Novelty Journals

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
Vol. 4, Issue 3, pp: (215-225), Month: September - December 2017, Available at: www.noveltyjournals.com

Impact of a Breast Feeding Educational Program for Mothers Having Pre-Term Infants in General Hospitals in Port Said

Nabila Hassan Abd-Allah[1], Elsayda Hamdy Nasr[2], Hanan Elzeblawy Hassan*[3]

[1] Pediatric Nursing, Faculty of Nursing, Port said University, Egypt
[2] Maternity, Obstetric & Gynecological Nursing, Faculty of Nursing, Port said University, Egypt
[3] Maternal & Newborn Health Nursing, Faculty of Nursing, Beni-Suef University, Egypt

* Correspondence: Hanan Elzeblawy Hassan, Faculty of Nursing, Beni-Suef University, Egypt.
E-mail: nona_nano_1712@yahoo.com

Abstract: **The provision of breast milk is essential for preterm infants as it provides unique health benefits that are unmatched by other types of feeding. However, breastfeeding presents unique challenges for preterm infants that include establishing and maintaining the mothers' milk supply and transitioning the infant from gavage feeding to breastfeeding.** ***Objectives:*** **evaluate the impact of breastfeeding education program on mother's knowledge and on preterm infants' outcome.** ***Subjects and method:*** **A quasi-experimental study was carried out at the Neonatal Intensive Care Units at El-Naser, General Port Fouad hospitals and Maternal and Child Health (MCH) Centers at Port-Said city. The sample comprised 100 neonates and their mothers divided equally into study and control groups. The data were collected using a questionnaire sheet to assess mothers' knowledge related to breastfeeding, neonatal physical assessment (feeding patterns) sheet during hospitalization, and assessment of neonates during follow up period.** ***Results:*** **The implementation of a well-designed applied intervention program about breast feeding of preterm infant proved to be successful in improving infants' outcomes in terms of breastfeeding.** ***Conclusion:*** **The implementation of a well-designed applied intervention program proved to be successful in improving their knowledge. This was reflected in their practice leading to improved infants' outcomes in terms of breastfeeding. These improvements were retained throughout the four-month follow-up with less gastrointestinal and lower rate of re-hospitalization. Multivariate analysis confirmed the positive independent effect of the intervention on mother's knowledge score. Therefore, the study recommended the implementation of the program on a wider scale to confirm its merits and for further improvement.**

Keywords: **breast feeding, pre-term infant.**

I. INTRODUCTION

Breast milk is a dynamic body fluid that changes in its composition to meet the nutritional requirements of the neonate, provides protection from infectious disease, and promotes neurodevelopment ***(American Academy of Pediatrics, 2005).*** The health benefits of mother's milk are especially significant for the immunocompromised preterm infant; however, mothers of those infants experience documented physiological & emotional barriers to the initiation & maintenance of lactation.

Preterm birth (PTB) is commonly defined as birth prior to 37 weeks of gestation ***WHO, 2016; Hermans, et al. 2016***. The incidence of PTB continues to rise worldwide. An estimated fifteen million babies are born preterm and this number is raising annually ***ACOG, 2003; Hassan & Nar, 2017***. Additionally, Preterm birth is considered the 2nd largest direct cause

of child mortality in children younger than 5 years, responsible for 75% of neonatal mortality, 70% of short & long-term neonatal morbidity as well as 50% of the term neurological impairments in children. Preterm births account for one-third of all health care spending on infants and one-tenth of spending for children ***Durnwald, etal, 2005; Blencowe, et al, 2010; Hermans, et al. 2016.***

The birth of a premature infant and hospitalization in the Neonatal Intensive Care Unit (NICU) disrupts the expected development of interactive skills for both the parent & the infant. The infant extensive period of hospitalization in the neonatal intensive care unit (NICU) impairs the establishment of maternal feeding and attachment. Neonates with premature are considered high-risk neonates, and they often begin life with serious medical challenges. They may need support for a number of medical issues, including breathing problems that require supplemental oxygen or a ventilator, temperature regulation, feeding problems, apnea (irregular breathing), or jaundice. Because of these needs, respiratory distress infants may have to spend weeks or even months in a Neonatal Intensive Care Unit (NICU). Fortunately, with support and growth, the immature organs recover and eventually function independently in most cases. By the time of hospital discharge, most preterm infants do not require specialized medical care, but all continue to need good supportive care ***(Spear, 2008).***

Breast milk is the optimal nutrition for preterm infants as it consists of unique amounts and types of proteins, enzymes, micronutrients, lipids, and particularly long-chain polyunsaturated fatty acids, which are critical for growth & development. Breast milk also protects the vulnerable premature infant by reducing the risk of infection and improving gastrointestinal function and the absorption of nutrients ***(Ahmed, 2008)***. In addition, breast milk is significantly associated with higher scores of cognitive ability, teacher rating, standardized achievement tests, and increased high school success later on. Ahmed (2008) explained that the use of fortified human milk provides the preterm infant adequate growth, nutrient retention, and biochemical indices of nutritional status.

The AAP (2005) recommends human milk as the preferred food for preterm infants. The breast milk of mothers of preterm infants is thought to be higher in protein, sodium chloride, and immunoglobulin's compared to mothers of term infants; additionally, it generates more rapid growth & easy digested. Mothers can pump their breast milk and freeze it to be used later for a bottle or gavage feeding. The oxygenation levels are often higher during breastfeeding because the infant can regulate breathing and be sucking better than bottle-feeding. In addition, the mother's body temperature helps keep the infant warm. Therefore, mothers of preterm infants are encouraged to continue pumping breast milk during the infant's prolonged hospitalization, they need support and frequent encouragement to continue pumping while their infant is not yet able to nurse ***(Samour & King, 2005; Perry, 2006)***.

Because preterm infants are separated from their mothers in order to receive the necessary and adequate treatment required to maintain their vital functions, which will delay or interrupt breastfeeding, the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) state that there is a duty to teach mothers how to begin or maintain lactation if separated from their neonates, so their neonates require special attention to be paid to the encouragement and support of breastfeeding in addition to intensive care and treatment in order to assure them of better quality of life and of care from the moment of birth. The mothers should be instructed about the techniques for milk expression and make sure that mothers perform it correctly, breast milk can be expressed by hand or manual or with the aid of breast pump. The process is facilitated if the mothers is relaxed and encouraged to drink liquids, also prepare the breast and gently massage breast using both hands. She has lean forward, put the thumb on the areola above the nipple and index finger on the areola below the nipple, and then press inward towards the chest. Repeated rotating the thumb and index finger around the areola empty the breast completely and obtain more of the hind-milk .The procedure is repeat the procedure on the opposite side, alternate until sufficient milk is collected ***(WHO, 2007; Towel, 2009)***.

II. SIGNIFICANCE OF THE STUDY

Mothers of preterm infants are more likely to have a problem in establishing breast-feeding and more likely to quit breast-feeding earlier without professional breastfeeding support, so preterm infants need more frequent support. Constant support is needed to reinforce education and ensure longer duration of breast-feeding. Therefore, this study involves the implementation of an educational program for mothers having premature infants for developing mother's competencies for proving safe care to their infants.

Novelty Journals

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
Vol. 4, Issue 3, pp: (215-225), Month: September - December 2017, Available at: www.noveltyjournals.com

III. AIM OF THE STUDY

The aim of this study was to plan and implement an educational program about breast feeding of the preterm infants for their mothers, evaluate the impact of the program on preterm infant's outcome.

IV. SUBJECTS AND METHOD

This quasi-experimental controlled study was carried out at the in general hospitals in Port Said at El Nasr and, Port Fouad General Hospital, and maternal and child health (MCH) centers for follow-up. It involved mothers with their preterm neonate (26 to 37 weeks) hospitalized in the NICU. Mothers were divided into a study group (50) to whom the homecare study intervention was applied, and a control group of the same size (50) who received the standard hospital care.

Tools: Two tools were developed and used by the researcher for data collection.

Tool I: Structured Interviewing questionnaire for the mothers:

(A) Interview Questionnaires Sheet:

This was designed and constructed by the researcher after reviewing the related literature and getting experts' opinion to assess mothers' knowledge breastfeeding of the preterm infant, the questionnaire was composed of two parts:

Part (I): Socio-demographic data and maternity history of the mothers. It includes: mothers' age, level of education, job status, maternity history as gravidity, parity, number of live birth, mode of previous delivery, and history of previous preterm delivery.

Part (2): Breastfeeding Knowledge Questionnaire (BFK) to measure mothers' knowledge related to preterm infant and breastfeeding. It covered the area of (a) preterm infants, (b) benefits of breastfeeding and breast milk for mother and infant, (c) technique of breast massage and breast milk expression, (d) breastfeeding technique in preterm infants, and (e) common breastfeeding problems in preterm infants. Content validity was considered through review by a group of expert nurses & neonatologists using a content validity form. Split half reliability reported a value of 0.95. This part was applied before the beginning of the program (pre-test), immediately at the end of program implementation (post-test 1) and two months later during follow up (post-test 2).

Scoring:

For the knowledge items, a correct response was scored 1 and the incorrect response zero. For each area of knowledge, the scores of the items were summed-up and the total divided by the number of the items, giving a mean score for the part. These scores were converted into a percent scored and means and standard deviations were computed. Knowledge was considered satisfactory if the percent score was 50% or more and unsatisfactory if less than 50%.

B-Neonatal Assessment Sheet:

This tool was developed in order to record the physical assessment findings of the preterm infant in the hospital. It consisted of two parts**:**

Part (1): Neonate's characteristics as name, gender, gestational age, date of admission, diagnosis on admission (causes of admission), weight on admission, and current diagnosis**.**

Part (2): Assessment feeding patterns of the preterm infant in incubator, during hospitalization, by the researcher. This was carried out three times: the first when the neonate was admitted, the second when the neonates' feeding pattern change from IV to oral and the third upon discharge. Assessment includes the route of feeding (oral, nasogastric, or intravenous).

Tool II: Neonate's Follow-up Assessment

It was developed to assess the preterm infants at age two and four months after discharge. This tool was applied at MCH centers during the follow-up phases of the study to evaluate the outcome of the implemented breastfeeding program on pre-term infant it included: Types of feeding, physical assessment, assessment for the occurrence of any complication or abnormal signs (fever) more than 38c˚, diarrhea, vomiting, refusing feeding).

Implementation Phase:

The program was implemented in the previously mentioned setting and lasted for six months. The mothers in the study group were gathered in small groups ranging from two to seven mothers according to availability. The educational program was implemented for each group separately, a total number of four sessions, one session per a day. The time allocated for training was two hours daily during visiting hours according to the hospital policy**.**

V. RESULT

Table (1) demonstrates no statistical significant differences between mothers in the study and control group regarding their demographic characteristics and obstetric history. They had an almost equal mean age of about 27 years (27.2 ± 5.2 - 27.8 ± 5.5) respectively. More than half of mothers in both the study and control group had Basic/intermediate level of education (54.0% and 66.0%), respectively, and the majority of them were housewives, (86.0% and 84.0%) respectively. More than half of the women in study and control group were multigravida (56.0% and 70.0%), had two or more living children (50.0% and 58.0%) and had a history of preterm delivery (52.0% and 56.6%), respectively. It also noticed that more than three-fifths of study and control mothers (62.0% & 72.0%) had history of cesarean section delivery

Concerning neonates' characteristics, **table (2)** shows that more than half of neonates (52.0%) were males in the study, while 42.0% in control. As well, the table reveals most of the neonate in study and control (82.0% - 84.0%) were of gestational age ranged between 32 - 36 weeks, with an almost equal mean of about 33 weeks. As for the duration of hospital stay, the mean of hospital stay in the study group was. 17.8 ± 6.0 while in control group were 19.2 ± 5.8 days. It also indicates that the majority of both groups study and control group had respiratory distress currently (90.0% and 84.0%), respectively, while the minority in both groups were jaundice (10.0%, 16.0%), respectively.

Concerning the feeding patterns, **table (3)** represents the Comparison between the study and control groups regarding (feeding patterns) of preterm neonates throughout hospitalization. The shows that none of the neonates in both groups had breast or bottle feeding at admission and almost all of them had IV feeding. The percentages of breastfeeding increased to 18% and then 92% at the post and discharge phases respectively in the study group. The corresponding figures in the control group were 4% and 64% and the differences were statistically significant. The table also indicates that significantly more neonates in the study had IV feeding at the post phase (64%) compared to the study group (16%), $p < 0.001$.

Table (4) shows the mothers' knowledge about feeding (advantage of breastfeeding and practice of breastfeeding) among mothers in study and control groups proved to be very deficient at the pre-intervention phase, with no statistically significant differences. As **table (4)** illustrates, none of study and control groups of mothers had satisfactory knowledge about helping respiration. Immediately after implementation of the program, all mothers in the study group had satisfactory knowledge in almost all areas, this improvement continued through the follow-up phase. On the other hand, the control group mothers' knowledge continued to be unsatisfactory, and the differences with the study group were all statistically significant at both the post and follow-up phases ($p < 0.001$).

Table (5) demonstrates statistically significant higher percentages of breastfeeding in the study group at both assessment times ($p < 0.001$). Conversely, more infants in control group were bottle fed and used pacifiers at both assessment times. The same table demonstrates that significantly more infants in the control group had diarrhea at the fourth month (20%) compared to the study group (2%), p=0.04. they also had more vomiting at the second ($p < 0.001$) and fourth ($p = 0.004$) months assessments. Similarly, they had a longer duration of refusal of feeding at the second ($p < 0.001$) and fourth ($p = 0.03$) months assessments.

Table (6) indicates a statistically significant decrease of the use of pacifier among infants in the study between the second and fourth months ($p = 0.02$). No other statistically significant changes were revealed in bottle or breastfeeding practices in either group.

Table (7) demonstrates a statistically significant improvement in the knowledge mean scores of mothers in the study group and control group throughout the program phases. However, the score mean in the study group increased from a pre-program level of 21.94% to 91.7% at the post, and slightly dropped to 88.41% at the follow-up phases. Meanwhile, the mean score of the control slightly increased from 20.73% at the pre-test to only 27.75% at the follow-up phase.

Novelty Journals

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
Vol. 4, Issue 3, pp: (215-225), Month: September - December 2017, Available at: www.noveltyjournals.com

Table (8) represents the best fitting multiple linear regression models for the score of knowledge among mothers. It shows that the study group and mother's working status are the statistically significant independent positive predictors of knowledge score. The model explains 47% of the variation in this score. Other factors as maternal age, education, parity, number of living children, and history of preterm delivery have no significant influence on knowledge score.

Table (1): Demographic characteristics and maternal history of the study and control groups

	Group				X^2 Test	p-value
	Study (n=50)		Control (n=50)			
	No.	%	No.	%		
Age (years)						
<25	18	36.0	15	30.0		
25-	16	32.0	15	30.0	0.75	0.69
30+	16	32.0	20	40.0		
Range	19.0-40.0		18.0-40.0			
Mean ± SD	27.2±5.2		27.8±5.5		t = 0.38	0.54
Education:						
Illiterate	8	16.0	3	6.0		
Basic/intermediate	27	54.0	33	66.0	2.91	0.23
High	15	30.0	14	28.0		
Job status:						
Housewife	43	86.0	42	84.0		
Working	7	14.0	8	16.0	0.08	0.78
Gravidity:						
Primi	22	44.0	15	30.0		
Multi	28	56.0	35	70.0	2.10	0.15
Living children:						
1	25	50.0	21	42.0		
2+	25	50.0	29	58.0	0.64	0.42
Mode of delivery						
NVD	19	38.0	14	28.0		
Cesarean	31	62.0	36	72.0	1.13	0.29
History or pre-term delivery:						
No	24	48.0%	22	44.0%		
Yes	26	52.0%	28	56.6%	Fisher	1.00

Table (2): Characteristics of neonates and current diagnosis in the study and control groups and their period of hospital stay

	Group				X^2 Test	p-value
	Study (n=50)		Control (n=50)			
	No.	%	No.	%		
Gender:						
Male	26	52.0	21	42.0		
Female	24	48.0	29	58.0	1.00	0.32
Gestational age:						
< 32	9	18.0	8	16.0		
32 - 36	41	82.0	42	84.0	0.07	0.79
Range	28.0-36.0		28.0-36.0			
Mean ± SD	33.0±2.4		33.3±2.5		t=0.64	0.42
Hospital Stay (days):						
≤ 10	8	16.0	9	18.0		
11 -	21	42.0	10	20.0	5.89	0.053
20 +	21	42.0	31	62.0		
Range	7.0-28.0		10.0-30.0			
Mean ± SD	17.8±6.0		19.2±5.8		t=1.69	0.19
Current Diagnosis:						
Respiratory distress	45	90	42	84.0	1.52	0.217
Premature, + jaundice	5	10	8	16.0	Fisher	0.591

Novelty Journals

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
Vol. 4, Issue 3, pp: (215-225), Month: September - December 2017, Available at: www.noveltyjournals.com

Table (3): Comparison between the study and control groups regarding to physical examination findings (feeding patterns) of preterm neonates throughout hospitalization phases

Feeding:#	Time (%)								
	on admission			During hospitalization			on discharge		
	Study	Control	X^2 test (p-value)	Study	Control	X^2 test (p-value)	Study	Control	X^2 test (p-value)
Breast	0.0	0.0	0.00 (1.00)	18.0	4.0	5.01 (0.03*)	92.0	64.0	11.42 (0.001*)
Bottle	0.0	0.0	0.00 (1.00)	84.0	80.0	Fisher (1.00)	88.0	90.0	0.10 (0.75)
Ryle	24.0	62.0	14.73 (< 0.001*)	16.0	20.0	Fisher (0.006*)	0.0	0.0	0.00 (1.00)
IV	100.0	100.0	Fisher (0.50)	20.0	64.0	41.03 (< 0.001*)	0.0	0.0	0.00 (1.00)

(*) Statistically significant at p < 0.05 *(#) Not mutually exclusive*

Table (4): Comparison between the study and control groups regarding their knowledge about breast feeding in percentage distribution before and after implementation of the program

Satisfactory knowledge about (50%+):	Time (%)								
	Pre			Post			FU		
	Study	Control	X^2 test (p-value)	Study	Control	X^2 test (p-value)	Study	Control	X^2 test (p-value)
Feeding Advantages of breastfeeding	12.0	10.0	10.70 (0. 21)	100.0	2.0	96.08 < 0.001*	100.0	0.0	100.00 < 0.001*
Practice of breastfeeding	10.0	6.0	4.33 (0.14)	100.0	6.0	88.68 < 0.001*	100.0	6.0	88.68 < 0.001*
Practice of milk expression	0.0	0.0	0.00 (1.00)	100.0	0.0	100.00 < 0.001*	100.0	0.0	100.00 < 0.001*
Helping respiration	0.0	0.0	0.00 (1.00)	100.0	0.0	100.0 < 0.001*	100.0	0.0	100.00 < 0.001*
Management of some feeding problems	0.0	0.0	0.00 (1.00)	100.0	0.0	100.00 < 0.001*	100.0	0.0	100.00 < 0.001*

(*) Statistically significant at p<0.05

Table (5): Comparison between study and control groups regarding to feeding patterns and signs and symptoms of gastrointestinal problems encountered by infants at the 2-month and 4-month follow-up assessments in percentage distribution (n = 50)

	2-month FU			4-month FU		
	Study	Control	X^2 test (p-value)	Study	Control	X^2 test (p-value)
Feeding: #						
Breastfeeding	80.0	46.0	12.40 (< 0.001*)	80.0	28.0	27.21 (< 0.001*)
bottle feeding	44.0	96.0	32.19 (< 0.001*)	46.0	98.0	33.53 (< 0.001*)
Use pacifier	34.0	54.0	4.06 (0.04*)	14.0	54.0	17.83 (< 0.001*)
Diarrhea:						
Duration (days)	10.0	20.0	1.96 (0.16)	2.0	20.0	8.27 (0.004*)
Mean ± SD	1.8 ± 0.8	2.4 ± 0.7	U = 1.91 (0.17)	2.0 ± 0.0	1.8 ± 0.8	U = 0.04 (0.84)
Vomiting:						
Duration (days)	24.0	60.0	11.30 (< 0.001*)	2.0	20.0	8.27 (0.004*)
Mean ± SD	1.8 ± 0.6	2.4 ± 1.8	U = 0.42 (0.52)	2.0 ± 0.0	2.2 ± 1.1	U = 0.00 (1.00)
Refuse Feeding:						
Duration (days)	2.0	48.0	28.21 (< 0.001*)	0.0	18.0	Fisher (0.003*)
Mean ± SD	1.0 ± 0.0	1.7 ± 0.7	U = 1.14 (0.29)	0.0	1.6 ± 0.7	Fisher (0.003*)

(*) Statistically significant at p< 0.05 *(U) Mann Whitney test* *(#) Not mutually exclusive*

Novelty Journals

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
Vol. 4, Issue 3, pp: (215-225), Month: September - December 2017, Available at: www.noveltyjournals.com

Table (6): Feeding patterns of infants in the study and control groups during the 2- and 4-month follow-up phases

	Time (age)				X^2 Test	p-value
	2		4			
	No.	%	No.	%		
Study Group:						
Use pacifier	17	34.0	7	14.0	5.48	0.02*
Use bottle feeding	22	44.0	23	46.0	0.04	0.84
Use breastfeeding	40	80.0	40	80.0	0.00	1.00
Control Group:						
Use pacifier	27	54.0	27	54.0	0.00	1.00
Use bottle feeding	48	96.0	49	98.0	Fisher	1.00
Use breastfeeding	23	46.0	14	28.0	3.47	0.06

(*) Statistically significant at $p < 0.05$

Table (7): Comparison between the total mean score of Knowledge about prematurity among mothers in the study and control groups throughout intervention phases

Total knowledge score	Time						Kruskal Wallis test	p-value
	Pre test		Post test		Follow up test			
	Mean	SD	Mean	SD	Mean	SD		
Study group	21.94	8.86	91.07	4.13	88.41	2.77	107.53	< 0.001*
Control group	20.73	7.50	20.73	7.50	27.75	4.55	32.90	< 0.001*

(*) Statistically significant at p<0.05

Table (8): Best fitting multiple linear regression model for the score of knowledge among mothers.

	Unstandardized Coefficients		Standardized Coefficients	t-test	p-value
	B	Std. Error			
Constant	110.367	4.324		25.522	< 0.001*
Job: (reference: none)	7.039	3.810	.078	1.848	0.066
Group: reference: control)	44.214	2.721	.685	16.251	< 0.001*

r-square=0.47 *Model ANOVA: F=89.12, p < 0.001*

Variables excluded by model: age, education, parity, living children, history of pre-term delivery

VI. DISCUSSION

Nurses play a vital role in helping parents by developing therapeutic relationships, providing emotional support, providing parents with accurate, clear information, involving parents in providing care for their premature infants, and encourage parents to ask questions and get the information they need. These approaches enable parents to feel more supported, more involved, confident, and more effective as parents of their vulnerable newborn ***(Obeidat et al., 2009)***. Potter et.al, (2006) as cited in Nasr & Hassan (2016) stated that educating the clients is a role for nurses in all health care settings; the nurse is often the main source of information about health promotion.

The present study was out aiming to assess mothers of pre-term infant' knowledge about breastfeeding their pre-term infants, plan and implement an educational program about home care of the preterm infants for their mothers, evaluate the impact of the program on mothers' knowledge, and on preterm infants outcome. The study findings demonstrated that the implementation of the intervention program led to a positive infants' outcome better feeding reduction of the risks of gastrointestinal and less re-hospitalization.

The study was conducted using a quasi-experimental design with a study and a control group. In order to reach valid results, the two groups need to be comparable in the factors that may confound the outcome, namely knowledge, and practice. The findings demonstrated that the two groups were similar in their demographic characteristics and obstetric history. Like the mothers, the preterm infants in the study and control groups of the present study had similar characteristics, which make the comparison of the outcomes in two groups valid. They had an almost equal sex distribution, and their mean gestational age was around 33 weeks (33.0 ± 2.4 and 33.3 ± 2.5) respectively. This gestational age often reported in the literature for preterm infants ***(Moselhi, 2010; Elkazazy, 2011).***

The positive effect of the present study intervention program on mothers' knowledge was further confirmed by multivariate analysis, which demonstrated that intervention was a statistically significant independent positive predictor of the knowledge score. This success of the program may be attributed to the fact that it was custom-tailored to mothers' needs, in addition to its simplicity and practicability. The response to mothers' needs of information is essential in such programs as indicated in previous studies that showed that parents of the infant's in the NICU were struggling to understand information and that they depended mainly on nurses who gave them booklets related to prematurity ***(McHaffie et al., 2001; Kowalski et al., 2006; Vaskelyte & Butkeviciene, 2010).***

Overall, the total knowledge scores of mothers in the study group demonstrated a considerable rise at the posttest, with a slight decline at the follow-up phase. At the same time, the scores of the control group women have also demonstrated a small but significant rise through the study phase. This slight improvement could be explained by the accumulation of knowledge and experience from the daily visits to their preterm neonates. It also might be due to a possible exchange of information between the mothers of the study and control groups since both groups were in the same setting. The current study has also monitored the feeding among infants in the study and control groups. As expected, almost all infants in both groups were on IV feeding with or without Ryle on admission. The findings are in agreement with previous studies that reported that almost all premature neonates had IV feeding with or without Ryle ***(Gomella et al., 2004; Moselhi, 2010).*** This expected given the difficulty encountered by preterm infants to feed orally which results from sequential maturation of sucking, swallowing, respiration and/or their coordination ***(Amaizu et al., 2008).***

At the post and discharge phases of the intervention, significantly more mothers in the study group practiced breastfeeding, reaching 92% on discharge. The findings point to a success of the intervention program to encourage mothers to breastfeed their preterm infants. Similar increases in the practice feeding were also reported by ***Mancini (2004); Ahmed (2008)***. The positive impact of the present study intervention on the practice of breastfeeding may be attributed to the program content and process. Mothers were first reassured about the prognosis of their infants to relieve their stress and were encouraged to relate to them in order to alleviate to lessen their stress and fears. This was an important component of the program since the mothers of preterm infants have high levels of stress. In this regard, ***Boykova (2008)*** emphasized that these mothers are at greater risk of psychological distress, depression, poor adjustment, and anxiety during the hospitalization and after discharge. Hence, they need information and teaching ***(Shaw et al., 2006)***. Nursing interventions teaching parents creativities may help them both in the hospital and after discharge ***(Heermann et al., 2005; Kaaresen et al., 2006).***

The importance of the instructions provided to mothers through the present study intervention program has been stressed in previous research. Thus, ***Davis et al. (2003)*** stated that the nurse should instruct the mother to pump her breasts at regular intervals of every two or three hours around the clock until the infant can nurse directly at the breast. Very early pumping may be for stimulation purposes only. The current study intervention program continued after discharge in a follow-up period extending up to fourth months. At discharge, the researcher ensured a proper discharge planning as a part of the intervention in order to achieve the program objectives. This was an essential element of the program given the importance of discharge planning of the program given the importance of discharge planning. In congruence with this, ***Smith (2009),*** emphasized that poor discharge planning has the poor cues to needs and ongoing medical problems after hospital discharge. Therefore, discharge preparation in the neonatal intensive care unit is critically important.

The better improvement in the study group of the current work, in comparison with the control group, might be attributed to the effect of the intervention program in dealing with such influential factors. The improvement in mothers' knowledge could have led to better care for feeding their preterm infants, with proper management of related problems of sucking. In

agreement with this, ***Kaaresen et al. (2006)*** clarified that preterm babies may have problems with sucking and swallowing, the baby may suffer growth problems.

The present study intervention had a positive impact on infants' feeding patterns. The two and four month follow-ups indicated significantly higher rates of breastfeeding among premature infants in the study group. Concomitantly, they had lower rates of refusal of feeding and of vomiting and diarrhea. Therefore, the breastfeeding component of the educational program was effective in improving breastfeeding knowledge and practices among mothers of preterm infants. In agreement with these findings, ***Gaffer & Ahmed (2008)*** showed gradual improvement in breastfeeding practices following an intervention, and breastfeeding problems were less among the intervention group.

Meanwhile, studies have shown a high rate of feeding difficulties in preterm infants specially refusal behavior ***(Hay 2008; Cerro et al., 2002).*** Such difficulties make the parent feel frustrated and anxious regarding the infant's growth and health, which then may induce the parents to become overactive in the feeding process. The most important clinical implication of these findings is that supporting healthy mother-infant interactions may improve not only behavioral but also developmental outcomes in premature infants. it is not easy to distinguish, already in the NICU, specific at-risk mother-infant patterns of interaction because the infant still is very immature, but after discharge, the nurse could be attentive to it as it becomes more apparent during the infant's first months of life ***(Forcada-Guex et al., 2006),*** this is what has been actually done in the present study intervention.

The improvement in the feeding patterns shown in the present study among infants in the study group, with higher rates of breastfeeding in comparison with the control group was also associated with protection of these infants from the related risks of gastrointestinal problems, which are common in premature ***(Bingham et al., 2010)***, and constitute dreadful risks for them ***(YanCho et al., 2012).*** Persistent vomiting and/ or diarrhea may lead to failure to grow normally due to nutrition loss through vomiting or diarrhea ***(Gardner et al., 2011).***

Thus, preterm infants in the current study intervention group had significantly lower rates of diarrhea and vomiting compared to the control group at both follow-up phases. This success of the program may be attributed to its components that target promoting premature infant wellbeing through hygienic measures during infant care. The importance of such measures in protecting the health of the premature have been stressed by ***Gaffar & Ahmed (2008).***

REFERENCES

[1] *Ahmed A. (2008):* Breastfeeding preterm infants: an educational program to support mothers of preterm infants in Cairo, Egypt. US National Library of Medicine National Institutes of Health Pediatr Nurs; 34(2):125-30, 138.

[2] *Amaizu N., Shulman R. and Lau C. (2008):* 67Maturation of oral feeding skills in preterm infants. Journal Acta Paediatr. January; 97(1): 61–67.

[3] *American Academy of Pediatrics (AAP) (2005):* Breastfeeding and the use of human milk, Pediatrics; 115(2): 496-506.

[4] *American College of Obstetricians and Gynecologists (ACOG). (2003):* practice bulletin. Management of preterm labor (number 43). Int J Gynecology Obstet, 2003; 82(1):127-35.

[5] *BinghamP., Thomas C., Ashikaga T. and Abbasi S. (2010):* Non-nutritive sucking measure predicts feeding skills in tube-fed premature infants. Presented at the meeting of the Pediatric Academic Society, Honolulu, Hawaii

[6] *Blencowe H., Cousens S., Oestergaard MZ., et al. (2012):* National, regional, and worldwide estimates of preterm birth rates in the year 2010 with time trends since 1990 for selected countries: a systematic analysis and implications. Lancet, 2012; 379(9): 2162-2172. doi: 10.1016/S0140-6736(12)60820-4.

[7] *Boykova M. (2008):* Follow-up care of premature babies in Russia: evaluating parental experiences and associated services. Infant; 4(4): 126-30.

[8] *Cerro N., Zeunert S., Simmer K. and Daniels L. (2002):* Eating behaviour of children 1.5-3.5 years born preterm: parents' perceptions. J Paediatr Child Health.; 38(1): 72–78.

[9] *Davis L., EdwardsH. R. and Mohay H. (2003):* Mother-infant interaction in premature infants at three months after nursery discharge. International Journal of Nursing Practice; P.p. 9, 374-381.

[10] *Durnwald CP., Walker H., Lundy JC., Iams JD. (2005):* Rates of recurrent preterm birth by obstetrical history and cervical length. Am J Obstet Gynecol, 2005; 193(3 Pt 2):1170-4.

[11] *EL-Kazaz R. (2011):* impact of implementation infection control program for nurses to control nasocomial infection in neonatal intensive care units in Port Said. Unpublished Doctorate thesis, Faculty of Nursing, Port Said University, Egypt.

[12] *Forcada-Guex M., Pierrehumbert B., Borghini A., Moessinger A. and Muller-Nix C. (2006):* Early dyadic patterns of mother-infant interactions and outcomes of prematurity at 18 months. Pediatrics; P.p. 118, 107-114.

[13] *Gaffar B. and Ahmed. (2008):* Prevention of diarrhea in the first year of life. Pediatric Oncall Journal child health care; ISSN; P.p. 0973 – 0958 .

[14] *Gardner SL., Carter BS., Enzman-Hines MI. and Hernandez JA. (2011):* Handbook of Neonatal Intensive Care, 7th ed., New York: Mosby; P.p. 434-480, 581-600.

[15] *Gomella., Ccunningham D., Eyal and Zenk (2004):* Neonatology: Management, procedures, on-call problems, diseases and drugs. 5th ed., London: Medical Publishing Divion, McGraw-Hill; P. 89.

[16] *Hassan H, Nasr E. (2017:)* Improving nurses' knowledge and skills regarding tocolytics for inhibiting preterm labor. Clinical Nursing Studies. 2017; 5(1): 1-12. https://doi.org/10.5430/cns.v5n1p1.

[17] *Hay WW. (2008):* Strategies for feeding the preterm infant, Neonatology; 94(4): 245-254.

[18] *Heermann JA., Wilson ME. and Wilhelm PA. (2005):* Mothers in the NICU: Outsider to partner. Pediatric Nursing; P.p. 31:176-181, 200.

[19] *Hermans F., Schuit E., pmeer B., Oudijk M., Bekker M., Et al. (2016):* Effectiveness of a cervical pessary for women who did not deliver 48 h after threatened preterm labor (Assessment of perinatal outcome after specific treatment in early labor: Apostel VI trial). BMC Pregnancy and Childbirth, 2016:: 16-154. Doi:10.1186/s12884-016-0935-7.

[20] *Kaaresen P., Ronning J., Ulvund S. and Dahl L. (2006):* A Randomized, Controlled trial of the Effectiveness of an Early-Intervention program in Reducing Parenting Stress After preterm Birth. Pediatrics; P.p. 118: 9-19.

[21] *Kowalski W., Leef K., Mackley A., Spear M. and Paul D. (2006):* Communicating with parents of premature infants: who is the informant? Journal of Perinatology; 26(1): 44–48.

[22] *Mancini P. (2004):* Exclusive breastfeeding at the point of discharge of high-risk newborns at a Neonatal Intensive Care Unit and the factors associated with this practice. Jornal de PediatriaVol. 80, No (3): 241-248.

[23] *McHaffie H., Laing I., Parker M. and McMillan J. (2001):* Deciding for imperiled newborns: Medical authority or parental autonomy? Journal of Medical Ethics.; 27: 104–109.

[24] *Moselhi E. (2010):* The Impact of Oral Glucose on Pain Response among Preterm Baby in Neonatal Intensive Care Units Thesis submitted to the Faculty of Nursing for partial fulfillment of Doctorate degree in nursing science.

[25] *Nasr E, Hassan H. (2016):* Association between quality of family planning services and client's satisfaction level in maternal and child health centers in Port Said city. Journal of Nursing Education and Practice. 2016; 6(1): 85-99. doi: 10.5430/jnep.v6n1p85.

[26] *Obeidat H., Elaine A. and Lynn C. (2009):* The Parental Experience of Having an Infant in the Newborn Intensive Care Unit Perinat Educ.; Lamaze International Publication; 18(3): 23–29.

[27] *Perry S. (2006):* Maternal child nursing care 3rd ed., United States. Mosby Elsevier; P.p. 795-825.

[28] *Potter P. A., Perry A. G., Ross-Kerr J. C., Wood M. J. (2006):* Canadian Fundamentals of Nursing (3rd Ed.). Elsevier, Canada: pp. 600-610.

[29] *Samour PQ. and King K. (2005):* Hand book of pediatric nutrition 3rd ed, united states. Jones and Bartlett publishers Inc; P.p. 53-70.

[30] *Shaw R., Deblois T., Ikuta L., Ginzburg K., Fleisher B. and Koopman C. (2006):* Acute stress disorder among parents of infants in the neonatal intensive care nursery; May-Jun; 47(3): 206-12.

[31] *SpearM.(2008):*TakingYourPreemieHome.http://kidshealth.org/parent/pregnancy_newborn/medical_care/preemie_home.html. 2008, 22:23 GMT

[32] *Towel M. (2009):* Maternal newborn nursing care. United States of America: person education, Inc, Upper Saddle River; P.p. 12, 223, 326-328.

[33] *Vaskelyte A. and Butkeviciene R. (2010):* Needs of parents with premature newborns in the Neonatal Intensive Care Unit: parents' and nurses' perceptions. Medicina (Kaunas). 46 Suppl 1: 43-53.

[34] *WHO (2007):* In addition, educating those who prepare infant formula/human milk will ensure precision and accuracy of the formula/human milk recipes being prepared, enhancing overall quality of care.

[35] *World Health Organization (WHO) (2016):* Preterm birth: Fact sheet. Media center.

[36] *Yun Cho J., Lee J., Youn A., Ju Kim S., Kim S. and Sung I. (2012):* Parental concerns about their premature infants' health after discharge from the neonatal intensive care unit: A questionnaire survey for anticipated guidance in a neonatal follow-up clinic Korean J Pediatr.; 55(8): 272–279.