The Impact of Home Care Program on Mothers' Knowledge, Practices and Their Premature Infants' Physical Growth

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Abstract

Background: prematurity is a global health problem with leading cause of infant death, mothers as the primary care giver need home care program of premature babies to ensure best practices and enhance their ability in attending to their infants' needs. **Aim of the study:** evaluate the impact of home care program on knowledge and practices of mothers of premature babies and their infants' physical growth. **Research Design:** A quasi experimental study with pretest-posttest nonequivalent groups design. **Research hypothesis:** The mothers with premature infants who received home care program have higher mean score of knowledge and practices, also, improvement of their infant's physical growth than those in the control group. **Subjects and Method**: A purposive sample consisted of 184 mothers and their premature infants divided into two groups (study & control), 92 for each were selected from the premature outpatient follow up clinics attached to premature unit at Abu EL- Reish Pediatric hospitals and El Manial University hospital, Cairo University. A structured interview questionnaire included demographic characteristics, Mother's knowledge and practices. In addition, growth measurement of the premature infants. **Result:** Mothers' knowledge and practice for caring premature infants were significantly higher than the total mean scores of those in the study group post and follow up program intervention (p=<0.000). Also, the premature infants in study group had good growth rate compared to the control group. **Conclusion:** the developed home care program led to significant improvement on mothers' knowledge and practices regarding caring of their premature infants, and consequently led to improve physical growth rates among their premature infants. **Recommendation:** Interventions are needed to be given to mothers at home to improve their ability of caring their premature infants.

Keywords: Premature, Home care program, Mothers' knowledge and practices, Infant physical growth

Introduction

Preterm birth is the most common cause of neonatal mortality and morbidity. According to WHO, **(2018)** Preterm is defined as babies born alive before 37 weeks of pregnancy are completed. Worldwide, it was estimated that 15 million babies are born prematurely each year, which means that more than 1 in 10 births are premature, more than 70 percent of premature babies are born between 34- and 36-weeks' gestation, these are called late-preterm births. In addition, about 12 percent of premature babies are born between 32- and 33-weeks 'gestation, 10 percent between 28 and 31 weeks, and 6 percent at less than 28 weeks gestation **(Blackburn, 2015).**

Approximately one million child deaths occur each year due to complications of preterm birth. Even those who survivors are at greater risk for disabilities, and lifelong health problems such as mental delay, learning and behavioral problems, hearing problems, vision problems, developmental difficulties, impairments in physical growth and mental development, social, behavioral and speech problems also infection are commonly seen **(Coffman, 2014 & Blackburn, 2015).** Noteworthy, Premature babies are at increased risk of rehospitalization related to many preventable factors such as poor feeding, jaundice, milk aspiration, diarrhea and infection **(Huff et al., 2018).**

One of the most effective methods of alleviating damages and complications of premature babies following hospital discharge is through parental involvement in infants' care measures. This is not only, but also the trend

about changes in the healthcare system that emphasis on reducing the length of hospitalization, support outpatient follow-up and home care treatment, that placed the caring responsibilities upon family care providers, so that today care and support for family members specifically mothers and babies is a major challenge for health care. Consequently, it is critically important to support family-centered care by encourage parents to actively cooperate in taking care of their infants, that in turn improve mothers' sense of partnership and confidence. Active participation of parents in taking care of the premature infant increases the parents' ability to improve infant's physical growth and development **(Arzani et al., 2015 and Mohammaddoost et al., 2016).**

Since mothers are the infant' primary caregivers, they have a greater responsibility for caring of their premature babies, mothers should therefore be knowledgeable about the ongoing needs of preterm babies. However, the majority of the mothers' awareness regarding the care of premature babies at home is still low, mothers feel unskilled and confident to care for their premature babies **(Osman & Othman, 2014).** Early home care management programs have beneficial effects on both the mothers and children, that help to address inadequate maternal care and facilitate the transition to the home. However, only a limited study has been conducted to identify the real needs of mothers of premature babies and to determine whether early home care programs meet such needs **(Toral-López et al., 2016).** Mothers need basic knowledge and skills related to premature home care management such as nutrition (breastfeeding), immunization, skin care, personal hygiene, and management of common health problems among their infants **(Osman & Othman, 2014**).

In this context, the provision of ongoing support for mothers of premature infants at home is a significant role of the primary care team which includes family doctors, health professionals and, crucially, nurses as a central member of the team. Community health nurse represent an important source of informational and ongoing support, educating mothers regarding care of premature infants help to improve their knowledge, care capacities which will subsequently assist mothers to develop

confidence in attending to their infants' needs and also assist them in handling the pressures of caring for a fragile baby at home **(Cheng et al., 2018 and Petty et al., 2018).**

Significance of the Study:

Globally, prematurity is the leading cause of death in children under 5 years of age, with approximately 1 million children dying each year due to complications of preterm birth. At 2018, the prevalence rate of premature births in Egypt about 12 percent of the total live births, prematurity represents 39% of total neonatal mortality rate in Egypt. Premature birth leading to expose infants to dangers and a wide range of problems or even death which impacting their families, communities, and health care services. Therefore, nursing support is necessary for families of these infants **(WHO, 2018 & Abd El-Salam et al., 2018)**. Interventions are needed to be given to mothers at home helping to enhance their ability and self confidence in caring for premature babies which in turn would affect the psychological health of the mother and also affect the health, growth and development of premature babies as well **(Premji et al., 2017 and Petty et al., 2018).**

Home care program to mothers with premature infants may substantially improve survival. Evidence suggested that teaching parents about premature newborn care skills as feeding, thermal control, hygiene, additionally preventing infection should be apriority goal, interventions and follow up visits need to be carried out by community health nurses to ensure the readiness and ability of mothers to care for their babies through educating mothers regarding special home care aspects for their premature infant will play a main role in reducing neonatal morbidity as well as mortality **(El-Gawly et al., 2014**).

Aim of the Study

- To evaluate the impact of home care program on knowledge and practices of the mothers with premature infants.

- To evaluate the effectiveness of home care program on infant's physical growth

Research hypotheses

- **H1**: The mothers with premature infants in the study group who received home care program will have higher mean score of knowledge and practices than those in the control group.

- **H2:** The mothers with premature infants in the study group will improve their infant's physical growth post home care program implementation than those in the control group.

Subject and Methods:

Research design

A quasi-experimental study with pretest-posttest nonequivalent groups design. The study participants divided into two groups, the experimental/study group was given a pretest, receives home care program of premature infants, and then was given a posttest. While nonequivalent control group was given a pretest, did not receive home care program, and then is given a posttest.

Research Setting:

The study was conducted at the premature outpatient follow up clinics attached to the premature unit at Abu EL- Reish Pediatric hospitals and El Manial University hospital, Cairo University, which represents a tertiary health facility to which cases are referred from all over the country, with various socio-economic level, high capacity, free services for patients.

Sampling: -

A purposive sampling technique was used. The sample size was estimated to be 236 mothers with their premature infants, using Raosoft sample size calculation soft program. The accepted margin of error was at 5%, the response distribution was 50%, confidence level 90% and the total premature infants admitted to Abu EL- Reish Pediatric hospitals and El Manial University hospital, Cairo University was 1127 premature babies in previous year (2017) using the following equation:

$$\text{Sample size, } n = N * \frac{\frac{z^2 * p * (1-p)}{e^2}}{\left[N - 1 + \frac{z^2 * p * (1-p)}{e^2}\right]}$$

While, there was 52 were excluded because of some infants die, incomplete data and absenteeism during program sessions and tests. Thus, the final sample size was 184 mothers assigned to either the control group (N = 92) and the study group (N = 92). They are selected under the following **inclusion and exclusion criteria:**

1. Mothers attended in the premature follow up outpatient clinics.

2. The mothers have their first premature baby and from different resident's region

3. Gestational age at birth 32 - ≥ 37 weeks.

4. The premature babies with congenital anomalies or diseases known to affect growth such as down's syndrome or other genetic syndromes, etc. were excluded.

Data collection tools

Tool (1):   A structured interviewing questionnaire: it was developed by the researchers in an Arabic language after reviewing the related article and literatures, it consisted of the following parts:

Part I: concerned with questions related to demographic characteristics of mothers such as, age, educational level, occupation, residence monthly income of family, family size, and type of family.

Part II: Mothers' knowledge questionnaire: It was used to assess mother's' knowledge about premature infant care, consisted of 30 questions divided into (20) multiple choice questions (MCQ's) and (10) true and false questions to assess mothers' knowledge about care of preterm babies; it covered areas of premature concept, criteria, related factors, complications of prematurity, signs and symptoms predictive of serious illness, needs of premature, benefits of baby massage, Kangaroo Mother Care (KMC), vaccination and its timetable. In addition, neonates weight gain, room and baby temperature.

Rating and scoring system:

The correct answers were given 1 score, while the incorrect answers were given zero.

So, the total score was 30 scores. The knowledge mean score was calculated and the total knowledge is considered satisfactory if the total score ≥ 60 % & unsatisfactory if the total score < 60%.

Part III: Mother's practices questionnaire, it includes 104 questions. It was used to assess the mother's practices towards care of their premature infants, divided into the followings:

- **First section**: 22 questions related to general care of preterm babies such as hygienic care, skin care, proper handling, warming, sleeping, feeding, prevention of infection, vaccination, and follow up.

- **Second section**: Procedure's checklists its modified from **Bowden and Smith, 2016 and WHO, 2003** included 82 items divided into eight infant care related procedures; breast feeding checklist contains 10 items, bottle feeding checklist contains 12 items, Axillary temperature checklist contains 9 items, cold compresses checklist contains 10 items, baby bath checklist contains 15 items, diaper care checklist contains 7 items, baby massage contains 11 items and Kangaroo Mother Care (KMC) 8 items

Rating and scoring system:

The correct answers were given 1 score, while the incorrect answers were given zero. So, the total score was 104 scores. The total practice score ≥ 70% considered adequate, while less than 70% considered inadequate practice. The overall mean score was calculated, with the higher score is the better practice of the mothers.

Tool (2): Anthropometric/Growth Measurement: included baby weight, supine length, head & chest circumferences were assessed using an electronic baby weighing scale and non-stretchable, plasticized measuring tape. Anthropometric/growth data were measured by the researchers at frequent intervals two times (one- and two-months posttest) and were plotted based on WHO child growth standards (**WHO, 2006).** Percentiles and Z-score values were generated for boys and girls aged 0– 24 months. The cutoff values of +2 standard deviations, which correspond to

the 2nd and 98th percentiles, to define child growth based in the following interpretation.

Percentile >2	Subnormal
Percentile >2 and <98	Normal
Percentile >98	Above normal

Validity and Reliability:

Data collection tools were reviewed by panel of 5 experts, from community health nursing and pediatric nursing specialties at the faculty of nursing in Ain shams university, in addition one of the panels was a pediatrician (Neonatologists) in faculty of medicine, Cairo University, to test the content validity. Reliability was done by Cronbach's alpha test and the result of knowledge was 0.75 and practice 0.78.

A pilot Study:

A pilot study was done on 10% of the mothers of premature infants that was excluded from the study sample to test the feasibility and applicability of the study in terms of its setting, tools, time needed.

Ethical consideration

The research approval was obtained from the faculty of nursing research ethics committee before initiating the study. The directorate of Education in kaser Elini and Abu El Reish pediatric hospitals and El Manial University hospital. Moreover, each mother announced informed consent. The researchers clarified the purpose and aim of the study to mothers with premature infants included in the study. The researcher-maintained anonymity and confidentiality of subjects' data. The mothers were informed that they could withdraw from the study at any time without penalty

Procedure: -

The procedure included three phases: preparatory phase, implementation phase, and evaluation phase

Preparatory phase:

This phase concerned with reviewing of the recent related studies and literatures to develop tools for the data collection. An official permission to conduct the study was

obtained from the directors of the premature units. Written consent was obtained from all mothers either the study or control groups before participating in the study after provide a detailed explanation of the study. The researcher mutually distributed the premature infants & their mother as two groups, study group, who received the premature home care program and control group who didn't receive the program. The data were collected through face-to-face interviews with the participants at premature outpatient clinic.

Implementation phase:

The teaching sessions were conducted for mothers with premature infants at premature outpatient follow-up clinics. The program's contents were explained over 4 sessions with 30-45 minutes for every session according to the mothers' preference. The teaching program was based on small groups (10- 15 mothers). The first session included: a pre-test to assess baseline mothers' knowledge and the theoretical part related to care of premature infants (concept, criteria, related factors, complications of prematurity, signs, and symptoms predictive of serious illness, needs of premature, benefits of baby massage, vaccination, neonates normal physical growth, room, and baby temperature), also conduct growth measurement of the baby, While, the second, third, and fourth sessions included: practical parts about home care of premature infants including general care of preterm babies, hygienic care, skincare, proper handling, warming, sleeping, feeding, prevention of infection, vaccination and its timetable, and follow up, in addition, proper techniques of breastfeeding, bottle feeding, axillary temperature, cold compresses, baby bath, diaper care, and baby massage. Methods of teaching, Lecture, small group discussions, question and answer, were used for giving the theoretical part, while demonstration and re-demonstration were used for the practical part. Some audio-visual materials such as PowerPoint lab top, baby doll and educational video CD were also used as baby bathing, diaper care, baby handling, bottle feeding, measuring temperature. If the mother didn't attend one session of the program, for any reason, the content of the session was explained to them when they came for the next

visit or via telephone conversation with women if available and sending educational video. Data collection and teaching sessions were conducted over a period of four months starting from the beginning of January 2018 till April 2018.

Evaluation phase:

Evaluation of the effectiveness of home care program was done by comparing the mothers of both groups in relation to the results of knowledge and practices pre and posttests that were conducted two times one month after finishing the program session and after two months (follow up test) using appropriate statistical analysis. Besides, comparing infant' growth measurement between the two groups.

Statistical Analysis

The collected data was analyzed using the statistical package for social science (SPSS) version 18. Quantitative and qualitative data were presented as numbers, percentages, a mean and standard deviation (SD). inferential statistics used Chi-square and t-test was used to determine the differences. While Pearson correlation coefficient was used to find correlations among the study variables. The significance of the observed difference was obtained at $P \leq 0.05$

Result of the Study: -

Table 1: showed that the mean age of the study group was 26.5 ± 4.3 years, 66% had no formal education, 84.8 were house wives, 71.7% had suburban residence places, 68.4% live in extended families. While in the control group, the mean age was 26.07 ± 5.0 years, 53.2% had no formal education, 80.4% were housewives, 79.3% had suburban residence places, 66.3% live in extended families. No significant differences were found between the study and control groups.

Table (2) indicated that the mean of the total score of mothers' knowledge pretest were 9.04 ± 6.31 and 8.91 ± 8.78 respectively in the control and study group, with no statistical significance differences (P=0.6188). while the study group showed significant improvement two- and four-months posttests 24.08 ± 3.19 and 22.40 ± 2.80 respectively compared with the control group 10.91 ± 4.69 and 11.64 ± 4.60

respectively with statistically significant difference between both groups (p=0.000).

Figure 1: Showed that 17.4% and 13.0% of the mothers had satisfactory knowledge in pretest in control and study groups while it improved to 89.1% and 84.8% in study group within two- and four-months posttests, compared with 23.9% and 22.8% in the control group.

Table 3: Showed that within pretest, no significant difference was found between the two groups in all practices' items. While one - and two-months posttests, the study group showed a significant increase in the adequacy level of the mothers' practices with statistically significant difference (P<0.000).

Table (4) indicated that the mean of the total score of mothers' practices pretest were 29.26± 9.81 and 29.03± 9.38 respectively in the control and study group, with no statistical significance differences (P<=0.219). while the study group showed significant improvement at one- and two-months posttests 78.81± 5.68 and 76.37±6.00 respectively compared with the control group 35.74± 8.71 and 39.78±9.29 respectively with statistically significant difference between both groups (p<=0.000).

Figure (2) denoted that 18.5% and 16.3% of the mothers had adequate practices in pretest in control and study groups, while it raised to 91.3 % and 89.2% in study group within one and two-months posttests, compared with 27.2% and 29.4% in the control group.

Table (5) highlighted that, 78.3% and 84.8% respectively of premature infants in the study group had proper body weight compared to 59.8% and 65.2% respectively of the control group at 1- and 2-months posttests with

statistically significant difference p <0.005 and 0.004 respectively. As regard to the infant' length, 68.5% and 55.4% respectively of premature babies in the study group and control group had appropriate length at one-month post-test with no statistically significant difference (p=0.068), continued improvement of the infant length was observed in the study group to reach 76.1% during two months posttest, compared to 59.8% in the control group with statistically significant difference (p<0.017). Also, 77.2%, 85.7 % of the premature infants at study group had proper measurement of head circumference at one- and two-months posttests compared with 64.1%, 68.5 respectively of those in the control group with statistically significant difference (p<0.000 and 0.012 respectively). 76.1%, 92.5% of the premature infants in the study group had proper chest circumference at one - and two -months posttests compared with 65.2, 76.0% respectively in the control group, statistically significant difference between both groups was found only at two months posttest (p<0.002).

Table (6): proved that there was significant relation between mothers' knowledge and their practice in pre-test in the control group (p<0.043) and the study group (p<0.30) as well as at two months posttest in control group (P<0.021).

Table (7): As noted in this table there were significant positive correlation between infant physical growth with mothers' knowledge (p<0.044) and practices (p<0.023) in control group at two months posttest. In addition, there was highly statistical relation between infant growth and mothers' practices in study group at two months post program intervention (P<0.002).

Table (1). Socio-demographic Characteristics of Mothers of Premature Infants in the study & control groups (n=184)

Items	Subject Groups				x2 Test	p-value
	Study Group (n=92)		Control Group (n=92)			
	No.	%	No.	%		
Mother age (years): ≤20 21 – 25 26 - 30 >30	11 20 33 28	11.9 21.7 35.8 26.1	9 25 31 27	9.7 27.2 33.7 29.4	1.508	0. 6804
Mean ±SD	26.5 ± 4.3		26.07 ± 5.0			

Items	Subject Groups				x^2 Test	p-value
	Study Group (n=92)		Control Group (n=92)			
	No.	%	No.	%		
Mother education: No formal education Primary education Secondary education Higher education	58 14 12 8	66.0 15.3 13.0 8.7	49 13 19 11	53.2 14.2 20.6 11.9	2.848	0.41559
Mother job: Housewife Working	78 14	84.8 15.2	74 18	80.4 19.6	0.605	0.4365
Residence: Suburban Rural	73 19	79.3 20.7	66 26	71.7 28.3	1.441	0.2299
Income (EGP): < 2000 2000 – 4000 > 5000	22 57 13	23.9 62.0 14.1	18 58 16	19.6 63.0 17.4	0.719	0.6980
Number of family members 2 3 – 5 6 – 9	29 54 9	31.6 58.7 9.7	30 58 4	32.6 63.0 4.4	2.082	0.3529
Type of the family Nuclear family Extended family	29 63	31.6 68.4	31 61	33.7 66.3	0.098	0.7531

Table (2): Comparison of Total Mean Mothers' Knowledge Score of Both Groups throughout Phases of Program Intervention Tests

Phases of Program tests	Knowledge mean sore of Subject groups(max=30)		Mean difference	Paired t test	
	Control Group (n= 92)	Study Group (n= 92)		T	P-value
	Mean± SD	Mean± SD			
Pre test	9.04±6.31	8.91±8.78	0.13	0.4993	0.6188
1 month Post test	10.91±4.69	24.08±3.19	-13.17	74.1442	**<0.000****
2 months post test	11.64±4.60	22.40±2.80	-10.76	40.7057	**<0.000****

(**) Highly Statistically significant at p<0.001

Figure (1) Comparison between the Total Score Levels of mothers' Knowledge in Both Groups throughout Phases of Program Tests (n=184)
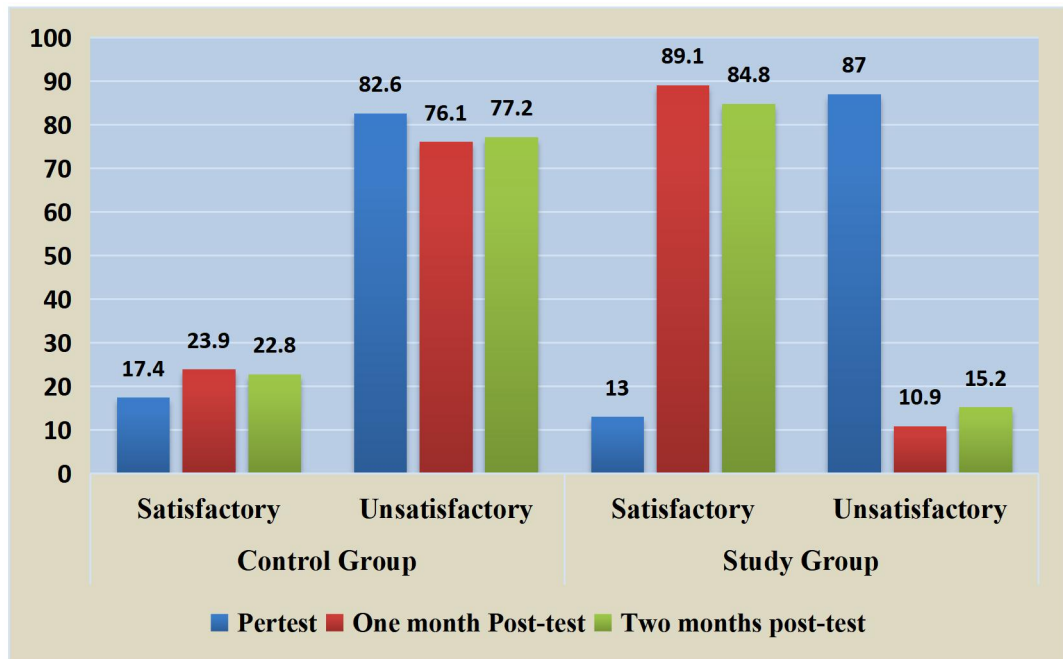

Table (3): Comparison of Mothers' Practices of Both Groups throughout Phases of Program Tests (n=184)

Mother's practices	Pre test				1 month post-test				2 months post test			
	Control Group		Study Group		Control Group		Study Group		Control Group		Study Group	
	N	%	N	%	N	%	N	%	N	%	N	%
General care of preterm babies												
Adequate	24	26.1	19	20.6	34	36.9	86	93.5	31	33.7	80	86.9
Inadequate	68	73.9	73	79.4	58	63.1	6	6.5	61	66.3	12	13.1
χ^2 P value	0.758 0.383				74.160 <0 .000**				54.521 < 0.000**			
Breast feeding												
Adequate	57	61.9	54	58.7	71	77.2	89	96.7	72	78.3	85	92.3
Inadequate	35	38.1	38	41.3	21	22.8	3	3.3	20	21.7	7	7.7
χ^2 P value	0.873 0.350				15.525 < 0.000**				7.335 < 0.006**			
Bottle feeding												
Adequate	56	60.8	55	59.8	56	60.8	90	97.9	61	66.3	89	96.7
Inadequate	38	39.2	37	40.2	38	39.2	2	2.1	31	33.7	3	3.3
χ^2 P value	0.000 0.976				40.301 <0 .000**				28.285 0.000**			
Vital signs (Axillary temperature) Adequate	0	0.0	1	1.1	0	0.0	67	72.8	2	2.17	61	66.3
Inadequate	92	100.0	91	98.9	92	100.0	25	27.2	90	97.8	31	33.7
χ^2 P value	0.000 0.993				102.423 <0 .000**				84.022 < 0.000**			
Cold compresses												
Adequate	18	19.6	10	10.9	20	21.7	89	96.7	22	23.9	86	93.5
Inadequate	74	80.4	82	89.1	72	78.3	3	3.3	70	76.1	6	6.5

Mother's practices	Pre test				1 month post-test				2 months post test			
	Control Group		Study Group		Control Group		Study Group		Control Group		Study Group	
	N	%	N	%	N	%	N	%	N	%	N	%
χ^2 P value	2.696 0.100				107.158 < 0.000**				91.820 < 0.000**			
Diaper care Adequate Inadequate	55 47	59.8 40.2	45 47	48.9 51.1	59 33	64.1 35.9	91 1	98.91.1	57 35	62.0 38.0	92 0	100 0
χ^2 P value	0.485 0.485				36.944 < 0.000**				40.328 < 0.000**			
Baby tub bath Adequate Inadequate	25 67	27.2 72.8	30 62	32.6 67.4	72 20	78.3 21.7	89 3	96.7 3.3	76 16	82.6 17.4	91 1	98.9 1.1
χ^2 P value	0.648 0.420				14.360 < 0.000**				14.582 < 0.000**			
Baby massage Adequate Inadequate	6 86	6.5 93.5	9 83	7.8 90.2	9 83	7.8 90.2	80 12	86.9 13.1	18 74	19.6 80.4	79 13	85.9 14.1
χ^2 P value	0.653 0.418				109.703 < 0.000**				81.130 < 0.000**			
Kangaroo Mother Care (KMC) Adequate Inadequate	8 84	8.7 91.3	9 83	7.8 90.2	13 79	14.1 85.9	86 6	93.5 6.5	23 69	25.0 75.0	82 10	89.1 10.9
χ^2 P value	0.0648 0.799				116.522 < 0.000**				77.215 < 0.000**			

(*) Statistically significant at p<0.05   (**) Highly Statistically significant at p<0.00

Table (4): Comparison of the Total Mean Score of Mothers' Practices in Both Groups throughout Phases of Program Tests (n=184)

Phases of Program tests	Practices' mean score of the Subject groups (max=104)		Mean difference	Paired t test	
	Control Group	Study Group		T	P-value
	Mean± SD	Mean± SD			
Pre test	29.26± 9.81	29.03± 9.38	0.23	1.2376	0.219
1 months Post test	35.74± 8.71	78.81± 5.68	- 43.07	107.3716	< 0.000**
2 months post test	39.78±9.29	76.37±6.00	-36.59	47.5757	< 0.000**

(*) Statistically significant at p<0.05

(**) Highly Statistically significant at p<0.j001

Figure (2): Comparison between the Total Score Levels of Practices among Mothers in Both Groups throughout Program Tests
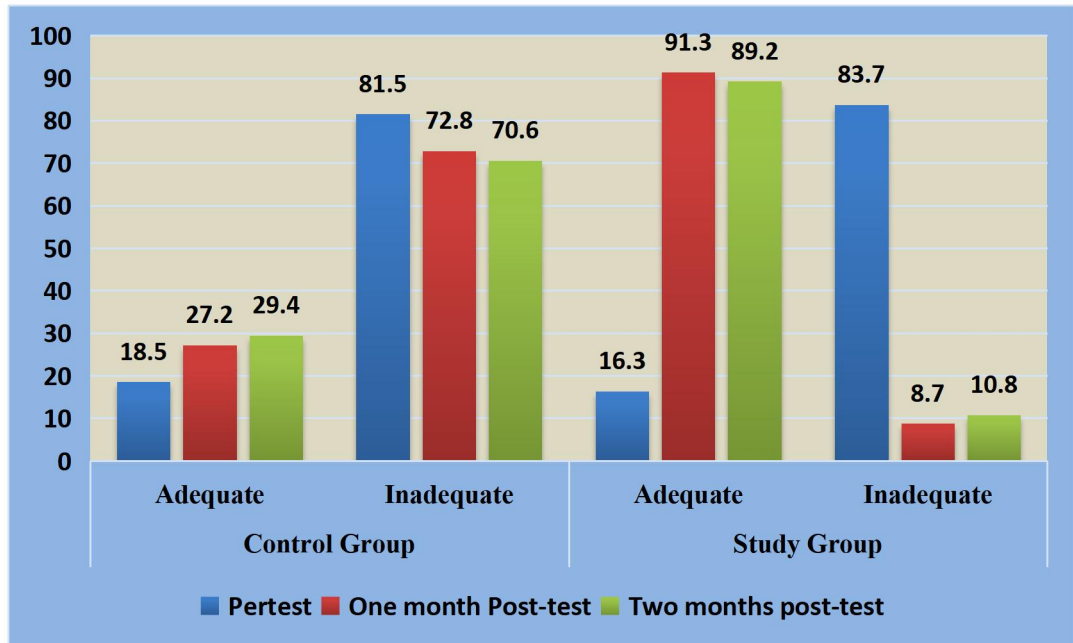

Table (5): Comparison between Growth Measurement of Premature Babies in Both Groups throughout Phases of Program Tests (n=184)

Growth Measurement	1 month Post-test				2 months post test			
	Control Group		Study Group		Control Group		Study Group	
	N	%	N	%	N	%	N	%
Weight								
- Normal	55	59.8	72	78.3	60	65.2	78	84.8
- Subnormal	33	35.8	14	14.2	24	26.1	8	8.7
- Above normal	4	4.4	6	6.5	8	8.7	6	6.5
χ^2 P value	10.356 < 0.005*				10.633 < 0.004*			
Length								
- Normal	51	55.4	63	68.5	55	59.8	70	76.1
- Subnormal	41	44.6	29	31.5	37	40.2	22	23.9
- Above normal	0	0	0	0.0	0	0.0	0	0
χ^2 P value	3.320 0.068				5.613 < 0.017*			
Head circumference								
- Normal	59	64.1	71	77.2	63	68.5	79	85.7
- Subnormal	33	35.9	21	22.8	24	26.0	9	9.8
- Above normal	0	0	0	0	5	5.5	4	4.3
χ^2 P value	21.911 < 0.000**				8.732 < 0.012*			
Chest circumference								
- Normal	60	65.2	70	76.1	70	76.0	85	92.5
- Subnormal	30	32.6	20	21.8	18	19.7	3	3.2
- Above normal	2	2.2	2	2.1	4	4.3	4	4.3
χ^2 P value	2.769 0.250				12.165 < 0.002*			

(*) Statistically significant at p<0.05

(**) Highly Statistically significant at p<0.001

Table (6): The Correlation between Mothers' Knowledge & Practices regarding Home Care Management of Premature Babies throughout Phases of Program Tests

	Control Group						Study Group					
	Pre test		1 month Post-test		2 months Post test		Pre test		1 month Post-test		2 months Post test	
	r	P	r	P	r	P	r	P	r	P	r	P
Mothers' Knowledge / Mothers' Practices	0.121	< **0.043***	0.93	0.121	0.138	< **0.021***	0.130	< **0.30***	0.007	0.908	0.062	0.335

(*) Statistically significant at p<0.05

Table (7): Correlation between Mother's Knowledge and Practices with Growth Measurements of their Premature Babies in both Groups throughout Phases of Program tests

	Infant Growth Measurements											
	Control Group						Study Group					
	Pre test		1 month Post-test		2 months Post test		Pre test		1 month Post-test		2 months Post test	
	r	P	r	P	r	P	r	P	r	P	r	P
Mothers' Knowledge	0.030	0.616	0.092	0.126	0.125	< **0.044***	0.018	0.760	0.086	0.155	0.032	0.623
Mothers' Practices	0.056	0.352	0.018	0.760	0.137	< **0.023***	0.007	0.908	0.018	0.760	0.189	< **0.002****

(*) Statistically significant at p<0.05
(**) Highly Statistically significant at p<0.001

Discussion:

Prematurity is a global health problem, in order to decrease preterm infant mortality and morbidity, mothers need to be informed on accurate knowledge and practices about prematurity care, helping to increase confidence in caring for their premature infants and eliminating false beliefs and traditions **(Ahmed, 2007)**.

The present study evaluated the effectiveness of home care program on knowledge and practices of the mothers with premature infants. Discussion of the findings in the current study covered the main areas; socio-demographic characteristics of mothers of premature babies, mothers' knowledge, practice and growth measurement of premature infants, in addition, correlation among the study variables.

As regards *Socio-demographic characteristics of mothers of premature babies*, the study results revealed that more than one third of the mothers in both groups were between 26- 30 years old. While the vast majorities of the participates were housewives, had no formal education and from suburban areas with no statistically significant differences were found between both groups, this confirmed that both groups were homogenous before program intervention. This result is quite similar with a study conducted by **Raffray et al., (2014)** about barriers and facilitators to preparing families with premature infants for discharge home from the neonatal unit in Colombia, which indicated that less than half (46.6%) of the mothers of premature babies were 25-30 years old. **Solomons & Rosant, (2012)** showed that more than half of mothers of premature babies didn't finish their secondary education. Moreover, the study of **Çelen and Arslan, (2017)** that conducted in Turkey and the study of **Ahmed, (2007)** from Egypt found that the majority of

the mothers of premature babies were unemployed.

The present study findings showed that mean scores of mothers' knowledge related to care of premature infants at home in two groups before home care program implementation were not significantly different, in which the majority of the mothers in both groups had unsatisfactory level of knowledge with low mean score in the pretest. Lack of mothers' knowledge would pose a greater threat on the care of their premature infants. The possible explanation of this inadequacy of mother's knowledge about home care of premature babies could be related to the effect demographic characteristics of the participants in the present study, as the majority of the mothers had low level of education, low socioeconomic status and a high level of unemployment status. The finding of the current study was similar with the study of **Mohini & Shetty, (2017)** who found in their study about knowledge of mothers on home-based neonatal care at Bangalore, only 14.2% of mothers had adequate knowledge on home-based neonatal care. In addition, Egyptian study of **EL-Gawly et al., (2014)** found a major deficiency in mothers' knowledge about prematurity before the intervention.

While after program implementation, mothers in the study group showed significant improvement of mean scores with higher satisfactory level of their knowledge in the posttest either immediately or at two-months, compared to the control group, with statistical significance differences in both groups. This finding supports the acceptance of ***Hypothesis (H1)*** that could be related to the effectiveness of the home care program session which might increases the mother's knowledge about care of preterm baby. This result in agreement with studies of **Amolo et al., (2017) and Ontita et al., (2016)** and found that the majority of mothers who received health education and training course had adequate knowledge about essential care. In addition, **Hayes et al., (2014)** who reported a higher level of knowledge among mothers in the experimental group on post-test compared to the control group. **Rungtiwa et al., (2012)** who found in their study about Effects of a transitional care program on premature infants and their

mothers, that the mothers involved in the intervention program had increased knowledge and skills about how to care for their fragile infants' needs.

As regards to mothers' level of practices related to care of premature babies at home. The study finding revealed that, before program implementation, the majority of the mothers in both groups had inadequate level of all practice's items required to care of their premature babies at home with low overall mean score. No significant difference was found between the two groups as they were equal. Even though our result exceeded the fifty percent in some practice items such as breast and bottle feeding besides diaper care, the fact that premature infants are vulnerable group, accordingly level of mothers' practices of care for premature babies in this study before program implementation looks unacceptable. This inadequacy of mother's practices about home care of premature babies could have a negative impact on their premature infants. According to **Huff et al., (2018),** adequate care for premature infants will prevent unwanted health conditions.

Whereas post home care program implementation, mothers involved in the study group showed a higher statistically significant improvement in the overall mean scores with greater adequacy of practices in both posttests than those in the control group. According to the researchers' point of view, this improvement could be attributed to the positive impact of the program; consequently, ***Hypothesis (H1)*** was completely accepted. The implemented home care program helped to improve mothers' knowledge and practice about care for their premature infants at home. This could be due to several reasons: First the study group received four sessions of educational program covering basic information about caring for their premature infants which met mothers' needs, second, active participating in the education program helped the mothers feel supported by healthcare providers, so that they have more self-confidence and eagerness and third, because the education program used small groups of mothers, that had additional chances to exchange experience with each other. Similarly, the studies conducted by **Guirguis**

& Farahat (2015) and Rungtiwa et al., (2012) showed that the positive effects of program on knowledge and practice of mothers with premature infants. Moreover, **Hayes et al., (2014),** reported that mothers in the study group had greater improvement of skills about proper care for their preterm infants than those of control group after program implementation.

As regards growth measurement of premature babies in both groups, the study revealed that the majority of premature infants of the mothers involved in the study group had higher appropriate/normal measures of infants' physical growth (weight- length- head and chest circumference) in both post-program tests than those of the control group, with statistically significant difference between both groups. Consequently, *Hypothesis (H2)* was accepted. This could be attributed to the impact of the home care program in the study group that led to enhance mothers' ability and confidence in caring for their premature infants that in turn helped to improve the physical growth of their premature infants. Home care program sessions included different measures of maternal premature infant care practices, included but not limited to the followings, breastfeeding that helped to improve infant feeding practices supporting them nutritionally, immunologically, and developmentally. In addition, infant massage improved circulation which affected positively on growth and development of premature infants. Besides, adherence to follow up visits would help mothers and their babies to receive health care services on a regular basis that facilitate early detection of any deviation in the physical growth of premature infants, hence supporting proper intervention such as feeding guidance and control measures. Importantly, many previous studies confirmed of the importance of kangaroo mother care (KMC)and its positive effect of on the child physical growth through enhancement of mother-child bonding, promoting breastfeeding and sleeping pattern.

The result of the present study supported by **Mohammaddoost et al., (2016)** who found in their study a significant increase of the mean weight gain of infants of mothers in the intervention group compared to that of infants of mothers in the control group. Also, **Bera et al., (2014)** found in their study that the KMC

infants in the study group showed better physical growth than those in the control group. **Esmaeeli (2013)**, study the effect of premature care program on premature general growth, and found a statistically significant difference in weight gain between the experimental & the control groups. Another study, conducted by **Borimnejad et al., (2012),** showed that after the implementation of the empowerment program, the mean scores for infants' weight in the experimental group were significantly higher than those of the control group.

Concerning statistical correlation among the study variables, the study result revealed that there was a significant positive correlation between mothers' knowledge with their practices regarding home care of their premature infants in both study and control groups before program implementation, as well as, at two months post-program implementation in only the control group (P< 0.05). Mothers who had satisfactory knowledge about the needs and care of their premature infants had adequate practice for caring for their premature infants and vice versa. This result confirmed that knowledge is an important motivator for changing behavior leading to improve practices, hence more knowledge in this regard results in better practice. The previous finding agrees with **Abd El-Salam et al., (2018)**, who found in her study about mother's care of low birth weight at home a highly statistically significance positive correlation between mothers' practice and knowledge after program implementation.

In respect to the correlation between mothers' knowledge and practices with growth measurements of their premature infants. The study finding showed that practices of the mothers for caring their premature infants have a positive and significant correlation with their premature infants' physical growth at two-month post program implementation in either study and control groups (P< 0.05). This result confirmed that mothers of premature babies required to have adequate practical skills regarding proper care of their premature babies that is very likely could in turn positively effect on their infant' physical growth. This finding coincides with **Sherrod (2015)**, who reported that caregivers who have good premature care

practices, their baby has normal growth and development in the first year of premature life.

Conclusion:

The developed home care program led to significant improvement on mothers' knowledge and practices regarding caring of their premature infants, and consequently led to improve physical growth rates among their premature infants.

Recommendations:

In the view of the previous conclusion, the following recommendations are suggested:

- Educational program interventions are needed to be given to mothers at home to improve their ability to care for their premature infants.

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