Impact of a Home Care Educational Program for Mothers Having Pre-term Infants in General Hospitals in Port Said

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Abstract

Background: Prematurity is associated with an increased risk of neonatal morbidity and mortality. Conventional neonatal care of premature infants is expensive and needs both highly skilled personnel and permanent logistic support

Aim: The aim of this study was to evaluate the impact of home care education program on pre-term infant outcome

Materials and Methods: 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.

Results: The implementation of a well-designed applied intervention program about home care of preterm infant proved to be successful in improving infants' outcomes in terms of breastfeeding. These improvements were retained throughout the four-month follow-up with better body weight and length gains, less gastrointestinal, respiratory and infection problems, and lower rate of re-hospitalization.

Conclusion: Implementation of the intervention program led to a positive infants' outcome in terms of anthropometric measurements, physical signs, and reduction of the risks of gastrointestinal, respiratory, and infection problems, better feeding and less- re hospitalization.
Therefore, the study *recommended* the implementation of the program on a wider scale to confirm its merits and for further improvement.

Key words: pre-term infant, Anthropometric measurements, Problem of pre-term infant

Introduction

HIGH-RISK neonate is a neonate who has a greater than average chance for morbidity and mortality. Any neonate whose life or quality of existence is considered to be in a high-risk category and requires close professional supervision. Prematurity and low birth weight often occurs together, and both these factors are associated with increased morbidity and mortality (Price & Gwin, 2008).

Infants born at less than 37 weeks' gestation are considered premature, 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, premature 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).

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 and the infant. The baby's extensive period of hospitalization in the neonatal intensive care unit (NICU) impairs the establishment of maternal bonding and attachment. This separation favors mothers' feelings of insecurity toward taking care of her child . Moreover , most preterm infants are born ill and the mother, in this context, experiences several feelings, like fear, uncertainty, and anguish (Talmi & Harmon, 2003).

Therefore, parents need guidance throughout the infant's hospitalization to help prepare them for this new experience. They may be disheartened by the unattractive appearance of the premature baby**.** The goal of the nurse will be to prepare for discharge and home care**.** The nurse must know the family members, their social circumstances, accepting all and every variations. Meeting their needs are all the nurse's responsibilities. So the nurses should be prepared to assist mothers in this transition process, and provide instructions in term of her responsibility and dedication in view of the baby's health condition (Ashwill, & Droske, 2002; Vaskelyte, & Butkeviciene, 2010).

Furthermore, improved premature neonatal home care may substantially improve survival. Evidence suggests that essential premature newborn care practices, for example related to feeding, hygiene, cord care, thermal control, bathing, skin care and recognition of danger signs are clearly

associated with major causes of neonatal mortality, particularly serious neonatal infections (Manandhar *et al.,* 2004; Darmstadt *et al.,* 2005; Jokhio *et al.,* 2005; Cynthia, 2010). Additionally, instructions in preventing infection should be a priority-teaching goal. Follow up visits are scheduled, and any home health care needs identified and met. The nurse should stress the importance of well baby examination and immunization for this infant (Schulte et al., 2001).

Significance of the Study:

Because the preterm infant account for the highest mortality rate among infant in the first year of life, this is probably the reason for the increasing amount of research done during the last few decades on the causes of prematurity, the need for better care have drawn the increasing concern and effort of all those working with them particularly the mother.

Therefore, this study involves the implementation of a home care program for developing mother's competencies for promoting health to their premature infants, maintain normal growth and development as well as preventing common complications of the premature infants.

Aim of the study:

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

Materials and Methods

Study Design: A quasi-experimental design (pre & post test) was used to determine the impact of pregnancy induced hypertension nursing educational program for maternity nurses on their performance.

Setting: The study was carried out at the neonatal intensive care units (NICUs) at El Naser Hospital, Port-Foad Hospital and maternal and child health (MCH) centers, which were selected according to the mothers' follow up plan.

Sample: A consecutive sample of 100 pre-term neonates and their mothers, who were hospitalized in the NICU of the specified hospital during the study period, their neonates were eligible for inclusion in the study. *Inclusion Criteria:* Pre term infants of both sex, Gestational age ranging from 26 to 37 weeks, has no congenital problems**.** The sample randomly divided into two groups: A study group& a control group.

Data collection tools:

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

Tool (I): Neonatal Assessment Sheet

This tool was constructed in order to assessment 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 it include : Vital signs, Anthropometric measurement, Skin condition, Nutritional status, Level of activity

Tool (II): Neonate's Follow-up Assessment

 It was developed to assess the preterm infants at age two and four month after discharge. This tool was applied at MCH centers during the follow- up phases of the study to evaluate the outcome of the implemented home care 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, cough, vomiting, diaper rash, oral thrush, refusing feeding).

Results

Table (1) represents to the Comparison between the study and control groups regarding to physical examination findings (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 (2) represents to the Body temperature and anthropometric measurements (body wt ,length, head circumference and chest circumference) of preterm infants in the study and control groups at the two months and four months follow-up assessment. The table shows that very few neonates in the study (2%) and control (4%) groups had their body temperature <36 at the two and fourth months of follow-up, and the differences were not statistically significant. As for the anthropometric measurements, about one-half of the infants in the study group (46%) reached 5000 gm at the two month, compared 24% in the control group, and the difference was statistically significant (p=0.04). As for the length, the percentages reaching 50 or more cm were respectively 92% and 82%. No significant differences were revealed in head and chest circumference. In addition, no significant differences could be shown between the study and control groups at the fourth month.

Table (3) represents to the comparison between study and control groups regarding to feeding patterns and signs and symptoms of gastrointestinal problems encountered by preterm infants at the 2-months and 4-months follow-up assessment. It is clear from the table that demonstrate 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 longer duration of refusal of feeding at the second (p<0.001) and fourth (p=0.03) months assessments.

Table (4) represents to the Comparison between study and control groups regarding to signs and symptoms of respiratory problems encountered by preterm infants at the 2-months and 4-months follow-up assessments. It is indicates that a significantly higher percentage of infants in the control group had cough at the fourth month (24%), compared to non in the study group, p<0.001. none of study had cyanosis or dyspnea, compared to 2% and 4% of those in the control group, although the differences were not statistically significant**.**

 Table (5) represents to the indicates that a significantly higher percentage of infants in the control group had fever at second and fourth month 28.0 %and 30.0%, compared to 2.0% and 4.0% in the study group. Meanwhile, the diaper rash was significantly higher among control group infants at both follow-up assessment times, p=0.02 and p< 0.001, respectively. Similarly, more infants in the control group had oral thrush at the fourth month (p=0.02), and had longer duration (p=0.048) compared to the study group. As for the rate of hospitalization, none of the infants in the study group was hospitalized during follow-up compared to 2% and 20% of the control group at the second and fourth months respectively=0.001

Table (6) represents the best fitting multiple linear regressions model for the infants' body weight. It shows that the intervention time and birth weight are the statistically significant independent predictors of the infant weight. It shows that the intervention time and birth weight are the statistically significant independent predictors of the infant weight. The birth weight has an inverse influence.

Discussion

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 with 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.

The long-term follow-up at four months demonstrated that preterm infants in the study group had significantly better improvements in body weight and length. This was further confirmed through multivariate analysis, which identified the intervention as a statistically significant independent predictor of the infant weight, in addition to the birth weight, which is inversely related to current weight. Other maternal and infant factors had no significant influence on the weight of the infant. However, other studies reported some maternal and neonatal issues that may influence postnatal growth as feeding problems, respiratory distress, hypothermia, and asphyxia (Larissa, 2007; Were & Bwibo, 2007). Namiiro et al., (2012) added the effect of the amount of social support a mother and infant receive from their family and community, the effect of these variables on infants' body weight.

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.

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).

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 long-term follow-up of the preterm infants in the present study has also demonstrated lower incidence of respiratory problems as cough among infants in the study group in comparison with those in the control group. This improvement is due to the implementation of the program, with associated better care provided by the mothers. It is of great importance since pulmonary diseases, ranging from recurrent coughing and wheezing to respiratory failure are significant complications of prematurity (Eber & Zach, 2001), and the most common cause of re-hospitalization of preterm infants is acute respiratory disease (Jobe & Bancalari, 2001; Underwood, 2007). In congruence with this study finding, Robert et al. (2004) reported improvements in respiratory symptoms in the intervention group at 2-4 months follow-up.

Infections constitute a serious problem for preterm infants given their higher susceptibility due to immaturity of their immune system. As a result, they may not be able to adequately fight off bacteria, fungi, viruses and other organisms that can cause infections (Mullany et al., 2003; Kim et al., 2009). Oral thrush may occur in babies because their immune systems take time to mature, making them less able to resist infection. It is more common in premature babies because their immune systems are not as strong and they have not had as many of their mothers' antibodies passes to them (Forcada-Guex et al., 2006).

The present study intervention was effective in decreasing the risk of infections such as diaper rash and oral thrush. Lower rates of these infections such as diaper rash and oral thrush. Lower rates of these infections were observed among premature infants in the study group at both follow-ups compared with the control group. Moreover, such infections if occurred had shorter duration among infants in the study group.

According to the present study findings, the rate of re hospitalization was significantly lower among infants in the study group, compared with the control group. Actually, none of these infants was re-hospitalized at the two or four-month follow-ups. This is a normal consequence of the better feeding and lower rates of gastrointestinal, respiratory, and infection problems among them. Therefore, this is an objective and strong indicator of the success of the educational program in achieving its objectives.

Conclusion:

Based on the results of the present study, it can be concluded that:

Educational program implementation of the mothers led to a positive infants' outcome health status.

On the light of the results of the current study, the following recommendations are suggested:

Care protocols for preterm neonate should be incorporated in the discharge plan to be adopted at home by caregivers. Implementation of the present study intervention in the study setting and in similar settings to confirm its beneficial effects and to further improve its content and process. Training sessions and educational classes should be planned in the hospital for mothers having preterm infants during hospitalization.

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Table (1): Comparison between the study and control groups regarding to physical examination findings (feeding patterns) of preterm neonates throughout

	Time (%)								
	On admission			During hospitalization			On discharge		
	Study	Control	χ^2 test (p-value)	Study	Control	χ^2 test (p-value)	Study	Control	χ^2 test (p-value)
Feeding:[@] 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)

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

Table (2): Body temperature and anthropometric measurements (body wt. ,length, head circumference and chest circumference) of preterm infants in the study and control groups at the two months and four months follow-up assessment (n=50)

Variable	2-month FU			4-month FU		
	Study	Control	χ^2test (p-value)	Study	Control	χ^2test (p-value)
Temperature:						
<36	2.0	4.0		2.0	4.0	
36-	68.0	72.0	0.72	54.0	34.0	4.13
37+	30.0	24.0	(0.70)	44.0	62.0	(0.13)
Range	36.0-37.5	36.0-37.2	t=0.01	36.0-37.3	36.5-37.5	t= 4.53
Mean± SD	36.6±0.4	36.6±0.3	(0.91)	36.7±0.3	36.9±0.3	(0.03*)
Body weight (gm):						
<3000	4.0	6.0		4.0	2.0	
3000-	20.0	26.0	13.60	4.0	8.0	1.01
4000-	30.0	44.0	(0.004*)			
5000+	46.0	24.0		92.0	90.0	(0.60)
Range	2500.0-6000.0	2300.0-6500.0	U=0.79	3600.0-7200.0	3500.0-8300.0	t=0.62
Mean± SD	4431.0±1008.6	4298.0±811.3	(0.38)	5770.0±862.7	5912.0±884.9	(0.43)
Weight increase (%)						
Range	25.0-220.0	31.8-233.3	U=0.00	100.0-325.0	90.5-411.1	U= 1.11
Mean± SD	110.5±41.6	109.6±46.1	(0.97)	177.9±54.1	189.7±62.4	(0.29)
Length (cm)						
<50	8.0	18.0	12.70	-	-	3.05
50+	92.0	82.0	(<0.001*)	100.0	100.0	(0.08)
Range	42.0-59.0	42.0-58.0	t=10.54	36.5-62.0	50.0-63.0	t= 0.60
Mean± SD	52.9±2.9	50.6±3.8	(0.001*)	56.8±4.3	57.6±3.4	(0.44)
Head circumference (cm):						
<34	4.0	6.0	Fisher			
35+	96.0	94.0	Fisher	100.0	100.0	Fisher
Range	33.0-41.0	33.0-41.5	t=0.01	35.0-43.0	35.5-43	U= 0.79
Mean± SD	37.9±2.4	38.0±2.0	(0.97)	40.8±1.7	41.0±1.8	(0.38)
Chest circumference (cm):						
<34	34.0	35.0	Fisher	2.0	4.0	Fisher
35+	66.0	65.0	Fisher	98.0	96.0	Fisher
Range	30.5-41.0	30.5-41.0	t=10.54	34.0-43.0	33.8-43.0	T= 0.62
Mean± SD	36.8±2.7	35.6±3.5	(0.91)	39.7±1.7	39.5±2.0	(0.43)

(*) Statistically significant at p<0.05   *(U) Mann Whitney test*

Table (3): Comparison between study and control groups regarding to feeding patterns and signs and symptoms of gastrointestinal problems encountered by preterm infants at the 2-months and 4-months follow-up assessment (n=50)

	2-month FU			4-month FU		
	Study	Control	χ^2 test (p-value)	Study	Control	χ^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)		1.6±0.7	

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

Table (4): Comparison between study and control groups regarding to signs and symptoms of respiratory problems encountered by preterm infants at the 2-months and 4-months follow-up assessments (n=50)

	2-month FU			4-month FU		
	Study	Control	χ^2 test (p-value)	Study	Control	χ^2 test (p-value)
Cough:						
Duration(days)	0.0	8.0	Fisher	0.0	24.0	13.64
Mean± SD		2.8±1.0	(0.12)		3.9±1.4	(<0.001*)
Cyanosis	0.0	2.0	Fisher (1.00)	0.0	0.0	0.00 (1.00)
Dyspnea	0.0	4.0	Fisher (0.49)	0.0	4.0	Fisher (0.49)

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

Table (5): Comparison between study and control groups regarding to signs of infection problems and hospitalization encountered by preterm infants at the 2-months and 4-months follow-up assessments (n=50)

	2-month FU			4-month FU		
	Study	Control	χ^2 test (p-value)	Study	Control	χ^2 test (p-value)
Fever:						
Duration (days)	2.0	28.0	6.78	4.0	30.0	11.98
Mean± SD	2.1±0.5	2.3±0.5	(0.009*)	2.0±0.0	2.5±0.5	(0.001*)
			t=0.43(0.51)			U=1.90 (0.17)
Diaper rash:						
Duration (days)	10.0	28.0	5.26	0.0	36.0	21.95
Mean± SD	2.0±0.0	2.4±0.6	(0.02)*		2.6±0.5	(<0.001*)
			U=1.86 (0.17)			
Oral thrush:						
Duration (days)	24.0	26.0	0.05	6.0	22.0	5.32
Mean± SD	2.8±0.6	2.5±0.5	(0.82)	2.0±0.0	3.3±1.1	(0.02*)
			U=2.53 (0.11)			U=3.89 (0.048*)
Hospitalization:						
Duration (days)	0.0	2.0	Fisher (1.00)	0.0	20.0	11.11
Mean± SD		3.0±0.0			4.9±1.2	(0.001*)

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

Table (6): Best fitting multiple linear regression model for the change in body weight throughout the intervention

	Un standardized Coefficients		Standardized Coefficients	t-test	p-value
	B	Std. Error			
Constant	-7.660	10.071		-.761	0.447
Birth weight	-.035	.004	-.194	-8.313	<0.001*
Intervention time	47.817	1.341	.832	35.661	<0.001*

r-square=0.73   *Model ANOVA: F=670.41, p<0.001*

Variables excluded by model: sex, gestational age, hospital stay, group

تـأثير بـرنــامـج تعليمي عن الرعاية المنزلية للأطفال الـمـبـتـسـرين بالمستشفيات العامة ببورسعيد

د / هــدى الـجـاولــى ـ د/ مـحمد القليوبي ـ د/ سهير ضبش ـ د/ أمــل خـليل ـ م.م / عـزة فـتحي

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الـخـلاصـــة

يرتبط الطفل المبتسر بمخاطر متزايدة من مرض ووفاة و العناية التقليدية له مكلفة وتحتاج لأشخاص شديدي المهارة للقيام بها ودعم مجتمعي دائم. اجريت هذه الدراسة لمعرفة تأثير برنامج تعليمي صحي للأمهات وتقييم تأثيره علي صحة الاطفال

الدراسة الحالية دراسة شبة تجريبية مع مجموعة ضابطة في اجراء الدراسة

هدفها تقييم تأثير برنامج تعليمي صحي للأطفال المبتسرين. نفذت هذه الدراسة في وحدات العناية المركزة للأطفال حديثي الولادة بالمستشفيات العامة و مراكز رعاية الامومة والطفولة ببورسعيد ١٠٠ طفل مبتسر مقسمين الى ٥٠ طفل فى مجموعة الدراسة و ٥٠ طفل فى مجموعة المقارنة(الضابطة) . وقد تم استخدام استمارتين لتحقيق هدف الدراسة وهما استمارة استبيان وتقييم عن حالة الطفل داخل المستشفي وعند خروجه و استمارة تقييم الطفل عند شهرين وأربعة شهور وقد وجد ان البرنامج التدخلي ادي الي تحسين في نواتج الطفل المبتسر وهذا التحسن احتفظ علي مدار الاربع شهور متابعة تأثير ايجابي لتقليل معدل حدوث مشاكل الجهاز الهضمي ،التنفسي مشاكل العدوي عند الأطفال و ايضا معدل دخول المستشفي وكانت الفروق ذات دلالة احصائية . وتوصي الدراسة بتطبيق هذا البرنامج في مكان الدراسة وأماكن مماثلة لتأكيد أثاره المفيدة ولتحسين مضمونه . وينبغي التخطيط لدورات تدريبية ودروس تعليمية في المستشفي للأمهات مع توفير المواد التعليمية ويقترح اجراء المزيد من الدراسات حول الوقاية من الولادة المبكرة، وتوثيق حالات الوفيات وحدوث المرض بين الاطفال المبتسرين خلال السنة الاولي من الحياة

الكلمات الدالة: *الطفل* المبتسر ـمشاكل الطفل المبتسر ـقياسات النمو