingual muscles; And stroke the child throat gently with the fingers and keeping head bent slightly forward to help him swallow.

- 4- Controlling of drooling through : Optimizing head control and body posture by keeping child's head either upright or slightly tilted back; Enhancing lip closure by keeping teeth and jaw's in good position; Facilitating active swallowing by stroke child's throat; Improve tongue control through pressure .And increase self awareness of drooling.
 - The control group receive routine hospital care in the form of given prescribed medication, follow-up, and feeding child either parenteral or enteral feeding.
 - Children (both in intervention and control group) were reassessed after intervention for feeding domain using the same pre intervention format. Data were collected through one year starting from January 2010 to February 2011.

Limitations of the study:

The limitation of this study was that the subject's pre intervention not has the same responses regarding deficit neuromuscular feeding behavior. The control group were had poor neuromuscular behavior than the intervention group in spite of both groups were selected randomly.

Statistical Analysis:

Data entry and analyses were performed using SPSS statistical package version 10 (SPSS, Inc., Chicago, IL, USA). Quantitative variables were presented as mean and standard deviation. Student t-test and One-Way ANOVA procedure were conducted to assess the effects of socio-demographic criteria on feeding parameters for the intervention and control group at pre and post intervention assessments. The chi-square (χ^2) was used to compare the intervention and control groups regarding the condition of each feeding parameter in

pre and post intervention. The P value of < 0.05 and < 0.001 indicate significant and highly significant results respectively at confidence interval 95%.

3. Results

Table (1) shows that the ages of children included in the study were between 2 years and 11 years with mean age 6.33 ± 2.38 in the intervention group and 6.23 ± 2.90 in the control group and more than half of them (53.3% in the intervention group and 60% in the control group) are female. While their GCS were 3-8 in the intervention group and 3-8 in control group. The majority of them (83.3% in the intervention, 86.6% in the control group) not have Ryle feeding and more than half (53.3%) their cause of injury was road traffic accident and the minority (16.7%, 3.3%) being struck by object. Regarding mother education (46.7%) in the intervention and (56.7%) in the control group were moderately educated, while (66.7%) of mothers in the intervention group were employed and the same percentage were not employed in the control group. 65.7% of mothers in the intervention group were from urban areas and half of mothers in the control group were from urban and other half from rural areas.

Table(2) shows comparisons between intervention and control groups regarding mean difference of improvement in feeding domains post nursing intervention, it is clear that the mean score of spoon feeding ability, chewing, cup drinking, drooling in the intervention group were 4.70 ± 1.49 , 4.30 ± 1.12 , 5.83 ± 1.78 , 1.73 ± 0.52 respectively, while the mean score in the control group were 3.43 ± 1.17 , 2.57 ± 1.04 , 3.23 ± 1.22 respectively and the total mean score are 19.47 ± 4.75 in the intervention group and 15.03 ± 5.25 in the control group with a significant statistical improvement in intervention group ($t=3.66$, 3.52 , 1.34 , 3.43 and $p .001$, $.001$, 0.18 , 0.01). Except in biting domain there is no statistical significant improvement ($t=1.07$, $p 0.2$).

Table (3) Shows subjects demographic criteria and its relation to improvement in feeding domains. It is obvious that the improvement among male children in the intervention group regarding biting, cup drinking and drooling is significantly high ($t=2.47$, 3.45 , 3.1 and $p 0.02$, 0.002 , 0.004 respectively) than female children. Concerning subject's residence the only statistical improvement are founded in the cup drinking domain among urban subject's in the intervention group ($t= 2.19$, $p 0.03$). Also the high educated mothers associated with statistical significant improvement regarding their children spoon feeding abilities, chewing and drooling in the intervention group (ANOVA 3.1 , 3.4 , 2.3 and $p 0.02$, 0.04 , 0.01) compared to the control group. Except that there is no significant variation with

Sociodemographic criteria of the subject's as well as their mean difference of improvement in feeding domains.

Figure (1) show that the improvement in spoon feeding ability regarding upper/ lower lip movement and food loss after nursing intervention are significantly higher in intervention group compared to control group post nursing intervention ($X^2 27.1$, 21.6 , 26.04 and $p 0.000$)

Figure (2) shows a highly statistical differences of improvement in intervention group compared to control group post nursing intervention regarding neuromuscular eating response (biting and chewing) of sustained control bite, circular rotatory pattern of jaw, lip closure and food loss ($X^2 26.7$, 32.4 , 18.09 , 28.1 respectively, $p 0.000$)

Figure(3) shows a significant improvement in intervention group than control group regarding neuromuscular cup drinking response to lip seal around cup, jaw position, sips sequence, cup holding and liquid loss post nursing intervention ($X^2 24.3$, 20.37 , 11.27 , 25.6 , 25.7 and $p 0.000$, 0.002).

Figure (4) shows that there is a highly significant improvement in intervention group compared to control group regarding degree of drooling post nursing intervention ($X^2 38.7$, $p 0.000$).

4. Discussion

Nurses play a critical role in the management of traumatic head injury among children. Pediatric head injury ranks among the primary causes of mortality and severe morbidity in this age group, moreover the aspect inherent to pediatric intensive care demand professional expertise to optimize management and improve outcome (**Andrew & Sullivan, 2010**).

The finding of the current study indicated that there are significant improvement regarding the mean score of feeding domains in the intervention group post intervention when compared to pre intervention except biting domain show no significant variation (Table 2). These findings agreed with a study made by **Abu Elsaad & Abdelateif (2008)** on children with cerebral palsy that demonstrated significant improvements in feeding domains in end-test when compared to pre-test except biting which demonstrated non-significant difference. Also this finding is contradicting with the results of a study done by **Gangil et al. (2001)** that stated limited improvement observed in spoon feeding, biting and chewing skills but not in drinking skills.

Studies provide evidence that early nursing intervention improved motor recovery of head injury children. Oral stimulation can be an effective adjunct to feeding treatment, it provide the child with the necessary sensory and movement input to adequately prepare the child for controlled practice with food

using suitable spoon(**Kumin et al., 2009**). Others emphasize that exercises and positioning may help improve a child's ability to chew and swallow, the use of varying foods a day is the key to increase the frequency of positive practice and thus increasing the acceptance of variety and volume of foods consumed in children exhibiting oral –motor difficulties (**Baily and Angell, 2005**) . Also a study on oral motor therapy which was designed to increase tongue lateralization, lip control, and vigor of chewing that delivered before the lunch meal 5-7 minutes/day,3 days/week for 20 weeks were associated with improved spoon feeding, biting and chewing (**Haberfellner et al., 2001**).Moreover other studies done by **Gisel et al. (2003)** and **DeMatteo (2003)** demonstrated that using different foods possess a wide array of sensory qualities with respect to temperature, texture and taste, these sensory qualities in combination stimulate oral movements. As well as

changing food texture can make a difference in a child's ability to manage food in his/her mouth and swallow. Several researches have designed behavioral interventions to improve oral- motor problems such as swallowing dysfunction and failure of cup drinking; the technique assumes competent oral-motor tongue and jaw movements, the children had increased swallow frequency, adequate jaw position and improved skill of cup drinking (**Kerwin &Eicher,2004** and **Gerek &Ciyiltepe, 2005**). All these researches emphasized the implemented nursing intervention and are agreed with the results of the current study as showing in (Figures 1,2,3) that indicated significant improvement in neuromuscular response to spoon feeding ability, chewing, biting and cup drinking response among intervention group post nursing intervention .

Table (1)Socio demographic criteria of the intervention and control groups in percentage distribution:

Items	intervention group No=30	Control group No=30	X ²	p-value
<u>Child age(year)</u>				
< 6	17(56.7%)	16(53.3%)	.351	.684
>6	13(43.3%)	14(46.7%)		
Mean ± SD	6.33± 2.38	6.23± 2.90		
<u>Child sex</u>				
Male	14 (46.7 %)	12 (40 %)	.271	.795
Female	16 (53.3 %)	18 (60 %)		
<u>Presence of Ryle</u>				
Yes	5 (16.7 %)	4 (13.3 %)	.131	1.00
No	25 (83.3 %)	26 (86.7 %)		
<u>Mother education</u>				
Illiterate	0 (0 %)	5 (16.7 %)	8.262	.041
Read/write	6 (20 %)	4 (13.3 %)		
Moderate education	14 (46.7 %)	17 (56.7 %)		
High education	10 (33.3 %)	4 (23.3 %)		
<u>Mother occupation</u>				
Employed	20 (66.7 %)	10 (33.3 %)	6.667	.019
Housewife	10 (33.3 %)	20 (66.7 %)		
<u>Residence</u>				
Rural	13 (43.3 %)	15 (50 %)	.268	.796
Urban	17 (56.7 %)	15 (50 %)		
<u>Causes of injury</u>				
Root Traffic Accident	16 (53.3 %)	16 (53.3 %)	3.394	.183
Fall from high	9 (30 %)	13 (43.3 %)		
Being struck by object	5 (16.7 %)	1 (3.3 %)		

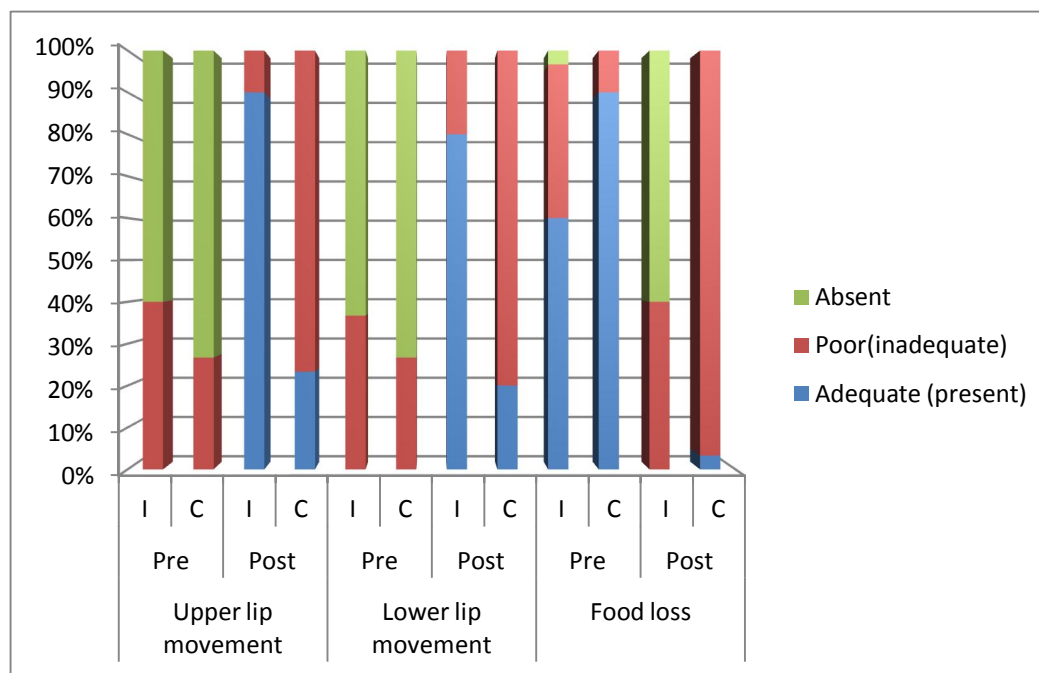
Table (2) comparisons of intervention and control groups regarding Mean Difference of Improvement in Feeding Domains:

Feeding Domains	Mean ± SD		t-test	P value
	intervention group/ n=30	Control group/ n=30		
Spoon Feeding	4.70± 1.49	3.43±1.17	3.66	.001
Biting	2.90±1.35	2.57±1.04	1.07	0.2
Chewing	4.30±1.12	3.23±1.22	3.52	.001
Cup drinking	5.83±1.78	5.17±2.04	1.34	0.18
Drooling	1.73±.52	0.90±.71	3.43	.001
Total	19.47±4.75	15.03±5.25	5.17	0.00

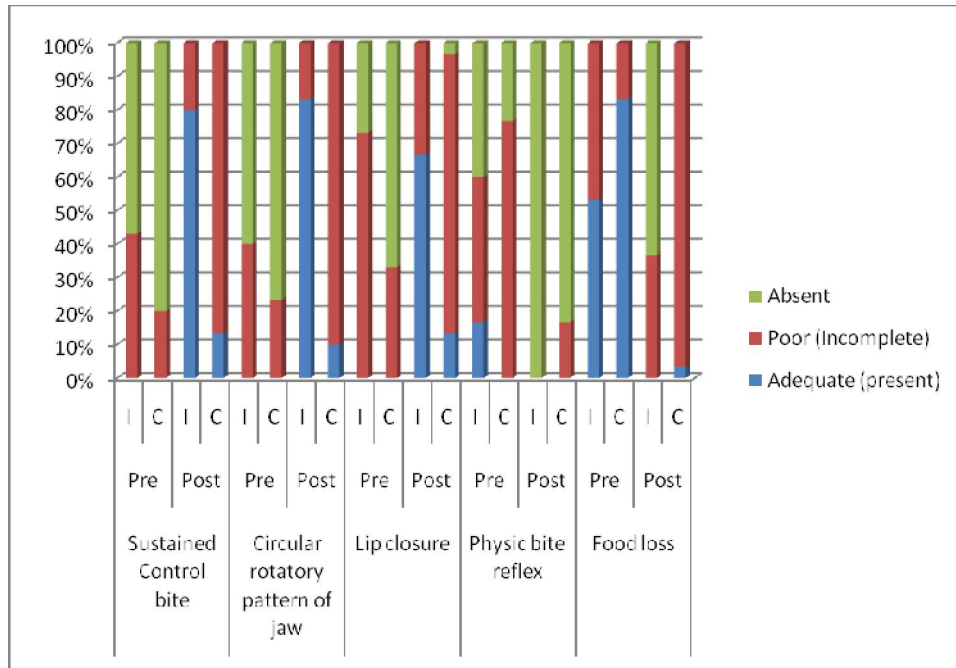
Table (3) : Subject's Socio-demographic Criteria and Their Improvement in Feeding Domain.

Socio-demographic criteria	Mean \pm SD										
	Spoon feeding		Biting		Chewing		Cup drinking		Drooling		
	I ^a	C ^b	I ^a	C ^b	I ^a	C ^b	I ^a	C ^b	I ^a	C ^b	
1-Age (years)											
▪ < 6	4.94 \pm 1.48	3.06 \pm 1.12	3.00 \pm 1.58	2.3 \pm 0.79	4.47 \pm 1.18	3.06 \pm 1.12	6.24 \pm 2.05	5.06 \pm 2.17	1.82 \pm 0.53	1.00 \pm 0.73	
▪ > 6	4.38 \pm 1.50	3.86 \pm 1.10	2.77 \pm 1.01	2.86 \pm 1.23	4.08 \pm 1.04	3.43 \pm 1.34	5.31 \pm 1.25	5.29 \pm 1.94	1.62 \pm 0.51	0.79 \pm 0.70	
t-test	1.013	-1.9	0.458	-1.4	0.970	-0.80	1.43	-0.29	1.08	0.818	
P-value	0.32	0.06	0.65	0.15	0.34	0.42	0.16	0.77	0.28	0.42	
2-Sex											
▪ Male	5.07 \pm 1.77	3.33 \pm 0.89	3.50 \pm 1.16	2.58 \pm 0.90	4.50 \pm 1.22	3.17 \pm 0.72	6.86 \pm 2.07	5.58 \pm 1.93	1.33 \pm 0.65	1.86 \pm 0.53	
▪ Female	4.38 \pm 1.15	3.50 \pm 1.34	2.37 \pm 1.31	2.56 \pm 1.15	4.13 \pm 1.02	3.28 \pm 1.49	4.93 \pm 0.78	4.89 \pm 2.11	0.61 \pm 0.61	1.63 \pm 0.05	
t- test	1.25	-0.41	2.47	0.07	0.90	-0.27	3.45	0.913	3.1	1.22	
P-value	0.22	0.69	0.02	0.94	0.38	0.79	0.002	0.37	0.004	0.29	
3-Residence											
▪ Rural	4.85 \pm 1.52	3.06 \pm 1.39	2.46 \pm 1.57	2.40 \pm 1.18	4.38 \pm 1.39	3.13 \pm 1.35	4.40 \pm 2.11	6.00 \pm 2.19	1.62 \pm 0.65	0.73 \pm 0.70	
▪ Urban	4.59 \pm 1.51	3.80 \pm 0.77	3.24 \pm 1.09	2.74 \pm 0.88	4.23 \pm 0.90	3.33 \pm 1.11	5.93 \pm 1.58	5.71 \pm 1.45	1.82 \pm 0.39	1.07 \pm 0.70	
t- test	0.46	-1.7	-1.5	-0.87	0.33	-0.44	-2.1	0.44	-1.08	-1.2	
P-value	0.65	0.08	0.12	0.39	0.74	0.66	0.03	0.66	0.29	0.20	
4M.education											
▪ Illiterate	-	4.20 \pm 1.48	-	2.60 \pm 1.82	-	3.20 \pm 2.28	-	5.60 \pm 1.82	-	0.60 \pm 0.54	
▪ Read / write	3.17 \pm 2.04	3.25 \pm 1.70	2.83 \pm 1.94	2.25 \pm 0.95	3.60 \pm 1.03	3.75 \pm 0.50	5.33 \pm 1.03	4.75 \pm 3.20	1.83 \pm 0.40	0.75 \pm 0.95	
▪ Middle	4.30 \pm 0.98	3.17 \pm 1.01	3.21 \pm 1.25	2.53 \pm 0.87	4.64 \pm 1.16	3.11 \pm 1.11	6.28 \pm 2.16	3.11 \pm 1.76	2.71 \pm 0.61	0.94 \pm 0.65	
▪ High	5.21 \pm 1.63	3.75 \pm 0.50	2.50 \pm 1.08	3.00 \pm 0.82	4.67 \pm 0.84	3.25 \pm 0.50	5.50 \pm 1.51	5.25 \pm 2.87	4.70 \pm 0.48	1.25 \pm 0.95	
ANOVA	3.1	1.14	0.81	0.33	3.4	0.26	0.85	0.12	2.3	0.67	
P-value	0.02	0.35	0.45	0.79	0.04	0.84	0.43	0.94	0.01	0.58	
5M.Occupation											
▪ Employed	4.80 \pm 1.28	3.40 \pm 0.61	2.90 \pm 1.29	2.50 \pm 1.17	4.30 \pm 1.17	3.10 \pm 0.87	6.20 \pm 1.99	5.00 \pm 2.05	1.70 \pm 0.57	1.00 \pm 0.82	
▪ House wife	4.50 \pm 1.90	3.45 \pm 1.36	2.90 \pm 1.52	2.60 \pm 0.99	4.30 \pm 1.05	3.30 \pm 1.38	5.10 \pm 0.99	5.25 \pm 2.07	1.80 \pm 0.42	0.85 \pm 0.67	
t- test	0.45	-0.13	0.000	-0.24	0.000	-0.48	1.6	-0.31	-0.48	0.53	
P-value	0.66	0.89	1.00	0.80	1.00	0.63	0.11	0.75	0.63	0.59	

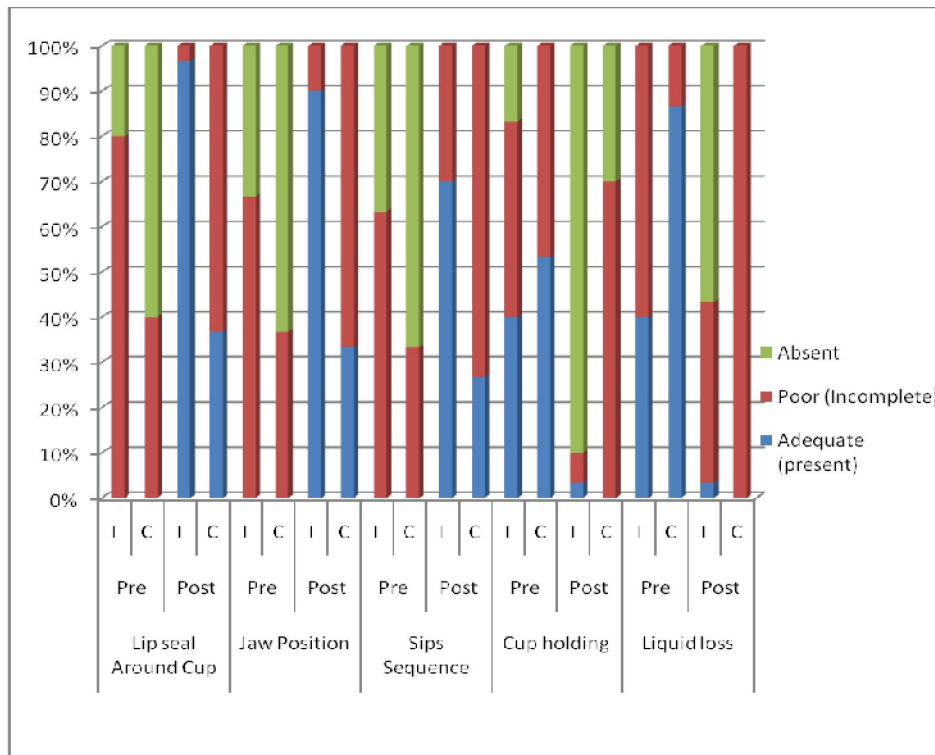
^a Intervention group, ^b Control group.



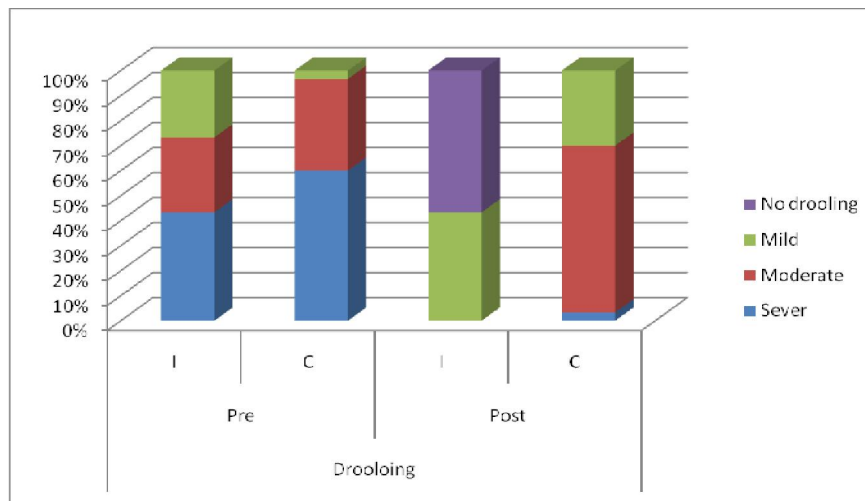
Figure(1) : Comparison between intervention(n=30) and control group(n=30) regarding spoon feeding ability pre and post intervention



Figure(2) Comparison between intervention(n=30) and control group(n=30) regarding neuromuscular eating response pre and post intervention



Figure(3) Comparison between intervention(n=30) and control group(n=30) regarding neuromuscular cup drinking response pre and post interventions



Figure(4) comparison between intervention(n=30) and control group (n=30)regarding degree of drooling pre and post intervention

Mothers/ guardian has a primary role in the given nursing care through their participation in teaching their child the various skills of daily living. In our study the improvement rate of drooling post intervention in the intervention group are obvious and has statistical significant variation , this resulting from education and stimulation of intervention children to optimize head control, enhancing lip closure, improve tongue control through pressure and Increase self awareness of drooling. These measures implemented by the researcher in combination with the mothers that are trained by the researcher (Figure 4).

The current study revealed that the improvement rate in neuromuscular feeding skills are significantly higher between male children than female, this may be because of our society culture and tradition in protecting, supporting and taking care of male better than female. In addition to this the improvement in feeding problems concerned with spoon feeding ability, chewing and drooling among children of highly educated mothers has a significant difference of improvement than among children of moderated to illiterate mothers (Table 3). This emphasize the importance of mothers educational level that help in efficient implementation of the given instructions. **Mueller, et al. (2003), Najdowski et al.,(2003) and Lewis and Kritzinger (2004)** utilized parent training packages to implement pediatric feeding protocols, the components evaluated included verbal instructions plus modeling, verbal instructions plus rehearsal, and verbal instructions alone. Results indicated parents could be trained to implement intervention procedures for their children's feeding difficulties.

Conclusion:

This study concluded that feeding problems in children who have acquired severe head injury could be eliminated by specific nursing intervention using a behavior modification program combining education and exercises to enhance oral-motor functions. Also mother education could help in eliminating children feeding problems induced by oral-motor deficit.

Recommendation:

According to the observed results the recommendation are, a carefully planned and subsequent feeding program designed on evidence-based to be compatible with the child's needs and abilities should be developed, the planning and implementation of these programs should involve the child's family especially primary caregivers. Also nursing care research must be conducted to achieve high quality nursing management of feeding problems induced by oral-motor difficulties.

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