



Effect of Nutritional Intervention on Growth of Infants Accompanying Their Mothers in Prison

Nagwa A. Zein EL Din¹, Taghreed K. Omar², Amal A Fath Allah³ Walaa A Abd E¹ All¹⁴

Pediatric Nursing Department, Faculty of Nursing, Menoufia University

*Correspondence: ahmedzin@gmail.com

Infants who accompanied their mothers in prison were vulnerable to consequence of malnutrition. So, nutritional intervention program for those infants who deprived from outdoor facilities is a subject of interest. Therefore, the purpose of this study was to assess the effect of nutritional intervention on growth of infants accompanying their mothers in prison. A quasi-experimental design was used (Pre and posttest). The study was conducted in Qanater Women's Prison in Egypt. A convenience sample of 30 mother accompanying their infants in the above- mentioned setting was included. Three instruments were used: a structured interview questionnaire, an observational checklist and anthropometric measurements. The findings of this study revealed that infant growth improved after implementation of the nutritional intervention. In addition,, there were statistically significant differences regarding mother's knowledge and practices observed on posttest than on pretest. As well as, there were a positive correlation between mother's knowledge, practices and infant growth. The study concluded that mother's gained more knowledge and had better practices on posttest following the adherence of nutritional intervention. In addition, their infants had better growth after implementation of nutritional intervention. Therefore, it was recommended that nurse's officers should provide mothers in prison for periodical nutritional intervention to sustain their infants growth. Special provisions must be in place to ensure that the child's rights are promoted and protected whilst in prison, Child welfare, rather than prison authorities, should have primary responsibility for making decisions regarding children in prison, and specialists in social work and child development should supervise their care.

Keywords: keyword, keyword, keyword, keyword, keyword, keyword, keyword, keyword,

Introduction

Nutrition plays an important role in the infant growth and development ^[1].The first two years of life are critical stages for child's growth and development. Adequate nutrition during this period is very important to ensure optimal, physical and mental development, as well any nutritional deficiencies during this period could lead to irreversible consequences such as stunted growth, Also, impaired cognitive development, compromised educational achievement and low productivity ^[2]. The World Health Organization (WHO) classified children in prison among children under difficult circumstances which they require special attention and practical support. Mothers and infants should remain together wherever possible and should be provided with the support they need to exercise the most appropriate feeding option available (WHO, 2010) ^[3].

Children accompanying their mothers in prison have limited access to well- baby clinic services available to children for free living mothers. Also, failure to take any special treatment or any un supported feeding will expose those children to many forms of malnutrition diseases, as well as, failure to

carryout regular growth monitoring could lead to delayed detection of growth failure ^[4]

Many women in prison are mothers and usually the sole or primary carvers for their children. The numbers of children being institutionalized when women are imprisoned estimated that, in the United Kingdom, showed that in 85% of the cases the father does not look after the child when the mother is imprisoned. The imprisonment of a mother may have a traumatic and lasting effect on both mother and child, in part due to great distress because of the separation together with a range of emotional and psychosocial problems, as well as because they are less likely than imprisoned men to have someone in the family looking after their child. Also, based on information gathered from different sources it is estimated that there are between 1.5 and 1.9 million children that have a parent in prison, with the largest numbers being in Brazil, Mexico and Colombia. This makes it impossible for governments and the community to understand the scope of the problem on a local, national, and regional level^[5]. Egypt Demographic and Health Survey ^[6] reported that around 21percent under five Egyptian children were stunted and 9



percent weighed too low for their age. So, the nutritional status of children under 5 years of age is affected by feeding practices, infections, hygiene and social demographic factors. For this reason, imprisoned mothers have an intense need for nutritional interventions in order to promote breastfeeding for 6 months and introduce appropriate feeding practices through counseling and conducting nutritional programs.

Literature Review

One of the most complex issues relating to the imprisonment of women is deciding whether young children and babies should be allowed to remain with their mother in prison. In many countries, babies born to women in prison stay in prison with their mother and young children may accompany their mothers up to reach the upper limit for prison low. Facilities vary widely between and within prisons in different countries. Some countries have 'mother and baby units', with special facilities to support the mother and the child's development. In others, babies live in the prisons without their presence being registered or monitored by the prison administrators and/or without any special provision being made for them. In prison, facilities to ensure the safety, growth, health and development of a child are often lacking or inadequate. Whilst a number of prisons for mothers with young children, are unable to interact regularly with the outside community and other family members. There is a dearth of research on the effects of living in prison on a child's early development, but it is likely that children living in prison often do not receive adequate stimuli where nursing infants are allowed to remain in the institution with their mothers, provision shall be made for a nursing staffed by qualified persons, where the infants shall be placed when they are not in the care of their mothers^[7].

Most prison systems allow young children to live in prison and set an upper age limit, after which the child is removed. This reflects a policy that the adverse effects of a prison environment on a child's growth and development from a certain age outweigh the benefits of the child being with its mother. There is little consensus on the 'right age' and by its nature this will vary between prison cultures. Some prison allow mothers to keep their babies with them only whilst breastfeeding, others maintained to 3, 4, 6 or even 12 years^[8]. While in Egypt Article 20 of Law No. 396 of 1956 on the Organization of Prisons, as amended by Law No. 20 of 1973, provides that a newborn in Egypt can remain with his/her imprisoned mother until the child reaches the age of two yrs. If the mother is not willing to have the child stay with her or when the child has reached two years of age, the child must live with his/her father or any relative selected by the mother. If the child does not have a father or any other relatives, the prison director must notify the governor to place the child in an outside orphanage. The director will notify the

imprisoned mother of the location of the orphanage so that she can visit the child in accordance with regulations^[9].

It is necessary to take steps to ensure that the children will be adequately cared for while the caregiver is incarcerated. consequence of concern for their children, exhibiting "anger, anxiety, sadness, depression, shame, guilt, decreased self-esteem, a sense of loss" and delayed growth Women prisoners themselves frequently cite concern for their children as their biggest problem or worry in prison^[10].

A mother's imprisonment seriously disrupts the lives of her children in all circumstances, and results in large numbers of children being institutionalized. Lack of facilities for children's can make it difficult for both child and mother. Children find it harder to comply with rules preventing them to sit, talking, and playing, recreating or even nourished. In addition, the presence of uniformed officers can be frightening. In addition, rules forbidding physical contact are particularly distressing for children and their mothers. Therefore, prisons should offer mothers support to help them maintain and develop their relationship with their children, whilst managing the trauma of unsanitary conditions. This might include parenting classes or counseling to promote their physical and psychological growth^[11].

Exclusive breastfeeding for the first six months of life with early initiation and continuation for two years is recommended by World Health Organization (WHO) to achieve optimal growth and development. It also recommended nutritionally adequate, safe, age-appropriate complementary starting at six months of age^[12]. Therefore, Poor breastfeeding and complementary feeding practices together with high rates of morbidity from infectious diseases are the prime proximate causes of malnutrition in the first two years of life^[13]. In Egypt 2014, only 13 percent of infants aged from 4-5month were exclusively breastfed. Malnutrition is one of the principle underlying causes of death for many infant worldwide, which contribute to more than third of under five years deaths globally. Many factors can cause it such as inadequate food intake, infections, psychosocial deprivation and insanitary environment as well as lack of hygiene^[14].

Therefore, nurses should assess whether children are meeting their nutritional requirements and prevent any problems related to poor nutritional status, To accomplish this, nurses must collect thorough assessment, provide relevant education and develop clear and appropriate nutritional intervention in order to sustain infant's growth specially for those accompanying their mothers in prison^[15].

Purpose

To assess the effect of nutritional intervention on growth of infants accompanying their mothers in prison.

Research hypothesis

1- Mothers accompanying their children in prison who received nutritional intervention would have more knowledge

and better practices related to infants' feeding.

2- Infants with their prisoned mothers would have better growth after implementation of nutritional intervention.

Methodology

Research design: A quasi-experimental design was utilized for this study (pre, post and follow up test).

Research setting: This study was conducted in Qanater Women's Prison at the library room and jail ward, which is the largest prison for women in Egypt.

Sampling: A convenience sample of 30 mothers accompanying their infants from birth up to 2 years old in prison were included

Inclusion criteria:

Infants accompanied their mothers who aged from birth to 24 months were included.

Exclusion criteria:

Infants with congenital anomalies, who had health problems that interfere with their abilities to suckle, swallow or assimilate food as cleft lip, cleft palate, esophageal atresia, glucose intolerance and intestinal obstruction.

Instruments:-

Three instruments were utilized for data collection:

Instrument one: A structured interview questionnaire (pre, immediate post and follow up test): It was adopted from Eleanor & Sara(2016) from Williams' 2011 ^[15] and modified by the researcher to assess mother's knowledge about their infants feeding. It divided into two parts:

Part 1: Characteristics of mothers and infants: It included mothers name, age, social status, level of education, occupation while out of prison, duration and nature of confinement as well as infants name, age and gender.

Part 2: Mother's knowledge about their infants feeding: It included 52 questions. This part divided into three subparts:

Subpart1: Mothers knowledge about breast feeding. It included 27 questions about feeding types during the first 6 months, definition and benefits of breast feeding, definition and benefits of colostrum, initiation time, other types of feeding provided immediately after delivery, breast care methods before and after feeding, suitable position during feeding, different positions of feeding, feeding schedule, changing breast each feed, which breast do you start first, feeding duration, eructation technique and duration. It also included knowledge about infant position after feeding, factors affecting milk production, benefits of emptying breast before starting feeding from other breast, duration and benefits of exclusive breast feeding, appropriate time of stopping breastfeeding, feeding obstacles, breast engorgement and nipple crackles care.

Subpart 2: Mothers knowledge about bottle-feeding. It included 12 questions about reasons and initiation time, feeding schedule, types of formula milk, quantities of powder or cow milk, eructation duration, suitable position

during sleep, characteristics of bottle and nipple, teat punching method and sterilization time.

Subpart3: Mothers knowledge about complementary feeding. It included 13 questions about definition of complementary feeding, methods of introducing and preparing foods for infants, ideal method of feeding, time of introducing new food for infant, type of food provided each time, starting time for weaning, weaning schedule by age (6-24months) and type of food by age (6-24 months).

Scoring system

Scoring items	Score	Total scoring
Correct answer	2	>80%
Incorrect answer	1	<60%

Instrument two: An observational checklist (pre, immediate post and follow up test):

It was developed by the researcher after thorough review of literature to assess mothers practice related to infants feeding. It divided into four parts:

Part1: Mothers practices while providing breastfeeding. It was divided into three stages:

1- **Before breast feeding:** It included four steps e.g (sit comfortably, wash hands, clean breasts and drink fluids).

2- **During breast feeding:** It included 10 steps about mothers technique during breast feeding e.g (support infant well, hold infant trucked against mothers body, avoid neck twisted, handle infant confidently, rooting positively, open mouth widely, quick latch to breast tissue with good amount, stay attached with a good latch throughout feed as well as establish effective sucking on both breasts and audible, regular soft swallowing).

3- **After breast feeding:** It included 5 steps e.g (burp infant, put infant on the right side, clean breasts, wash hands and check nipple for normal shape and colour).

Part2: Mothers practices while providing bottle feeding. It was divided into three steps:

1- **Before starting bottle feeding.** It included 10 steps e.g (wash hands, wash all equipment in hot soapy water and rinse well. In addition to place all equipment in a covered container and boil for 10 minutes, Also, place nipple and rubber articles in covered pan and boil for 3 minutes, boil water for 5 minutes, pour the required amount into the bottle, leave water until become warm, measure the required amount of milk and put into the bottle, check formula for correct type and amount, check infant & change wet or soiled diaper).

2- **During bottle feeding:** It included 4 steps about mothers technique during bottle feeding e.g (put infant on her lap & protect chest with bib, check milk temperature by pouring one drop in inner aspect of wrist, insert the teat into the infant mouth and hold the bottle at angle).

3- **After bottle feeding :** It included 6 steps e.g (take teat from mouth slowly, burp infant, put infant on the right side, throw the remaining milk, wash, boil & replace articles ready for next use and wash hands).

Part3: Mothers practices while introducing complementary feeding: It included food frequency per day, amount, texture and food variety by age.

Part4: Mothers practices about food safety and hygiene: It included 9 steps e.g (wash hands before feeding, wear clean clothes, use safe water, use clean utensils, keep food at safe temperature, feed infant in clean place, separate raw and cooked food, wash and rinse equipment after use and throw the remaining food).

Scoring items	Score	Total scoring
Adequately	2	>80%
In adequately	1	<60%

Scoring system

Instrument three: Anthropometric measurements pre, post and follow up): It was developed by WHO (2012) & National Institution (2008)⁽¹⁶⁾.It divided into five measurements:

1- **Weight:** It was performed by using Germany Digital Scale for infants. It was measured in kilogram.

2- **Length:** It was performed by using plastic measuring tape. It was measured in centimetre.

3- **Growth chart:** It was developed by National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (NCHS&NCCDP, 2008)⁽¹⁶⁾ in Egypt. It is graph used to assess growth and evaluate nutritional status of infants by plotting infant weight and height on the growth chart and comparing these to reference data. A percentile of 50 represents normal ideal standard of weight and length. Value below 5th percentile means that the infants weight or length is below the average (malnourished or stunted). On the other hand score above 50 percentile average & not exceed than 95th percentile means that the infant still around average and if the measurement increase than 95th percentile represents that infant is obese or tall stature. And if the infants are piloted below the 5th percentile they were mal nourished

4- **Body mass index:** It was developed by Center for Disease Control and Prevention Division of Nutrition (CDCPD, 2012)⁽¹⁷⁾. It was calculated as weight (kg) divided by height(m²). It used to diagnose overweight and obesity. Infants were considered healthy if BMI was 18,5 to 24,9 Kg/m², underweight if BMI was below18,5Kg/m² and overweight if BMI was over 25Kg/m².

5- **Mid arm circumference:**It was performed by using plastic measuring tape and used to detect malnutrition in infants more than one years old. Infants were considered undernourished if MAC is less than11,5cm and well-nourished if MAC is more than13,5cm

Reliability:

The reliability of the instruments was tested to determine the extent to which items in the instruments were related to each others. Internal consistency of the items was evaluated using

Cronbach's alpha coefficient ($\alpha \geq 0.85$). Pearson correlation co-efficiency was used to test the internal consistency of all items of the instruments.

Validity:-

For validity assurance, the two instruments were submitted to a jury of three experts in the pediatrics field (one Professor in Pediatric Medicine, one Professor in Pediatric Nursing and one Assistant Professor in Pediatric Nursing) to be sure for questionnaire items. Content validity was assessed using the scale content validity index average (S-CVI \AVE). The lower limit of acceptability for S-CVI\AVE was 0.80.

Ethical Consideration:-

A verbal approval to share in the study was obtained from mothers of infants in the prison. An explanation was provided about purpose of the study and data collection procedure. Mothers were told that sharing in the study is voluntary and they had the right to withdraw at any times.

Confidentiality and anonymity of mothers' data were assured through coding all data and put all paper in a closed cabinet.

Pilot study:

Pilot study was carried out on three mothers (10% of the sample) to test the practicability, applicability, consistency, clarity and feasibility of the study tools to estimate the needed time to fill the tools. No modifications were required. Therefore, the sample of the pilot study was included in the total sample.

Procedure

Written permission:

An official permission to carry out the study was obtained from the director of setting after submitting an official letter from the Dean of the Faculty of Nursing explaining the purpose of the study and the method of data collection. Meeting was conducted first with the Director of the prison to obtain permission for conducting the research, explaining the purpose and conclude recommendation will be available for improvement.

Assessment phase:

1- Data was collected over a period of six months started from November 2016 until May 2017.

2- The researcher introduced herself to the mothers before starting the nutritional intervention.

3- Assessment of mothers' knowledge were done at the beginning of the study and lasted for 3 days (pre-test).

4- Knowledge deficit were identified for all mothers.

5- Mothers' practice was assessed by observing mothers' while feeding their infants (pre-test).

6- The observation was carried out three days per week. The observation time lasted for three hours to cover all items of the observation checklist; mothers not informed that they would be observed.

7- Areas of weakness in mothers' practices were identified and program objectives were set.

8- Assessment of anthropometric measurement was done by the researcher for all infants and lasted 2days before starting the nutritional intervention (pre -test).

Planning phase:

The nutritional intervention program was provided after designed into four sessions (one session for knowledge and three sessions for practice). The first session aimed to provide mothers' with knowledge about infant feeding (theoretical part). The second three sessions aimed to improve mothers' practice about infant feeding (practical part).

Implementation phase:

1. First session was about mother's knowledge regarding breast -feeding, bottle- feeding, and complementary feeding. The session included knowledge about definition of breastfeeding, feeding on demand & exclusive breast-feeding. As well stages of breast milk secretion, time and benefits of breast feeding, factors affecting milk production, methods of increasing breast milk production, duration of breastfeeding, breast care methods, contraindications of breastfeeding, Also, definition& reasons of bottle feeding ,Types of milk , disadvantages of bottle feeding, characteristics and types of foods and weaning schedule were discussed (theoretical part).

2. Lectures, printed material, **illustrated** pictures and group discussion were **used. And** Booklet was provided for each mother at the end of session.

3. The theoretical part took place in **the library room. The** session lasted for four hours for all mothers. Time allowed for break and each mother had the opportunity to ask questions.

4. Mothers were divided into five small groups, each group contains 6 mothers.

5. Each group received three practical sessions in the jail ward.

6. **Second** session was about mothers practice regarding breastfeeding such as different positions of feeding, attachment and practice after feeding. This session lasted for 1-2 hours (practical part).

7. Third session was about mothers practice regarding bottle-feeding (before, during and after feeding). This session lasted for 2-3 hours (practical part) for each group.

8. Fourth session was about complementary feeding such methods of preparing foods in hygienic way. This session lasted for 2-3 hours (practical part).

9. Demonstration was provided by the researcher and time allowed for each mother to re-demonstrate the procedures under supervision until feel competent in each procedure.

Evaluation phase:

1- Mother's knowledge and practice were reassessed immediately after implementation of the nutritional intervention program using the same form of the instrument (immediate post test).

2- Reassessment for the retention of knowledge and practice was carried out six months later (follow up test).

3- Reassessment of infants anthropometric measurements were done on the 2nd, 4th and 6th month's later (post &follow up).

Data analysis

Data was coded and transformed into specially designed form to be suitable for computer entry process. Data was entered and analyzed by using SPSS (Statistical Package for Social Science) version 21. Graphics were done using Excel program. Quantitative data was expressed as mean &standard deviation ($\bar{x} \pm SD$) and analyzed by using friedman test and ANOVA test for comparison between means. Pearson correlation was used for explaining relationship between normally distributed quantitative variable. Level of significance was set as P value 0.05 for all statistical tests (Morton et al., 2001). A statistical significant difference was considered if $P < 0.05$. A highly significant difference was considered if $P < 0.001$.

Results

Table 1 showed characteristics of studied mothers and infants. It was obvious from this table that mean of mothers age was 28.86 ± 4.68 and the majority of them were married (90.0%). Concerning duration of confinement, approximately one third were less than 6 years (30%). Regarding infants characteristics. It was found that their mean age was 9.03 ± 5.27 and the mean for their birth weight was 2.90 ± 0.40 while the mean of current infant's weight was 10.08 ± 11.29 .

Table (1): Characteristics of studied mothers and their infants.

Characteristics of studied mothers	No (n=30)	%
Mothers age $\bar{X} \pm SD$	28.86 ± 4.68	
Marital status		
Married	27	90.0
Divorced	3	10.0
Duration of confinement		
1-5 years	9	30.0
6-10 years	8	26.6
11-15 years	3	10.0
16-20 years	5	16.7
21-25 years	5	16.7
Infant's Age /months	9.03 ± 5.27	
$\bar{X} \pm SD$		
Infant's birth weight	2.90 ± 0.40	
$\bar{X} \pm SD$		
Current infants weight	10.08 ± 11.29	
$\bar{X} \pm SD$		

Figure 1 showed that more than one third of studied mothers (40.0%) were breastfeed. While, one quarter of them were bottle feed (23.3%) and 36.7% of them have complementary feeding

Figure (1): Types of infant feeding for prisoned mothers.

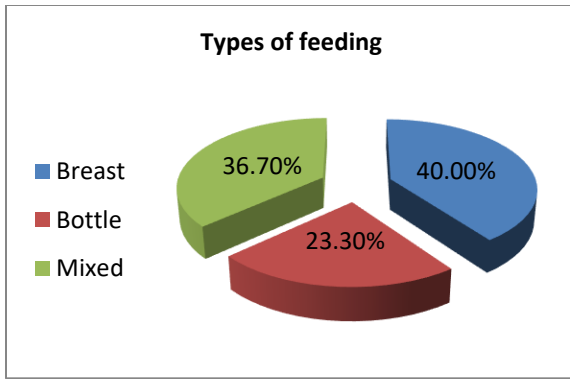


Table 2 showed the mean of total score of mother's knowledge about breastfeeding on pre, immediate post and after 6 months of nutritional intervention. It was obvious that, the mean total score of mothers knowledge on pre intervention were 39.43 ± 7.51 compared to 52.43 ± 1.60 & 40.53 ± 7.98 on immediate post and after 6 months of intervention respectively. Therefore, there were statistical significant differences between mothers knowledge at 1% level of statistical significance. Also, mean total score of mother's knowledge about bottle -feeding on pre intervention was 21.00 ± 6.67 compared to 28.83 ± 2.40 & 25.16 ± 4.1 on immediately post and after 6 months of nutritional intervention respectively. Therefore, there were statistical significant differences between total mothers knowledge at 1% level of statistical significance. In addition, the mean of total score of mother's knowledge about complementary feeding on pre intervention was 29.06 ± 5.08 compared to 36.53 ± 1.33 & 34.67 ± 5.1 on immediate post and after 6 months of intervention. Therefore, there were statistical significant differences between mothers knowledge at 1% level of statistical significance.

Table (2): Mean total score of mothers knowledge about breast feeding, bottle feeding and complementary feeding on pre, immediate post and after 6 months of nutritional intervention

Total knowledge score	Pre (n=23)	Immediate Post (n=23)	After 6 months (n=23)	ANOVA F	P-value
	X ± SD	X ± SD	X ± SD		
Breast feeding	39.43 ± 7.51	52.43 ± 1.60	40.53 ± 7.98	33.723	.000
Bottle feeding	21.00 ± 6.67	28.83 ± 2.40	25.16 ± 4.1	22.600	0.000
Complementary feeding	29.06 ± 5.08	36.53 ± 1.33	34.67 ± 5.1	24.911	.000

Table 3 showed the mean of total score for mothers practice about breast feeding on pre, immediate post and after 6 months of nutritional intervention. The table illustrated that mothers had higher mean score of performance on immediate post intervention compared to pre intervention and after 6 months of nutritional intervention (32.60 ± 3.15 vs 30.60 ± 2.36 and 30.04 ± 1.8). Therefore, there were statistical significant

differences between mothers practice at 1% level of statistical significance. Also, mothers had higher mean score of performance on immediately post intervention compared to pre intervention and after 6 months of intervention respectively regarding bottle feeding (35.83 ± 3.7 vs 31.75 ± 3.91 & 32.76 ± 2.3). Therefore, there were highly statistical significant differences between mothers practice at 1% level of statistical significance. In addition, mothers had higher mean score of performance after 6 months of intervention compared to pre intervention and immediate post intervention (19.33 ± 0.75 vs 16.85 ± 2.00 & 18.19 ± 2.33). Therefore, there were a statistical significant differences between mothers practice at 1% level of statistical significance.

Table (3): Mean total score of mothers practice about breast feeding, bottle feeding and complementary feeding on pre, immediate post and after 6 months of nutritional intervention

Table 4 showed Means and standard deviations of infant's anthropometric measurements on pre, after 2, 4 and 6 months of intervention. It was clear that infants had the highest mean

Total Practice score	Pre (no=23)	Immediate Post (n=23)	After 6 months (no=23)	ANOVA F	P-
	X ± SD	X ± SD	X ± SD	Test	Value
Breast feeding	30.60 ± 2.36	32.60 ± 3.15	30.04 ± 1.8	6.096	.004
Bottle feeding	31.75 ± 3.91	35.83 ± 3.7	32.76 ± 2.3	5.795	.007
Complementary fee	16.85 ± 2.00	18.19 ± 2.33	19.33 ± 0.75	48.554	.000

score of anthropometric measurements after 6 months of nutritional intervention (10.28 ± 1.17 , 79.38 ± 8.06 , 71.40 ± 21.79 , 60.30 ± 23.05 , 16.48 ± 1.73 & 13.56 ± 0.47). Therefore, there were statistical significant differences between infants anthropometric measurements on pre, after 2, 4 and 6 months at 1% and 5% level of statistical significance. Except for their mid -arm circumference ($p > 0.05$).

Table 5 represented Pearson Correlation between total knowledge and practice scores of breast -feeding, bottle feeding and complementary feeding. The table reflected that there were no correlation between total knowledge and practice scores of breast feeding. Also, there were positive correlation between total knowledge and practice scores of bottle feeding at 1% level of statistical significance. In addition, there were positive correlation between total knowledge and practice scores of complementary feeding at 1% level of statistical significance.

Table (4): Means and standard deviations of infant's anthropometric measurements on pre, after 2, 4 and 6 months post intervention

Items	Pre (n=30)	after 2 month(n=30)	after 4 month(n=30)	after 6 month(n=30)	Friedman Test	P – value
	X ± SD	X ± SD	X ± SD	X ± SD		
Infant weight	8.90 ± 1.60	9.72 ± 1.38	10.08 ± 11.29	10.28 ± 1.17	83.04 ^(HS)	.000
Infant length	72.53 ± 10.95	75.17 ± 9.91	77.43 ± 8.81	79.38 ± 8.06	2.89 ^(S)	.038
Growth chart for length	50.43 ± 30.32	67.73 ± 25.17	68.67 ± 23.11	71.40 ± 21.79	4.26 ^(S)	.007
Growth chart for weight	32.80 ± 20.12	47.80 ± 22.58	57.43 ± 26.04	60.30 ± 23.05	8.68 ^(HS)	.000
Body mass index	15.11 ± 1.68	15.87 ± 1.76	16.32 ± 1.68	16.48 ± 1.73	3.82 ^(S)	.012
Mid-arm circumference	13.45 ± 0.60	13.48 ± 0.59	13.55 ± 0.47	13.56 ± 0.47	.13 ^{ns}	>0.05

Table (5): Pearson Correlation between total knowledge and practice scores about breast-feeding, bottle -feeding and complementary feeding.

Total Practice Scores	Total knowledge scores	
	r	P –value
Breast feeding	.041	.666
Bottle feeding	.499**	.002
Complementary feeding	.388**	.001

Table 6 showed Pearson Correlation between total practice scores of complementary feeding and Infants weight. The table reflected that there were positive correlation between total practice scores of complementary feeding and infant's weight at 1% level of statistical significance.

Table (6): Pearson Correlation between total practice scores of complementary feeding and Infant weight

Items	Total practice scores	
	r	P -value
Infant weight	.427**	.000

Discussion

Nutrition plays an important role in the health and development of children (Unicef, 2011)⁽¹⁸⁾. Adequate nutrition during infancy and early childhood is essential to ensure healthy growth, and development of children to fulfill their potential. Poor nutrition increases the risk of illness and is responsible directly or indirectly for one third of the estimated 9.5 million deaths that occurred in children less than 5 years of age. Inappropriate nutrition can also lead to childhood obesity which increasing public health problem in many countries (Black et al., 2014)⁽¹⁹⁾. Nowadays due to increased number of women in prison specially those who accompanied infants which live under poor circumstances and facing a lot of nutritional problems. Therefore, our main target is to provide those mother's with knowledge and skills related to their infant feeding in order to help their infants to grow better.

the current study firstly hypothesized that mothers in prison who received nutritional intervention would have more knowledge and better practices related to infant's feeding.

Most countries in Western Europe and North America only allow children to live in prison if there are specialist mother and baby facilities available. Women may also make practical preparations for their children entering prison. Children's clothes, toys, books and cradles have all been taken into prison, though in some countries the children's mother/ family may be so poor that they find more resources in prison than they have outside. Prison authorities may check these items to ensure they are not being used to smuggle in prohibited substances or items.

Regarding characteristics of studied mothers, the present study showed that more than one third of studied mothers were illiterate and most of them were homemaker. In addition, approximately one third of them were incarcerated less than 6 years and the mean age of them were 38,36±4,68,. This finding was disagreed with Ndaun (2013)⁽¹⁹⁾ who conducted a study about "Feeding Practices and Nutritional Status of Children Aged 0-59 Months Accompanying Incarcerated Mothers in Selected Women's Prisons in Kenya". The study revealed that more than two third of mothers were illiterate & one third of them were housewives. In addition, the majority of mothers were incarcerated less than 6 years. From the researcher perspective this could be related to the culture and citizen differences in crime. Also, Omukhweso 2007⁽²⁰⁾ study the relationship between prison conditions and the nutritional status of the children accompanying their mothers in prisons in Kenya illustrated that most of mothers in his study were aged between 19 and 55 years. The findings of this study compare with those by conducted in selected women prisons in Kenya indicating that most mothers in prison are young and they cannot care for their children. Prisons with "minimal provisions" demonstrate little to no consideration of their child populations in terms of infrastructure, nutrition, education, or stimulation. Many of these prisons lack resources for implementing programming for children and their caregivers, accommodations made are inconsistent and inadequate. In Egypt state that children of women in pre-trial detention commonly accompany their mothers into prison at infancy stage, rather than after waiting to see whether a

custodial sentence is imposed. Depending on the length of detention, space within the prison, location of the prison and the regulatory requirements that must be met, a mother may be unable to arrange for a child to stay with her. In addition Oliver [22] stated that children up to three, four or six years old can live in prison; in the UK, where conditions are much more severe, the upper limit for children living in prison is 18 months and there are concerns about children being damaged if they live in prison beyond six months. These children thus receive the health benefits of exclusive breastfeeding, which is considered to increase chances of surviving infancy. Oliver [22] also, reported that the confinement vary among mothers which reflect a wide variation in this confinement. In many countries, the number of women held in pre-trial detention is equivalent to or even larger than the number of convicted female prisoners. However, in this study, those convicted were the majority; this is likely to influence the nutritional status of their children as mentioned by United Nations [23].

Regards characteristics of studied infants, the present study illustrated that more than half of studied infants were boys and their mean age was 9.3 ± 5.27 months. This finding was agreed with [19]. His study showed that more than half of studied infants were boys. A question, which arises frequently, is the age to which children should be permitted to live in prison. Many countries have specific age limits, with more or less flexibility depending on various factors. As with the decision on whether a child should live in the prison or not in the first place, it depends on the individual child and all the circumstances in the specific case. These include such factors as the prison itself: a lower age limit [22].

Concerning mean total score of prisoned mother's knowledge about breastfeeding, this study showed that mean total score increased on immediate posttest compared to pretest and after 6 months test. This finding came in line with [24]. Whose conducted a study about "Success of An Educational Intervention on Maternal, New born nurse's breastfeeding knowledge and Attitudes". the study illustrated that mean total score of mothers knowledge increased on immediate post and follow up test than on pre test. From the researcher point of view this could be attributed to the clear illustration for the theoretical part of sessions which given by the researcher and had a positive effect on improving mothers knowledge regarding breastfeeding as well as availability of those feeding methods and support given from the researched. In addition, Breastfeeding is important for the physical and emotional health of the child as well as for bonding and attachment between mother and child. Thus not only should women prisoners be enabled to breastfeed their babies, but the prison factor should be taken into consideration specifically not only in sentencing, but also as a factor in deciding in favors of non-custodial measures prior to and during trial. It also means that babies should not

automatically be removed from their imprisoned mother. Enabling and supporting imprisoned mothers to breastfeed has implications for prison facilities – including space and hygiene – as well as the prison regime, work programed, and nutrition. Also, The percentage of breast feeding mothers exceeded than the other types of feeding compared to Exclusive breastfeeding in Kenya prison which is about at 32% [25]. This is probably because of the relatively small sample size in this study. The higher prevalence of breast feeding in prison may also be attributed to the support given to mothers with infants 0-3 months and also for Islamic recommendations.

Regards mean total score of mothers knowledge about bottle feeding, it was noted that mean total score was highly increased on immediate posttest than on pretest and after 6 months test. Such finding came in a line with Baghiani (2010) [26]. Study entitles The effect of education on formula and bottle feeding behaviors of nursing mothers based on precede model, The study revealed the total mean score of mothers knowledge increased on posttest than on pretest. From the researcher perspective, this might be attributed to the positive effect of the nutritional intervention program when held for any mothers under different circumstances get better consequences [27]. In their Literature Review of Prison-based Mothers and Children Programs: Final Report :Prepared for The Victorian Department of Justice and Regulation Reported that programs received included: mother and child health information and hands-on-training which included prenatal care, antenatal care, including breastfeeding, and bottle feeding in units access to standard prison programming including education classes in which most programs were delivered in a group setting. Results from the New Beginnings program showed no significantly findings between those that received the New Beginning group and the control group alternatives to, and different forms of, imprisonment that better support motherhood and child development

Concerning mean total score of mother's knowledge about complementary feeding, this study clarified that the studied mothers had higher mean total score on immediate post and follow up test than on pretest. This finding was in consistent with [28] who conducted a study about "Community – Based Educational Intervention Improved the Diversity of Complementary Diets in Western Kenya: Resulted from Randomized Controlled Trial". The study illustrated that intervention had a significant effect on the caregivers nutrition knowledge score. From the researcher perspective this could be due to different teaching methods which used by the researcher to illustrate different complementary diet.

Regarding mean total score of mothers practice about breast feeding, this study showed that mothers had higher mean total score on immediate post intervention than on pre intervention.

This finding came in agreement with Cowdery & McCarthy, [29]. Who conducted a study about "Breast feeding Facilitation and Initiation With One Prison Nursery Program". The study noted that program had a positive role in improving breastfeeding practices in prison. From the researcher point of view this could be due to mother's ability to provide better performance after having practical breastfeeding sessions.

Regarding mean total score of mothers practice about bottle feeding, this study showed that mother's had higher mean total score on immediate post intervention than pre intervention. The finding came in line with [30] his study noted that the total mean score of mothers practice increased on post intervention. From the researcher perspective this could be attributed to the successfulness of the practical sessions which given by the researcher. As well as the researcher negotiation with the authorized personal that ended, to provide incarcerated mothers with needed supplies necessary for preparing additional meals for infants.

Regards mean total score of mothers practice about complementary feeding, this study showed that mothers had higher mean total score after 6 months of nutritional intervention than on pre and immediate post intervention. From the researcher point of view such result could be due to the effectiveness of the practical session that provided to mothers as well as the problem that faced incarcerated mothers were discussed about addition of complementary feeding for growing infant. These findings are in agreement with those by Omukhweso (2007) [21]. where a majority (85%) of the children 6 months of age had been appropriately introduced to solids, semi-solids and soft foods. Delaying the introduction of complementary feeds is likely to affect the nutrition status since breast-milk alone at six months is not adequate to maintain an infant in the right nutrition status (WHO, 2011) [13]. Reported that The diet served in the prisons comprised mostly of starchy/carbohydrate foods. Cabbage was served daily with some prisons serving kales once or twice a week. Meat was served thrice in a week; however, all the prisons served beans daily. In all the prisons, a cup of milk was offered to the children. A combination of these food groups contributed to half of the children meeting the recommended dietary diversity. The meals were however served within very short intervals in all the prisons; breakfast was served at 8 am, 10 o'clock snack at 11am, lunch at 12.30 pm, dinner at 3.30 pm together with the evening snack (Observation made during the study period by Researcher). Meals served within such intervals may interfere with nutrient utilization in the body leading to malnutrition.

Concerning to pearson correlation between total knowledge and practice scores about breastfeeding. It was clear that there were no correlation between total knowledge and practice scores about breastfeeding. Such finding was disagreed with

Shewa (2015) [30]. who conducted a study about "Knowledge and Attitudes and Practices regarding Breastfeeding among Military Mothers". The study clarified that there was positive correlation between total knowledge still practiced without any significant and practice scores about breastfeeding from the researcher perspective this could be due to their the prisoned mothers knowledge about breast feeding for their education or knowledge considerations. Also, Study conducted by Sarah [31]. Entitled Children Accompanying Mothers in Jail reveals the general conditions of children who are accompanying their mothers prevailing in prison. The findings indicate that there are no special provisions available for children in almost any of the jails, therefore, these children are compelled to share the same services which are provided for their mothers including food, bedding, health and recreation.

Concerning to Pearson correlation between total knowledge and practice scores about complementary feeding. It was clear that there were positive correlation between total knowledge and practice scores about complementary feeding. Such finding was agreed with Shams [33]. who conducted a study about "Dominants of Complementary feeding among Mothers of 6-24 months. The study clarified that there was positive and significant correlation between mother's knowledge and performance about breastfeeding from the researcher point of view such finding could be attributed to researcher influence with the authority personal in the prison which in turn had good effect of providing on the missing nutritional supplies. Gaza's Ansar Prison mother commented that she must buy everything from the prison's grocery store; because there is no baby food, she feeds her son bread dipped in tea. The prison has no hot water, no trees or toys, and electricity cuts affect fan-use and ventilation. Palestinian Nation Authority, 2015) [33]. in Egypt have had to use their own resources to acquire such goods as food, medicine, milk, clothes and blankets, whereas many of those in other countries are unable to buy things for their children, either due to a lack of goods or a lack of money. Case Study Egypt Community and Institutional Development (2007) [34]. Final Report: A Rights-Based Analysis of Child Protection in Egypt.

In relation to hypothesis two:

the present result revealed that infant had better growth after 6 months of nutritional intervention, The findings revealed a significance difference with increase in regards to weight for age and for growth charts as well as for length while there were no changes in mid – arm circumference which reflecting better services provided for those children inside the prison even if their mothers buy some food from Sufferer in which the poor nutritional status affected by weight and growth chart on the short run while the length and mid – arm circumference affected on the long run which revealed that the study in need to be followed in long run such finding came in line with

Chandra (2009) who conducted a study about "Mothers Behind Bars" The study noted that prison nursery programs improved growth status of infants. Also, a study conducted by Omukhweso (2007) [21] study the relationship between prison conditions and the nutritional status of the children accompanying their mothers in prisons in Kenya showed that stunting rate was 18.8%, underweight (14.1%) and wasting was 8.9%. Also, not found relationship between Stunting and wasting Furthermore, a study in Ghana showed similar findings with weight-for-age was significantly associated with dietary practices. In addition, Nti, 2011 [35]. Studies in prisons have not yet established the link between nutritional status and these indicators In addition, maternal level of education in this study had a significant relationship with nutritional status (underweight and wasting). Therefore the circumstances in prisons may have had a greater influence because women did not have much choice in terms of care and infant feeding practices.

Conclusion

Based on the finding of the present study, it was concluded that: mothers gained more knowledge and had better practices on post test following the adherence of nutritional intervention. Also, their infants had better growth after implementation of the nutritional intervention.

Recommendations

- Mothers in prison in need for periodical nutritional intervention to sustain their infants growth. Special provisions must be in place to ensure that the child's rights are promoted and protected whilst in prison,
- Child welfare, rather than prison authorities, should have primary responsibility for making decisions regarding children in prison, and specialists in social work and child development should supervise their care.
- Food must be provided that is separate from the prisoners and meets the children's nutritional needs as prescribed by the state governments.
- Nurse's officers should provide mothers in prison for periodical nutritional intervention to sustain their infants growth.

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