Effect of Breastfeeding Training Using Educational Toolkit on Primary Health Care Nurses' Knowledge, Attitudes and Problem-Solving Skills

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Abstract

Background: Breastfeeding is one of the most effective ways to ensure child health and survival and is a central part of the 2030 Agenda for Sustainable Development. Knowledgeable health care professionals play a vital role in protecting, promoting and supporting breastfeeding. Unfortunately, many of nurses lack even basic breastfeeding knowledge and skills due to lack of training along with inadequate breastfeeding education in undergraduate nursing programs. **Aim of the study**: to evaluate the effect of breastfeeding training using educational toolkit on primary health care nurses' knowledge, attitudes, and problem-solving skills. **Methodology**: A randomized educational interventional trial (pre-post) study involved 364 nurses (182 intervention and 182 control) working in primary health care facilities in El-Behira governorate, Egypt. The intervention group received breastfeeding educational program using educational toolkit consists of a group of active teaching methods and materials. The nurses' (intervention and control groups) breastfeeding knowledge, attitudes, and problem-solving skills were evaluated before the training, immediate post training and after 3 months. **Results**: Before the training, 83.0 % of the intervention group and 88.5% of the control group were having neutral attitudes and the majority of both groups (95.1, 96.7 % respectively) were having fair knowledge about breastfeeding. Moreover, 90.1% of intervention group and 85.2% of the control group were incompetent in breastfeeding problem solving. Meanwhile, after training significant improvement occurred among nurses in the intervention group. **Conclusion**: The present study revealed that training using educational toolkit has positive effect on primary health care nurses' knowledge, attitudes and problem-solving skills related to breastfeeding. **Recommendations:** provide continuous in-service training programs for nurses regarding breastfeeding management and establish national standards and guidelines for BF support in all primary health care facilities based on the ten steps for successful breastfeeding.

Key words: Toolkit, Problem solving, Breastfeeding, Breast milk, Breastfeeding problems, Active learning.

Introduction:

Breastfeeding is one of the most effective ways to ensure child health and survival and is a central part of the 2030 Agenda for Sustainable Development **(UNICEF, 2016)**. According to the world health organization (WHO), over 820 thousands lives could be saved every year among children under 5 years, if all children under age 2 years were optimally breastfed **(WHO, 2020)**.

Despite the boundless benefits of breastfeeding and the global efforts made to improve its practices, the rates of breastfeeding initiation, duration, and exclusivity throughout the world are low. Globally, 3 in 5 babies are not breastfed in the first hour of life; nearly 2 out of 3 infants are not exclusively breastfed for the recommended 6 months (a rate that has not improved in 2 decades) **(WHO, 2020)**. Additionally, only 70 % of infants received breastfeeding until the age of 12 months, and by two years of age, breastfeeding rates drop to 45% **(Global breastfeeding collective, UNICEF, & WHO, 2019**) .

Regarding the situation in Egypt, breastfeeding practices are not always optimal. Infants were reported to have received a prelacteal feed after birth in 61 % of last born children, only 36.7% of children less than 6 months of age and 13.3 % of children at age 4-5 months were being exclusively breastfed, and only 20.4 % of children continue to be breastfed until two years of age **(El-Zanaty, 2014)**.

Community health nurses in primary health care facilities are in frequent contact with mothers either during antenatal or postnatal period. Thus, they have an important and vital role in breastfeeding support **(Kaar, et al., 2019)**. They can significantly impact breastfeeding success by encouraging expectant mothers to seek out prenatal breastfeeding education, helping mothers until breastfeeding is well established, performing early and frequent follow-up for at-risk mothers and early identification and management of low breastfeeding self-efficacy and problems that can challenge breastfeeding **(Whalen & Cramton, 2010)**. However, different studies conducted in Egypt showed inadequate antenatal and postnatal education given to mothers regarding breastfeeding **(Hassan & Abdelwahed, 2015)**, low quality of breastfeeding knowledge delivered by health care providers **(El-Zanaty& Way 2008)** , and lack of training on breastfeeding among staff working in primary health care facilities **(Abul-Fadl & Mohamed, 2016).**

Nurses are unable to fulfill their roles toward breastfeeding because they have deficiency in knowledge and skills necessary to promote and support breastfeeding as a result of minimal breastfeeding education either during their undergraduate or in-service training **(Mostafa, Salem& Badr, 2019, Burgio, et al., 2016)**. Breastfeeding training help to increase nurses' knowledge, clinical breastfeeding support skills, positive attitudes, confidence, supportive behavior and counseling skills when supporting breastfeeding mothers and also improve the rates of exclusive breastfeeding and breastfeeding duration. Therefore, breastfeeding in-service training for nurses becomes mandatory in order to support breastfeeding **(Mulcahy, et al., 2012)**.

To achieve better learning outcomes and greater problem-solving abilities during training, active learning activities (such as Brainstorming, Think, pair, and share, Case Studies, Simulation, Discussion, Concept Map, Debates) are more effective than traditional one. Using a toolkit that combines a group of such activities can help nurses to acquire better knowledge, attitudes, and problem-solving skills regarding breastfeeding **(Yacout & Shosha, 2016, Smith, et al., 2015)**.

Toolkit is a knowledge translation (KT) strategy that includes packaging of multiple resources that codify explicit knowledge and that are geared to knowledge sharing, educate, and/or facilitate behavior change. Toolkits are used to facilitate the implementation of

evidence into clinical care to simplify practice change. They provide simple, flexible and expedient methods for promoting and utilizing best healthcare practices. Toolkit includes multiple resources for educating and/or facilitating behavior change such as information/handout sheets, posters, pocket guides and educational modules **(Yamada, et al., 2015)**.

Aim of the study:

The current study was carried out to evaluate the effect of breastfeeding training using educational toolkit on primary health care nurses' knowledge, attitudes and problem-solving skills in El-Beheira governorate.

Research Hypothesis:

Primary health care nurses in El-Beheira governorate who receive breastfeeding training using educational toolkit will exhibit higher knowledge, more positive attitudes, and higher problem-solving skills than those who are not.

Materials and Methods:

Materials

Research design:

A randomized educational interventional trial (pre - post) design was used to carry out this study.

Study setting:

The study was carried out in 8 primary health care facilities affiliated to four health directorates in El-Behira governorate namely: **Damanhour** (Naser medical center, and El-Helal child care center), **Kafr-El-Dawar** (El westniya family health unit, and Kafr-El-Dawar child care center), **El Mahmoudia** (Fesha family health center, and El Mahmoudia child care center), and **Itay El-Baroud** (Qilishan family health center, and Itay El-Baroud child care center).

Subjects:

The subjects of this study were 364 nurses working in the previously mentioned settings.

Sample size:

The sample size was calculated by using EPI info7software based on the total population of 6445 nurses working in the primary health care settings in El-Behira governorate, an expected frequency of 50%, acceptable margin of error of 5%, and confidence interval of 95%. This resulted in minimum required sample size of 364 nurses assigned randomly into two groups (182 as an intervention group and 182 as control group).

Tools of data collection:

Four tools were used in this study:

Tool I: Nurse's personal profile self - administered structured questionnaire

This tool was developed by the researcher in order to collect data from the studied nurses. It included the following parts:

Part 1: Personal and professional data sheet: it included age, residence, educational degree, occupation, years of experience, previous training about breastfeeding, sources of information about breastfeeding, topics they would like to have an additional training related to breastfeeding, and participation in breastfeeding support.

Part 2: Nurses previous breastfeeding self-experience sheet: to assess their personal experiences with breastfeeding, it included the number of children, number of children who were breastfeed, initiation of breast feeding, giving a prelacteal feeding, exclusive

breastfeeding, and duration of breast feeding, previous breastfeeding problems, and its management.

Tool II: Australian Breastfeeding Knowledge and Attitudes Questionnaire (ABKAQ): it was developed by **Brodribb, et al., 2008** to determine breastfeeding knowledge and attitudes. The questionnaire composed of 18 attitude items and 36 knowledge items. The complete English version of this questionnaire was adopted from a published research study that was conducted in Alabama University in USA **(Davis, 2014)** and it was translated into Arabic by the researcher.

- The answer of the attitude items were scored then summed together and the maximum total score was 90. The total score was categorized into three levels as the following:

Interpretation	Score
Negative attitude	< 50 % (< 45)
Neutral attitude	50 %-75% (45-68)
Positive attitude	> 75 (>68)

- The answer of knowledge items were scored then summed together and the maximum total score was 180. The total score was categorized into three levels as the following:

Interpretation	
Poor knowledge	< 50 % (< 90)
Fair knowledge	50 % -75% (90 - 135)
Good knowledge	>75% (> 135)

Tool III: Breastfeeding problem-solving skills questionnaire:

It was developed by the researcher after reviewing recent literature **(Smith, 2017, Naylor, 2014, Team, 2019)** to assess nurses' abilities to solve breastfeeding problems and challenges. It included 33 questions and case scenarios about:

- Common breastfeeding problems: nipple pain and trauma, candidiasis, breast engorgement, mastitis, breast

abscess, flat nipples, plugged ducts, and milk overproduction.

- Mother's diseases as diabetes and infectious diseases, and medications use during breastfeeding.

- Infant's problems as prematurity, jaundice, cleft lip, cleft palate, and congenital heart diseases.

- Lactation during pregnancy and lactation of twins.

- Mother's employment and breast milk expression.

- Family planning use during breastfeeding.

- Breastfeeding counseling skills.

The problem-solving score was calculated as follows; Correct answer = 1 & Incorrect answer or no response = zero. The answers to all questions were scored then summed together, the maximum total score was 33, the total score was categorized into two levels as the following:

Interpretation	Score
Incompetent in problem solving.	< 60 % (<20)
Competent in problem solving.	≥ 60 % (≥ 20)

Tool IV: Educational program satisfaction scale:

This tool was developed by the researcher to assess nurses' satisfaction (intervention group) with the educational program. It included 10 questions. The questions were scored on a 5-point Likert scale (strongly disagree, disagree, neither agree nor disagree, agree, strongly agree). The answers of the questions was scored then summed together; the total score was categorized into three levels as the following:

Interpretation	Score
Dissatisfied	< 50 % (< 25)
Neutral	50 % -75% (25-38)
Satisfied	>75% (>38)

Methods

I- Administrative process:

- An official letter from the dean of Faculty of Nursing was directed to the Health Affairs Directorate in El-Beheira governorate to inform them about the study objectives and to obtain their permission to conduct the study in the selected settings affiliated to this directorate.

- An official letters from the Faculty of Nursing was directed to the directors of selected settings to facilitate the implementation of the study.

II- Development of study tools:

- Tools I, III, and IV were developed by the researcher after reviewing recent literature to collect data from the studied nurses.

- Tools I, II, III, and IV were tested for content validity by a group of (5) experts in the fields of community health nursing, nursing education, and breastfeeding (international breastfeeding consultants) and their opinions and suggestions were taken into consideration.

- Tools I, III, and IV were tested for reliability by using Cronbach's alpha coefficient test. The tools' reliability were (r =0.66, r=0.76, r= 0.93 respectively).

- Tool II was translated into Arabic and its content validity after translation was tested by a group of (5) experts in the fields of community health nursing, nursing education, and breastfeeding and their opinions and suggestions were taken into consideration. Cronbach's alpha for 18 attitude items was .84, and for the 36-item knowledge scale was .83.

III- Pilot study:

- Pilot study was carried out on a sample of 37 nurses selected from Ezbat Saad family medicine center and not included in the study sample to assure the clarity, applicability, and comprehension of the study tools. Accordingly, the necessary modifications were done.

IV- Data collection:

- The study tools were distributed to nurses at the previous settings to collect necessary data.

- The fieldwork was accomplished in a period of 10 months (from the beginning of May 2020 to the end of February 2021).

V- Program:

- During the study, training was implemented to the intervention group, while control group hadn't received any training from researcher.

- Breastfeeding training program using educational toolkit was applied according to the following phases:

a) Assessment Phase:

- List of nurses' names and phone numbers was obtained from each health facility.

- Nurses were randomly selected from the lists; every odd number was assigned to the intervention group and every even number was assigned to the control group.

- The questionnaires (tool I, II, and III) were distributed to all available nurses either in the control or intervention group as pre-test. The objectives and the aim of the study were explained to them.

b)Planning Phase:

✧Breastfeeding toolkit was developed according to the following steps:

▪ **Step I: Identification of educational needs of the key participants for the toolkit:**

Data collected in pretest was analyzed to determine the level of nurses' knowledge, their attitudes, and problem-solving skills regarding breastfeeding.

▪ **Step II: Determining the scope of the toolkit:**

➢ *Determining the general objective:* by the end of the program nurses will exhibit higher breastfeeding knowledge, more positive attitudes, and higher problem-solving skills.

➢ *Determining the specific objectives:*

▪ Identify the benefits of breast feeding.

▪ Recognize the different factors that affect breast milk production and composition.

▪ Assess breastfeeding session.

▪ Describe steps of management for different maternal breastfeeding problems.

▪ Demonstrate appropriate counseling skills related to breastfeeding.

▪ **Step III: Develop a strategy for collecting content:**

➢ The researcher reviewed all the available literature about breastfeeding (e.g WHO &UNICEF 2020).

➢ All the collected materials were evaluated for its relevance, currency, understandability, and adaptability and it is an evidence based.

▪ **Step IV: Organizing resources into a logical format and create content:**

➢ All of the selected content was organized into a logical format and divided into five sessions.

➢ Appropriate active educational methods (strategies) were selected for each session such as brain storming, group discussion, demonstration and re-demonstration, and breastfeeding mothers' experience narrative case study ……etc.

✧ Plan of the training was formulated as regard to numbers of sessions and teaching methods.

c) Implementation Phase:

- This phase included the execution of the training plan.

- At each facility the intervention group of nurses divided into two groups to promote active participation.

- At the beginning of the first session, the researcher explained the aim of the study. Moreover, during each session the researcher explained the objectives of the session and orientation made to nurses about the educational strategies used in the session to facilitate the understanding of its objectives in relation to breastfeeding.

- Training was conducted over 5 sessions:

▪ **Session 1**: it was conducted over 3 hours and included: benefits of breast feeding, hazards of artificial feeding, breastfeeding rates and trends globally and in Egypt, national and international goals for breastfeeding, and baby friendly hospital initiatives and updates on ten steps to successful breastfeeding.

▪ **Session 2**: it was conducted over 3 hours and included: anatomy of the breast, physiology of milk production, stages of lactation, composition of breast milk, factors affecting breast milk production and composition,

breastfeeding initiation and skin to skin contact, mother nutrition during breastfeeding, factors affecting breastfeeding practices, and common breastfeeding myths. Example for media used during the session: video about real experience with breast crawl and early initiation of breastfeeding immediately after delivery.

▪ **Session 3**: it was conducted over 3 hours and included: proper breastfeeding technique, assessment of breastfeeding, breast milk expression and storage, and criteria for adequate breast feeding. Example for the teaching methods and media used during the session: use of breast model and fabric doll for demonstration and re_ demonstration of feeding positions.

▪ **Session 4**: it was conducted over 4 hours and included: common breastfeeding issues related to mother such as flat and inverted nipples, nipples pain and trauma… etc. Example for teaching methods and media used during the session: screen shots for real mothers' problems with breastfeeding posted on social media and audio record for mother about her experience with re-lactation.

▪ **Session 5**: it was conducted over 4 hours and included: common breastfeeding issues related to infant such as breastfeeding refusal, nipple confusion, prematurity… etc. Additionally, contraindications to breastfeeding, breastfeeding support, role of nurse toward breast feeding, and breast-feeding counseling skills. Example for the media used in the session: videos about feeding infant with cleft lip &cleft palate.

d) **Evaluation Phase :** This phase included:

- Evaluation of groups' (intervention, and control) knowledge, attitudes, and

problem-solving skills through posttest structured questionnaire immediately after the 5th session and then after 3 months using the study tools II and III.

- Evaluation of nurses' satisfaction (intervention group) with the implemented educational program using the study tool IV.

VI- **Ethical considerations:**

- Permission to conduct the study was obtained from ethical committee in Faculty of Nursing Damanhour University.

- Permission to conduct the study was obtained from the directorate of health affairs and from directors of the selected settings.

- Each director of primary health care facility was informed about the aim, date and time of the study.

- Written consent was obtained from every nurse to participate in the study after explanation of the study aims and assurance that collected data will be used only for the study purpose.

- Confidentiality and anonymity of individual response were guaranteed by using cover pages and using code numbers instead of names.

- Control group was educated about breastfeeding and received its educational materials after the completion of data collection of three months post program evaluation.

VII- **Statistical analysis of the data:**

The collected data were coded and analyzed using PC with the statistical package for social science (SPSS) version 20.0. All of the following statistical measures were used: frequencies, percentages, arithmetic means, and standard deviation (SD) ,Chi-square test, Monte Carlo test, and Fisher's Exact test , Student t-test, ANOVA test. The level of

significance selected for this study was P value equal to or less than 0.05.

Results:

Table (1) shows distribution of the studied groups according to their personal and professional data. The age of nurses was ranged from 22 to 59 years. More than two thirds of nurses in the intervention group and the control group (67.6%, 69.2% respectively) were aged ≥40 years. Concerning their residence, 67.0% of the intervention group and 70.9% of the control group were living in urban areas. More than three quarters of nurses in both groups (81.9%, 83.0% respectively) had nursing diploma. Nearly three quarters of nurses in both groups (74.7%, 72.5% respectively) were having experience ≥ 20 years. Nearly equal percentage of the intervention and control group (61.0, 61.5% respectively) were had no previous BF in-service training. In relation to their role in breastfeeding support, only 20.9% of the study group and 35.2% of the control group said they help mothers in managing breastfeeding problem. With respect to their need for breastfeeding training, 42.3% of both groups need training about management of breastfeeding problems.

Table (2) demonstrates distribution of the studied groups according to their previous breastfeeding self-experiences. The table shows that, 97.3% of both groups were having children. More than three quarters of those who have children either in the intervention or in the control group (87.6% 82.0% respectively) were breastfeed all of their children. Only 34.0% the intervention group and 30.3% of the control group were continued breastfeeding after 18 months. On the other hand, more than half of the intervention group (54.0%), and slightly less than half of the control group (49.7%) were not practicing exclusive breastfeeding in the first 6 months after delivery. Pertaining to the previous

exposure to breastfeeding difficulties, around half of the intervention and the control group (49.2%, 50.9% respectively) were exposed to breastfeeding difficulties.

Figure (1) clarifies the distribution of the studied groups according to their previous breastfeeding difficulties. The figure portrays that, the most common difficulties in both the intervention and the control group were nipples pain and trauma (55.2%, 55.1% respectively), breast engorgement (24.1%, 20.2% respectively), insufficient milk supply during the first six months (20.7%, 24.7% respectively), breastfeeding refusal (8.1%,13.5% respectively), and mastitis and breast abscess (5.7%, 12.4% respectively).

Table (3) portrays the distribution of the studied groups according to their breastfeeding attitudes total scores. The table shows that 83.0 % of nurses in the intervention group compared to 88.5% of the control group were having neutral attitudes before the program with a mean score of 52.27± 7.57 for the intervention group compared to 52.81± 6.83 for the control group. In immediate and 3 months post program evaluation, the intervention group's attitudes were greatly improved as shown in their positive attitudes (90.7%, 91.8% respectively), with mean score of 77.52± 5.75, and 77.65±5.72 respectively. T-test reveals significant difference in the intervention group attitudes' scores before and after the program (immediately, after 3 months) [t1=43.06 (p=.000), t2=42.86 (p=.000)] respectively. On the contrary, T-test reveals no significant difference in the control group attitudes' scores before and after the program (immediately, after 3 months) [t1=.083 (p =.934), t2 = 1.56 (p =.101)] respectively. The table also shows no significant difference preprogram between the intervention and control group [t^a=.720 (P=.472)]. While, there is a statistically significant

difference between two groups post program and after three months [t^b= 37.899 (P=.000), t^c= 38.877 (P=.000) respectively].

Table (4) illustrates the distribution of the studied groups according to their breastfeeding knowledge total scores. The table shows that, the majority of the intervention and the control group (95.1, 96.7 % respectively) were having fair knowledge about breastfeeding before the program with a mean score of 122.32± 9.41 for the intervention group compared to 120.74±8.73 for the control group. In immediate and 3 months post program evaluation, the intervention group's knowledge was greatly improved as shown in their good knowledge (91.2%, 93.4% respectively), with mean score of 153.63± 13.59 and 155.01±121.59 (respectively). T-test reveals significant difference in the intervention group knowledge's scores before and after the program (immediately, after 3 months) [t1= 28.693 (p =.003), t2 = 31.477 (p =.000)] respectively. In contrast, T-test reveals no significant difference in the control group knowledge scores before and after the program (immediately, after 3 months) [t1=1.39 (p =.166), t2 = 1.749 (p =.08)] respectively. The table also shows no significant difference preprogram between the intervention and control group [t^a=1.663 (P=.097)]. While there is a statistically significant difference between two groups post program and after three months [t^b= 27.438 (P=.000), t^c= 30.110 (P=.000) respectively].

Table (5) displays the distribution of the studied groups according to their breastfeeding problem-solving skills total score. The table shows that before the program 90.1% of intervention group and 85.2% of the control group were incompetent in breastfeeding problem-solving with a mean score of 14.79± 4.34 for the intervention group compared to 14.78± 4.01 for the control group. In immediate and 3 months post program evaluation phase, the intervention group's problem-

solving skills were greatly improved as 95.1% and 95.6% (respectively) became competent in problem solving, with mean score of 29.38± 3.01 and 29.12±2.97 (respectively). T-test reveals significant difference in the intervention group problem-solving scores before and after the program (immediately, after 3 months) [t1= 48.67 (p =.000), t2 = 48.08 (p =.000)] respectively. On the other hand, there is no improvement among the control group regarding their problem-solving total scores across the three stages of the intervention. While there is a statistically significant difference between two groups post program and after three months (tb= 39.659 (P=.000), tc= 38.735 (P=.000) respectively).

Table (6) reveals the relation between intervention group's breastfeeding knowledge and their breastfeeding problem-solving skills. It can be observed from the table that, the majority (94.5%) of the nurses who were incompetent in breastfeeding problem-solving in preprogram stage were having fair knowledge about breastfeeding. Whereas the majority (95.4% and 96.6% respectively) of nurses who were competent in problem-solving in immediate and 3 months post program stages were having good knowledge. However, the table showed that in preprogram stage there is no significant relation between nurses' knowledge and their problem-solving skills (^{MC}P =.644), while in immediate and 3months post program stages there is a highly significant relation between nurses' knowledge and their problem-solving skills ($\chi2$ =75.757(p=.000), $\chi2$ =63.580 (p=.000) respectively).

Table (7) illustrates the relation between intervention group's breastfeeding attitudes and their breastfeeding problem-solving skills. It can be noticed from the table that, more than three quarters (82.3%) of the nurses who were incompetent in breastfeeding problem-solving in preprogram stage were having neutral attitudes toward breastfeeding. Whereas the majority (90.2% and 91.4% respectively) of nurses

who were competent in problem-solving either immediately post program or after 3 months were having positive attitudes. However, there is no significant relation between nurses' breastfeeding attitudes and their problem-solving skills in all three stages of the intervention (MCP=.163, $\chi2$=.976 (p=.323), and $\chi2$=.752(p=.386) respectively).

Table (8) exhibits the distribution of the intervention group according to their satisfaction with breastfeeding training program using educational toolkit. The total satisfaction scores, it was observed that all nurses (100.0%) in the intervention group were satisfied with the program with a mean score of 46.86± 3.46.

Table (1): distribution of the studied groups according to their personal and professional data (N= 364)

Personal and professional data	Intervention group (n =182)		Control group (n =182)	
	No.	%	No.	%
Age				
- 20-	12	6.6	10	5.5
- 30-	47	25.8	46	25.3
- ≥ 40-	123	67.6	126	69.2
Min-Max	22-59		24-59	
Mean ±SD	44.74±9.26		44.89±8.89	
Test of significance	χ^2 =.229		p =.906	
Residence				
- Urban	122	67.0	129	70.9
- Rural	60	33.0	53	29.1
Test of significance	χ^2 =.629 p =.428			
Education				
- Nursing diploma	149	81.9	151	83.0
- Nursing institute	22	12.1	19	10.4
- Bachelor of nursing	9	4.9	12	6.6
- Master degree in nursing	2	1.1	0	0.00
Test of significance	[MC]p =.744			
Years of experience				
- <10	10	5.5	10	5.5
- 10-20	36	19.8	40	22.0
- ≥ 20	136	74.7	132	72.5
Min-Max	2-40		2-42	
Mean ±SD	24.95±9.56		25.53±9.01	
Test of significance	χ^2 =.270 p =.874			
Previous BF in-service training				
- No	111	61.0	112	61.5
- Yes	71	39.0	70	38.5
Test of significance	χ^2 =.012 p =.914			
Frequency of training	(n=71)		(n=70)	
- <3 times	59	83.1	62	88.6
- ≥ 3 times	12	16.9	8	11.4
Min-Max	1-6		1-5	
Mean ±SD	1.7±1.1		1.57±1.03	
Test of significance	χ^2 =.933 p =.334			
Main source of information about BF				
- Previous education	23	12.6	26	14.3
- Previous training	36	19.8	35	19.2
- Family and friends	13	7.1	15	8.2
- Personal experience	89	48.9	82	45.1
- Work experience	20	11.0	23	12.6
- Television &internet	1	0.5	1	0.5
Test of significance	[MC]p =.935			
Role in BF support #				
- Recommend breastfeeding	99	54.4	122	67.0
- Discuss pros & cons	37	20.3	51	28.0
- Conduct health education sessions	77	42.3	78	42.9
- Help mothers in managing BF problems.	38	20.9	64	35.2
- None	47	25.8	26	14.3
Test of significance	χ^2 =.296 p =.586			

Need for breastfeeding training#				
- Breastfeeding positions	31	17.0	25	13.7
- Contraindications	44	24.2	51	28.0
- Problems management	77	42.3	77	42.3
- Breast milk expression and storage	64	35.2	53	29.1
- Breastfeeding counseling	30	16.5	40	22.0
- BF mother's nutrition	33	18.1	31	17.0
- None	35	19.2	31	17.0
Test of significance		$\chi^2 =.756$ p $=.006$*		

#: Multiple answers χ^2: Chi square test p: p value for Chi square test *: Significant at P ≤ .05

Table (2): distribution of the studied groups according to their previous breastfeeding self-experiences. (N= 364)

Previous breastfeeding self-experiences	**Intervention group (n =182)**		**Control group (n =182)**	
	No.	**%**	**No.**	**%**
Having children				
- No	5	2.7	5	2.7
- Yes	177	97.3	177	97.3
Test of significance	$\chi^2 =.000$ p $=1.000$			
Number of breastfeed children	**(n =177)**		**(n =177)**	
- All of them	155	87.6	145	82.0
- More than half	5	2.8	2	1.1
- Half	10	5.6	17	9.6
- Less than half	6	3.4	11	6.2
- None	1	0.6	2	1.1
Test of significance	^{MC}P = .258			
Duration of breastfeeding	**(n =176)**		**(n =175)**	
- < 6 months	6	3.4	10	5.7
- 6-12 months	8	4.6	9	5.1
- 12-18 months	102	58.0	103	58.9
- >18 months	60	34.0	53	30.3
Test of significance	$\chi^2 =1.494$ p $=.684$			
Initiation of breastfeeding (for the most of children)	**(n =176)**		**(n =175)**	
- 1st hour	101	57.3	110	62.9
- 1st 6 hours	61	34.7	46	26.2
- 1st 24 hours	10	5.7	19	10.9
- > 24hours	4	2.3	0	0.00
Test of significance	^{MC}P $=.026$*			
Exclusive breastfeeding	**(n =176)**		**(n =175)**	
- No	95	54.0	87	49.7
- Yes	81	46.0	88	50.3
Test of significance	$\chi^2 =.552$ p $=.457$			
Breastfeeding difficulties	**(n =177)**		**(n =175)**	
- No	90	50.8	86	49.1
- Yes	87	49.2	89	50.9
Test of significance	$\chi^2 =.139$ p $=.709$			

#: Multiple answers χ^2: Chi square test p: p value for Chi square test * Significant at P ≤ 0.05
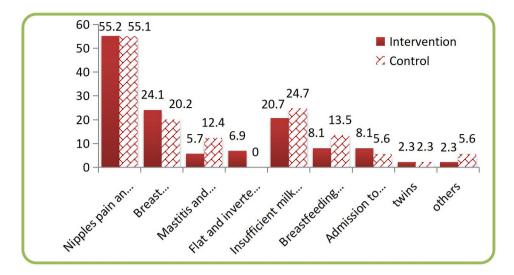
Figure (1): Distribution of the studied groups according to their previous breastfeeding difficulties.

Table (3): Distribution of the studied groups according to their breastfeeding attitudes total scores (N= 364)

Total Attitudes Scores	Intervention group (n=182)						Control group (n=182)					
	Pre-program evaluation		Immediate evaluation		3months post-program evaluation		Pre-program evaluation		Immediate evaluation		3months post-program evaluation	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
- Negative attitude	28	15.4	0	0.0	0	0.0	21	11.5	23	12.6	26	14.3
- Neutral attitude	151	83.0	17	9.3	15	8.2	161	88.5	159	87.4	156	85.7
- Positive attitude	3	1.6	165	90.7	167	91.8	0	0.00	0	0.0	0	0.0
Mean ± SD	52.27± 7.57		77.52± 5.75		77.65±5.72		52.81± 6.83		52.79±6.66		52.33±6.67	
Paired T_ test	$t1 = 43.06$ p =.000*			$t2 = 42.86$ p =.000*			$t1 =.083$ p =.934			$t2 =1.56$ p =.101		
ANOVA Test	P=.000*						P=.738					
Independent Samples T - Test	$t^a = .720$ P=.472 $t^b= 37.899$ P=.000* $t^c= 38.877$ P=.000*											

* Significant at p ≤ 0.05
t1: Between total scores in pre-program and immediate post program evaluation.
t2: Between total scores in pre-program and three months post program evaluation.
ta: Between the intervention and control group in preprogram evaluation.
tb: Between the intervention and control group in immediate evaluation.
tc: Between the intervention and control group in three months post program evaluation.

Table (4): Distribution of the studied groups according to their breastfeeding knowledge total scores (N= 364)

Total knowledge scores	Intervention group (n=182)						Control group (n=182)					
	Pre-program evaluation		Immediate evaluation		3 months post-program evaluation		Pre-program evaluation		Immediate evaluation		3 months post-program evaluation	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Poor knowledge	1	.5	0	0.0	0	0.0	0	0.00	1	.5	1	.5
Fair knowledge	173	95.1	16	8.8	12	6.6	176	96.7	175	96.2	175	96.2
Good knowledge	8	4.4	166	91.2	170	93.4	6	3.3	6	3.3	6	3.3
Mean ± SD	122.32± 9.41		153.63± 13.59		155.01±121.59		120.74±8.73		120.66±8.82		120.53±8.95	
Paired t test	t1= 28.693 p =.003*		t2 = 31.477 p =.000*				t1 =1.39 p =.166		t2 =1.749 p =.08			
ANOVA Test	P=.000*						P=.973					
Independent Samples T - Test	t^a = 1.663 P= .097 t^b=27.438 P=.000* t^c=30.110 P=.000*											

* Significant at p ≤ 0.05
t1: Between total scores in pre-program and immediate post program evaluation.
t2: Between total scores in pre-program and three months post program evaluation.
ta: Between the intervention and control group in preprogram evaluation.
tb: Between the intervention and control group in immediate evaluation.
tc: Between the intervention and control group in three months post program evaluation.

Table (5): Distribution of the studied groups according to their breastfeeding problem-solving skills total score (N= 364)

Total problem-solving skills scores	Intervention group (n=182)						Control group (n=182)					
	Pre-program evaluation		Immediate evaluation		3months post-program evaluation		Pre-program evaluation		Immediate evaluation		3months post-program evaluation	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Incompetent in problem solving.	164	90.1	9	4.9	8	4.4	155	85.2	154	84.6	152	83.5
Competent in problem solving.	18	9.9	173	95.1	174	95.6	27	14.8	28	15.4	30	16.5
Mean ± SD	14.79± 4.34		29.38± 3.01		29.12±2.97		14.78± 4.01		14.75± 3.97		14.79± 4.0	
Paired T_ test	t1 = 48.67 p = .000*		t2 = 48.08 p = .000*				t1 =.639 p =.524		t2 =.502 p =.616			
ANOVA Test	P=.000*						P=.993					
Independent Samples T -Test	ta = .038 P= .970 tb=39.659 P=.000* tc=38.735 P=.000*											

* Significant at p ≤ 0.05
t1: Between total scores in pre-program and immediate post program evaluation.

t2: Between total scores in pre-program and three months post program evaluation.
ta: Between the intervention and control group in preprogram evaluation.
tb: Between the intervention and control group in immediate evaluation.
tc: Between the intervention and control group in three months post program evaluation.

Table (6): Relation between intervention group's breastfeeding knowledge and their breastfeeding problem-solving skills.

Breastfeeding knowledge	Breastfeeding problem-solving skills (n=182)											
	Pre-program evaluation				Immediate evaluation				3 months post-evaluation			
	Incompetent (n =164)		Competent (n =18)		Incompetent (n =9)		Competent (n =173)		Incompetent (n =8)		Competent (n =174)	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
- Poor knowledge	1	0.6	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
- Fair knowledge	155	94.5	18	100.0	8	88.9	8	4.6	6	75.0	6	3.4
- Good knowledge	8	4.9	0	0.0	1	11.1	165	95.4	2	25.0	168	96.6
Significance	^{MC}P =.644				χ^2 =75.757 p=.000*				χ^2 =63.580 p=.000*			

χ^2: Chi square test **p:** p value for Chi square test ^{MC}**P** : p value for Monte Carlo test ***** Significant at P ≤ 0.05

Table (7): Relation between intervention group's breastfeeding attitudes and their breastfeeding problem-solving skills.

Breastfeeding attitudes	Breastfeeding problem-solving skills (n=182)											
	Pre-program evaluation				Immediate evaluation				3 months post-evaluation			
	Incompetent (n =164)		Competent (n =18)		Incompetent (n =9)		Competent (n =173)		Incompetent (n =8)		Competent (n =174)	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
- Negative attitude	27	16.5	1	5.6	0	0.0	0	0.0	0	0.0	0	0.0
- Neutral attitude	135	82.3	16	88.9	0	0.0	17	9.8	0	0.0	15	8.6
- Positive attitude	2	1.2	1	5.6	9	100.0	156	90.2	8	100.0	159	91.4
Significance	^{MC}P =.163				χ^2 =.976 p=.323				χ^2 = .752 p=.386			

χ^2: Chi square test **p:** p value for Chi square test ^{MC}**P** : p value for Monte Carlo test

Table (8): Distribution of the intervention group according to their satisfaction with breastfeeding training program using educational toolkit.

Satisfaction with training program using educational toolkit.	Intervention group (n= 182)	
Total Satisfaction scores	**No.**	**%**
Satisfied	182	100.0
Mean ± S D	46.86± 3.46	

Discussion:

All nurses who care for woman and children have a key role to play in sustaining breastfeeding. Contrariwise, many of them cannot fulfill this role effectively because they have to be trained to do so and little time is assigned to breastfeeding counseling and support skills in the pre-service curricula **(Hasnain & Majrooh, 2012)**. In this respect the current study showed that, slightly less than two thirds of the nurses had no previous breastfeeding in-service training and less than one fifth of them considered their previous breastfeeding training as the main source of their information about BF. This result was disagreed with a study conducted in Ireland by **Mulcahy, et al., 2012** who found that, most of Public Health Nurses (PHNs) had attended formal WHO/UNICEF breastfeeding training. Moreover, it was not supported by a study conducted in Egypt by **Ellakany, 2020** which revealed that, less than two thirds of the nurses in family health centers in Alexandria had been trained on breastfeeding support. Lack of BF in-service training may be due to that nurses perceive that breastfeeding training is not required as BF is considered absolute knowledge or lack of the available continuing educational opportunities.

These findings draw the attention to the needs of nurses in primary health care facilities for training.

Concerning their needs for BF training, more than three quarters of nurses in the current study expressed their needs for training and around two fifths of them reported that they need training about management of breastfeeding problems. This result was in line with a study conducted at Kingdom of Saudi Arabia by **Al-Binali, 2012** who found that, 86.1% of female health care workers are willing to attend BF workshops in the future.

There is evidence that, basic nursing education does not adequately prepare nurses to assist breastfeeding families. Breastfeeding support provided by nurses is often based on personal experiences versus the evidence or best practice **(Spatz, Evans, & Froh, 2017 & Folker-Maglaya, et al., 2018)**. In this respect, the current study revealed that nearly half of the studied nurses considered their personal experience as the main source of information about BF compared to only more than one tenth of them considered their previous education as the main source of information. This finding agreed with a study conducted in Egypt by **Weshahy, et al., 2019** which revealed that personal experience was the highest source of breastfeeding knowledge among nurses. These finding is alarming to that; nursing curriculums need to give more attention to breastfeeding education based on the best available evidence and recent guidelines.

Primary health care settings are the facilities in which the most breastfeeding issues should be resolved and support from appropriately skilled health care providers can have positive effects on women's experiences of breast feeding **(Watkins & Dodgson, 2010)**. The current study findings revealed that, more than three quarters of nurses reported that they have a role in breastfeeding support. However, only more than one quarter of them stated that they help mothers in managing

breastfeeding problem. These findings were congruent with a study executed in USA by **Szucs, et al. 2009** who reported that nurses in maternity units avoided fulfilling their counseling role and underestimating their capacity to influence mothers on breastfeeding. This reflects deficiency in counseling skills among nurses in primary health care facilities. Inversely, this result was disagreed with study conducted at Lithuania by **Leviniene, et al., 2009** which revealed that more than half of nurses in primary health care were helping mothers to solve the arising BF problems. These differences may be attributed to the lack of training provided to the nurses in the current study and their perceived need for training about BF problems management which reported by around two fifths of them, these perceived needs can reflect the lower confidence among nurses in their abilities to help mothers when problems arise.

Nurses' attitudes towards breastfeeding is considered one of the important determinants for breastfeeding, as nurses' advice has great potential to either promote or discourage breastfeeding **(Mgolozeli, Shilubane, & Khoza, 2019)**. Several studies showed that, the attitudes of health professionals' and their support for breastfeeding positively affect mothers' breastfeeding rates **(Ekström & Thorstensson, 2015& Tillman, 2018)**. Accordingly, the current study assessed the attitudes of the nurses and revealed that, pre the execution of the training program most of nurses either in the intervention group or control group were having neutral attitudes, while only 1.6% of them were having positive attitudes. These results were disagreed a study conducted in Ireland by **Mulcahy, 2012** and another study in Croatia conducted by **Zakarija-Grković & Burmaz, 2010** who found positive attitudes among the vast majority of nurses working in primary care. These findings indicated the negative attitudes toward BF among Egyptian nurses compared to others in Ireland and Croatia

which could be attributed to the differences in their cultural backgrounds.

However, after the training program the results of the present study revealed that, the intervention group expressed higher total attitudes scores compared to the control group and the majority of the intervention group in immediate evaluation and 3 months post-program evaluation had positive attitudes. In contrast, there is no significant difference in the attitudes of the control group across the three stages of the program. These results agreed with different studies conducted by **Ekström &Thorstensson, 2015** at Sweden, **Young, 2014** at USA, **Zakarija-Grković & Burmaz 2010** at Croatia, and **Bernaix et al. , 2010** at USA. All of these studies showed significant improvement in nurses' BF attitudes after educational programs with different spans of training. Unfortunately, these results disagreed with a study conducted in USA by **Tillman, 2018** who found no significant difference between pre and post groups in attitudes toward breastfeeding after conducting one-time breastfeeding education session. This could reveal that in order for training to affect the attitudes, it should be conducted in multiple sessions over a period of time.

Breastfeeding knowledge is a significant predictor for nurses' supportive behaviors. Significant knowledge deficits often limit nurses' capacity to assist breastfeeding women and their infants. Accordingly, accurate assessment of nurses' breastfeeding knowledge is important **(Brodribb, et al., 2008)**. In this respect, the current study found that, before the training program, the majority of nurses in the intervention and the control groups were having fair knowledge about breastfeeding, while only very few percentages of them were having good knowledge. This result was in agreement with different studies by **Bernaix, et al., 2010** at USA, **Al-Binali, 2012** at Kingdom of Saudi Arabia**, & Sigman-Grant &Kim, 2016** at USA, which showed lack of breastfeeding knowledge among nurses and other health care professionals. Conversely, it was in dissimilarity with a study conducted in Egypt by **Ellakany, 2020** which revealed that, more than three quarters of the nurses in family health centers in Alexandria had good knowledge about breastfeeding. This dissimilarity may be due to the difference in attendance of training in both studies, since Ellakany found that less than two thirds of the nurses had been trained on breastfeeding support and found significant difference in knowledge between nurses who had training and those who did not have.

With respect to the comparison of total scores of breastfeeding knowledge before and after the training program, the finding of the present study revealed a statistical significant improvement among the intervention group at the immediate and 3 months post program evaluation, where the percentage of the nurses in the intervention group who had good knowledge was greatly increased. In contrast, there is no improvement among the control group regarding their knowledge across the three stages of the evaluation process. These findings were supported by another study conducted in Egypt by **Yacout & Ibrahim, 2018** who highlighted that, the implementation of the active toolkit intervention leads to a statistically significant improvement in participants total knowledge score. Also, it was agreed with a study conducted in USA by **Folker-Maglaya, et al., 2018** who found that, after implementing a breastfeeding toolkit, the mean change score of knowledge for the intervention group was significantly higher than that for the control group. Moreover, **Zakarija-Grković & Burmaz 2010** found significant improvements in breastfeeding knowledge as a result of the 20-hour course, especially in relation to management of mastitis, exclusive breastfeeding, management of cracked nipples, and that breast preparation in pregnancy was unnecessary and may be harmful. Likewise, a study conducted in USA by **Tillman, 2018** showed a significant difference in knowledge about breastfeeding between the pre and post

groups after attending a breastfeeding education session.

For breast-feeding to be successfully initiated and established, mothers need the active support, which can be achieved if all health workers with whom mothers come into contact would be able to provide appropriate and truthful information as well as demonstrate adequate breast-feeding problem-solving skills **(Blixt, et al.,2019)**. The current study showed that, before the training program, the majority of nurses in the intervention and the control groups were incompetent in breastfeeding problem-solving skills. This justifies the result that only more than one quarter of the nurses said they help mothers in managing breastfeeding problems. These findings were congruent with a study conducted in Lithuania by **Leviniene, et al., 2009** which revealed that knowledge of primary health care professionals about breast-feeding management was insufficient and sometimes incorrect.

Whereas, after the training program the results of the current study revealed that, the intervention group expressed higher total problem-solving scores compared to the control group. In contrast, there is no significant difference in the control group across the three stages of the program. This result was supported by the findings of a study conducted in Croatia by **Zakarija-Grković & Burmaz 2010** which revealed that most health professionals in primary health care improved their approach to managing common breastfeeding scenarios as a result of the 20-hour training course. Additionally, it was congruent with study conducted in Denmark by **Kronborg, et al., at 2008 who** reported that health visitors receiving the 18-hour WHO 'Breastfeeding Promotion and Support in a Baby-friendly Hospital' course had significantly higher scores post-intervention for management of breastfeeding practice case studies than staff who did not receive additional training.

Problem-solving skill is widely known as the level of attaining the knowledge which leads the person to the solution of the problem. Thus, effective problem-solving strategies and decision-making skills require a powerful basis of knowledge **(Çinar, et al., 2010)**. The current study showed that, before the training program, there was no significant relation between nurses' knowledge and their problem-solving skills. While post program there was a highly significant relationship, nurses who had greater breastfeeding knowledge's scores have better problem-solving skills. Absence of significant relation between knowledge and problem-solving skills before the training program could be attributed that, most nurses were having fair knowledge and were incompetent in breastfeeding problem-solving skills and this made it difficult to observe significant variations. These findings agreed with a study conducted at Sweden by **Ekström & Thorstensson, 2015** who found that higher knowledge of breastfeeding leads to greater ability to manage breastfeeding problems.

It was interesting to find that although the overall problem-solving scores were low, less than half of the nurses expressed that they need training in breastfeeding problems management, and only 19.2% of them reported they need training on BF counseling. This indicates either poor recognition among nurses that they have knowledge deficiency or lack of interest to provide support for breastfeeding mothers.

Learners' satisfaction is the most important key to continue learning. Satisfaction reflects learners' perceived value of their educational experiences and how comfortable they feel to accomplish their goals. **(Abou Shosha, Mohamed, &Fayed, 2019)** So, it was important for the current study to assess nurses' satisfaction with breastfeeding training using educational toolkit. The findings of the study revealed that, all nurses in the intervention group were satisfied with the training program. These agreed with the findings of a study conducted in Egypt by

Yacout **& Ibrahim, 2018** who reported that, post active toolkit training related to breastfeeding, the majority of the participants were satisfied with the applied active toolkit that included a combination of dynamic teaching/learning methods that engage them in active participation practices. Also, this result was in the same line with a study conducted in Canada by **Turenne, et al., 2016** who found that, all surveyed nurses had high level of satisfaction with the intervention content, modality, and duration, as well as teaching/learning methods. Moreover, all of nurses participated in the study reported that, the educational intervention met most of their learning needs and supported the development of their knowledge.

Conclusion:

Based upon the findings of the current study, it could be concluded that most of nurses working in primary health care facilities were providing breastfeeding related service. However, their role was limited to just advise mothers to breastfeed their infant, or conduct health education sessions, and few of them were helping mothers to manage their breastfeeding problem.

Before the training program, most of nurses were having neutral breastfeeding attitudes and fair breastfeeding knowledge and they were incompetent in breastfeeding's problem-solving skills. Training program using educational toolkit had positive effect on nurses' knowledge, attitudes and problem-solving skills related to breastfeeding. After the training program, the majority of nurses in the intervention group were having positive breastfeeding attitudes and good breastfeeding knowledge and they were competent in breastfeeding's problem-solving skills.

The overall results revealed high satisfaction among nurses in the intervention group with the intervention applied.

Recommendations:

Based on the current study, the following recommendations are suggested:

1. Mandatory of 20 hour WHO training program for all nurses working in primary health care facilities.
2. Provide continue in-service training programs for physicians, nurses, and midwifes regarding breastfeeding problems management and counseling.
3. Establish national standards and guidelines for BF support in all primary health care facilities based on the ten steps for successful breastfeeding.
4. Nurses should pay attention to attend training programs about breastfeeding counseling and management of breastfeeding problems.
5. Emphasize the use of active teaching strategies toolkits in breastfeeding education.

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