

Relation between Feeding Types and Surgical Wound Healing of Neonates

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Abstract

Background: Breast milk has antimicrobial and healing properties that actually can help the wound healing. Surgical neonates are at a much higher risk for malnutrition as a result of increased metabolic demands from surgery, nutrient losses, and sepsis. Many methods of feeding are used postoperatively for neonates; oral feeding (breast milk or formula milk), enteral, or parenteral feeding. **Aim of this work** was to assess the relation between feeding types and surgical wound healing of neonates after. **Methods and materials:** Comparative descriptive research design was used to carry out this study. It comprised 100 neonates aged less than one month, they were divided into two equal groups as the following: Group 1: received breast milk feeding, Group 2: received formula milk feeding. Tools were developed by the researcher, after that the researcher fulfill assessment sheet and took the photographs were taken by the researcher on the 7th postoperative day and reassessed for second time on the 14th day. **Results:** Out of the included neonates received breast milk feeding, 78 % were boys, while 22% were girls. Also in the formula-feeding neonates, the majority (58%) of formula feeding neonates' wounds were inflamed, while less than one third (30%) of breast milk feeding neonates' wounds were inflamed during the 7th day. On the other hand 38% of formula fed neonates' wounds were inflamed, while only 8% of breast milk feeding neonates' wounds were inflamed during the 14th day. **Conclusion,** neonates received breast milk feeding have rapid sound healing, less wound inflammation and receiving more number of daily feeding than formula feeding neonates.

Key Words: Wound Healing, Preoperative Feeding, Postoperative Feeding, Neonatal Feeding.

Introduction

Breast milk feeding remains the optimal method for nutritional support of the healthy neonate. In addition to fostering bonding between the mother and her child, breast milk provides optimal nutrient content to support growth and provides immunoactive substrates (Ziegler et al., 2003 & Sanchez, 2007).

At birth, the neonate has substantial nutritional demands because of the high metabolic rate and the rapid growth and development. Surgical neonates are at a much higher risk for malnutrition as a result of increased metabolic demands from surgery, nutrient losses, and sepsis. Many methods of feeding are used postoperatively for neonates; oral feeding (breast or formula milk), enteral, or parenteral feeding (Shulman and Phillips, 2008).

Wound healing progresses through four phases: hemostasis, inflammation, proliferation, and remodeling. Nutrition plays a significant part in wound healing since it enables optimal healing to occur. Proper nutrition enhances the body's ability to regain its balance (Browne et al., 2007). Wound infection can cause illness, anxiety, increase patient discomfort and can lead to death. It is estimated that surgical wound infections result in an increased length of hospital stay by about 7-10 days (Duque et al., 2003).

Nurses who care for children with wounds should develop an understanding of wound care in order to expedite wound healing, prevent infection,

promote accurate communication both written and verbally, provide patient comfort, and prevent the development of institution-acquired wounds (Letizia et. al, 2006).

Significance Of The Study

Breast milk has antimicrobial and healing properties that actually can help the wound healing. The importance of breast milk feeding must be identified to nurses and parents. Mothers should be encouraged to maintain breast milk feeding during the postoperative period if oral feeding is allowed, in order to promote wound healing.

Aim Of The Study

The aim of this study was to assess the relation between feeding types and surgical wound healing of neonates.

HYPOTHESIS

Neonates who will receive breast milk are experiencing rapid wound healing more than those who will receive formula milk.

SUBJECTS AND METHODS

Research design:-

Comparative descriptive research design was used to carry out this study to fit the nature of the problem under investigation.

Setting:-

The study was conducted in the Pediatric Surgical Unit at Assiut Pediatric University Hospital.

Subjects:

The study subjects included 100 neonates who were selected according to the following criteria:

Inclusion Criteria :

Both sexes, full term neonate up to one month of age. Postoperative for 3 days.

Exclusion Criteria :

Neonates with medical problems as diabetics and heart diseases were excluded from the study subject.

(The neonate were divided randomly into two equal groups, each group included 50 neonates; group one received breast milk feeding and group two received formula milk feeding).

Tools:-

Two tools were used in this study.

Tool one: Assessment sheet for neonate:

It was developed by the researcher after reviewing of literature and consists of two parts:

Part one: Demographic and clinical data about neonate and his/her parents such as gestational age, birth weight, sex, and their diagnosis.

Part two: Child's food consumption pattern (preoperative and postoperative): such as, number of feeds / day, type of milk (formula or breast milk), and route of feeding.

Tool two: Observation sheet which included surgical wound healing criteria; sound healing, wound inflammation or redness, wound discharge, gapping of wound, burst abdomen, or incisional hernia. Wound's photographs were taken.

Data collection:

- Tools were developed by the researcher after reviewing of literature. Then the contents of the assessment sheet of wound healing were given to a panel of five pediatric surgeons and pediatric nurses with more than five years experience to determine the content validity.
- Permission was obtained from the director of Pediatric Surgical Unit to collect the necessary data

Pilot study:

A pilot study was carried out on 10 neonates who were fulfilling the criteria of the study to evaluate the content of the questionnaire and assessment sheet and to estimate the time needed for answering the questions. The pilot study was

subjects of the pilot study were excluded from the study sample.

- Mothers were interviewed individually where the study objective was explained and informed consent was obtained to collect the desired data. When interviewing the mothers, the investigator started by introducing herself explaining the purpose of the study, on the day of operation (before the neonate's operation) to assess the preoperative feeding.

Field of the work

- The field work was carried out through a period of 12 months from January 2009 to January 2010.
- The time taken for filling each sheet ranged from 10 – 15 minutes that is depending upon the response of the mother.
- All the neonates of the two groups were reassessment for wound healing during follow up at 7th and 14th days of operation.
- Photographs were taken by the researcher on 7th postoperative day and reassessed for second time on 14th day.

Data analysis:

Collected data were revised and coded for computerized data entry. Data were then verified prior to statistical analysis. Statistical methods were applied including descriptive statistics as; (frequency, percentage, mean, and standard deviation), Z-test and Chi-square (χ^2) were used. P-values were considered as statistically significant when less than 0.05.

Ethical considerations:

Consent was taken from every mother and mothers were reassured that the information obtained will be confidential, and used only for the purpose of the study.

Limitations of the study:

Shortage in number of full term gestation and milk feeding newborns (breast milk feeding and formula feed newborns) postoperative at Neonate Intensive Care Unit (NICU) was found.

Results:**Table (1):** Distribution of breast milk feeding and formula feeding neonates according to their gestational age, birth weight, and sex.

Items	Breast milk		Formula milk	
	No.	%	No.	%
Gestational Age:				
< 41 weeks	18	36	22	44
41 – weeks	22	44	24	48
> 42 – weeks	10	20	4	8
Total:	50	100	50	100
Birth Weight:				
3.400 kg –	20	40	8	16
3.700 kg –	18	36	14	28
> 4 kg	12	24	28	56
Total:	50	100	50	100
Sex:				
Male	39	78	32	64
Female	11	22	18	36
Total:	50	100	50	100

Table (2): Distribution of breast milk feeding and formula feeding neonates according to their diagnosis.

Diagnosis	Breast milk		Formula milk	
	No.	%	No.	%
1) Congenital	41	82	33	66
2) Acquired	9	18	17	34
Total:	50	100	50	100
Types of disorders:				
1) Congenital				
- Duodenal atresia	10	24.4	5	15.2
- Ileal atresia	5	12.2	4	12.1
- Hirschsprung's disease	11	26.8	8	24.2
- Anal atresia and anorectal malformations	15	36.6	16	48.5
Total:	41	100	33	100
2) Acquired				
- Intussusception	8	88.9	15	88.2
- Trauma	1	11.1	2	11.8
Total:	9	100	17	100

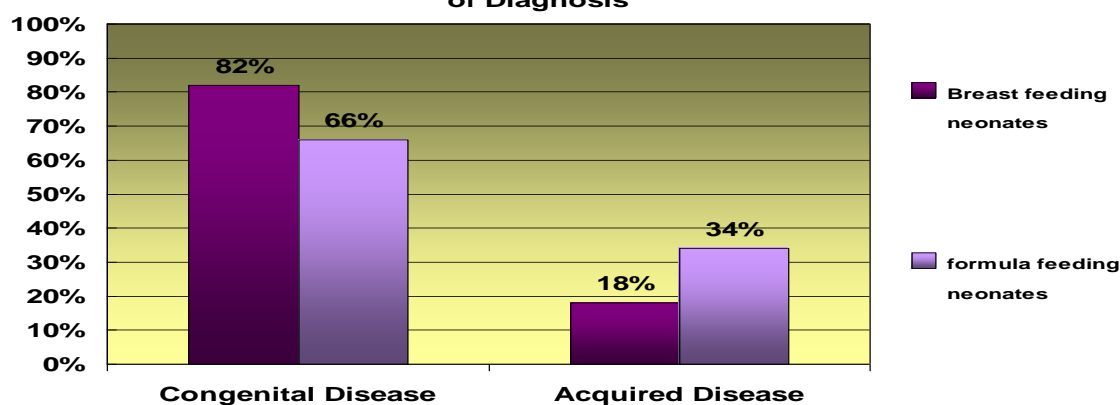
Fig. (1) Distribution of Neonates According to their Type of Diagnosis

Table (3): Relationship between sound healing of neonates' wounds and their type of feeding during 7th and 14th day

Items	Breast milk		Formula milk		Z.Test	P.Value
	No.	%	No.	%		
A. Preoperatively						
<u>Method of Feeding</u>						
Breast	45	90	0	0	9.045	0.000***
Bottle	2	4	43	86	8.241	0.000***
Nasogastric	3	6	7	14	1.333	0.091
Total:	50	100	50	100		
X² = 83.956 *** P.Value= 0.0001						
<u>Number of Feedings Daily:</u>						
1-	0	0	2	4	1.429	0.077
4-	7	14	22	44	2.928	0.002**
7-	17	34	15	30	0.429	0.334
10-	11	22	10	20	0.246	0.403
13-15	15	30	1	2	3.819	0.000***
Total:	50	100	50	100		
X² = 20.650 *** P.Value= 0.0001						
B. Postoperatively						
<u>Method of Feeding</u>						
Breast	42	84	0	0	8.510	0.000***
Bottle	1	2	42	84	8.282	0.000***
Nasogastric Tube	7	14	8	16	0.280	0.390
Total:	50	100	50	100		
X² = 81.160 *** P.Value= 0.0001						
<u>Number of Feedings:</u>						
1-	18	36	34	68	3.203	0.007***
6-	24	48	16	32	1.633	0.051*
11-15 Feeds	8	16	0	0	2.949	0.0016**
Total:	50	100	50	100		
X² = 14.523 *** P.Value= 0.001						

* P. Value < 0.05 = Statistically Significant Difference

** P. Value < 0.01 = High Statistically Significant Difference

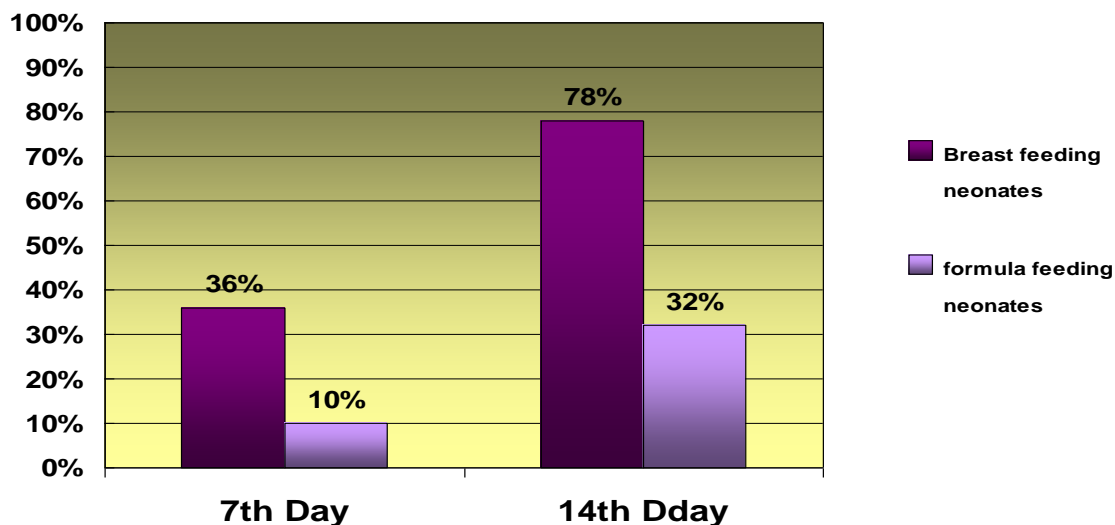
*** P. Value < 0.0001 = Very High Statistically Significant Difference

Wound healing process:**Table (4):** Relationship between sound healing of neonates' wounds and their type of feeding during 7th and 14th day

Feeding Sound healing	Breast milk		Formula milk		X ²	P-Value
	No.	%	No.	%		
7th Day:						
Yes	18	36	5	10	8.131**	0.004
No	32	64	45	90		
Total	50	100	50	100		
14th Day:						
Yes	39	78	16	32	19.556***	0.000
No	11	22	34	68		
Total	50	100	50	100		

** P. Value < 0.01 = High Statistically Significant Difference

*** P. Value < 0.0001 = Very High Statistically Significant Difference

Fig. (2) Distribution of Neonates According to their Occurrence of Wound Healing Sound**Table (5):**Relationship between inflammation of neonates' wounds and their type of feeding during 7th and 14th day

Inflammation \ Feeding	Breast milk		Formula milk		X ²	P-Value
	No.	%	No.	%		
7th Day:						
Yes:	15	30	29	58	6.859**	0.009
No:	35	70	21	42		
Total:	50	100	50	100		
14th Day:						
Yes:	4	8	19	38	11.067***	0.000
No:	46	92	31	62		
Total:	50	100	50	100		

** P. Value < 0.01 = High Statistically Significant Difference

*** P. Value < 0.0001 = Very High Statistically Significant Difference

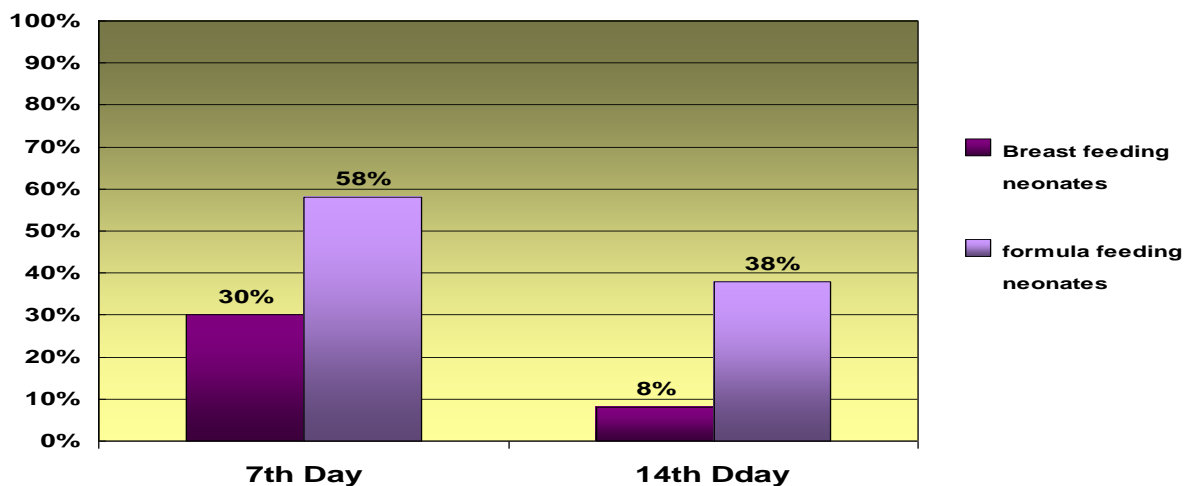
Fig. (3) Distribution of Neonates According to their Occurrence of Wound Inflammation

Table (6): Relationship between gapping of neonates' wounds and their type of feeding during 7th and 14th day

Feeding Gapping	Breast milk		Formula milk		X ²	P-Value
	No.	%	No.	%		
7th Day:						
Yes:	11	22	17	34	1.240	0.266
No:	39	78	33	66		
Total:	50	100	50	100		
14th Day:						
Yes:	7	14	17	34	4.441*	0.035
No:	43	86	33	66		
Total:	50	100	50	100		

* P. Value < 0.05 = Statistically Significant Difference

Table (7): Relationship between neonates with burst abdomen and their type of feeding during 7th and 14th day

Feeding Burst Abdomen	Breast milk		Formula milk		X ²	P-Value
	No.	%	No.	%		
7th Day:						
Yes:	1	2	6	12	2.458	0.117
No:	49	98	44	88		
Total:	50	100	50	100		
14th Day:						
Yes:	1	2	7	14	3.397	0.065
No:	49	98	43	86		
Total:	50	100	50	100		

Table (8): Relationship between neonates with wound discharge (presence of discharge) and their type of feeding during 7th and 14th day

Feeding Items	Breast milk		Formula milk		X ²	P-Value
	No.	%	No.	%		
7th Day						
Presence of Discharge:					3.610	0.057
Yes:	12	24	22	44		
No:	38	76	28	56		
Total:	50	100	50	100		
Type of Discharge						
- Purulent	6	50	13	59	5.020*	0.025
- Non purulent	6	50	9	41		
14th Day						
Yes:	3	6	12	24		
No:	47	94	38	76		
Total:	50	100	50	100		
Type of Discharge:						
- Purulent	2	67	7	58		
- Non purulent	1	33	5	42		

* P. Value < 0.05 = Statistically Significant Difference

Table (9): Relationship between neonates with wound discharge (site of discharge) and their type of feeding during 7th and 14th day.

Feeding Site of Discharge	Breast milk		Formula milk		X ²	P-Value
	No.	%	No.	%		
7th Day						
- Suture Only	8	66.6	11	50	3.610	0.057
- Suture +Incision	2	16.7	10	45.5		
- Site of Drain Only	2	16.7	1	4.5		
14th Day						
- Suture Only	0	0	4	33.3	5.020*	0.025
- Suture +Incision	2	66.7	7	58.4		
- Site of Drain Only	1	33.3	1	8.3		

* P. Value < 0.05 = Statistically Significant Difference

Table (1) show that the distribution of breast milk feeding and formula feeding neonates according to their gestational age, birth weight, and sex. It's clear from table one that 44% of breast milk feeding neonates and about half of formula feeding neonates (48%) gestational age ranged from 41 – < 42 weeks. About half of breast milk feeding neonates (40 %) and only 16% of formula feeding neonates had birth weight ranged from 3.400 - < 3.700 kg.

Regarding the sex it was found that the majority of breast milk feeding neonates (78 %) were males compared to 64% of formula feeding neonates.

Table (2) and Figure (1) show that the distribution of breast milk feeding and formula feeding neonates according to their diagnosis. It was found that the majority of the breast milk feeding (82%) and formula feeding neonates (66%) had a congenital disease, while only 18% of breast milk feeding neonates and 34% of formula feeding neonates had an acquired disease.

No statistical significant difference was present between type of neonates' feeding (breast milk feeding and formula feeding) and their diagnosis.

Table (3) clear that the relationship between sound healing of neonates' wounds and their type of feeding during 7th and 14th day.

A very high statistically significant difference was found between breast milk feeding and formula feeding neonates by breast and bottle ($P < 0.0001$), while no statistical significant difference was found between breast milk feeding and formula feeding neonates by nasogastric tube.

Regarding the number of daily feeds, a very high statistically significant difference was found between breast milk feeding and formula feeding neonates in the number of 13-15 feeds/day and 4-6 feeds/day ($P < 0.0001$). While the highest numbers of feeds (13-15 feeds/day) were found among breast milk feeding neonates during the preoperative period. The highest percentages of 4-6 feeds/day was found among formula feeding neonates.

Very high statistically significant difference was found between breast milk feeding and formula feeding neonates ($P < 0.0001$), while no statistical significant difference was found between feeding method of breast milk feeding and formula feeding neonates by nasogastric tube ($P = 0.390$).

Regarding the number of daily feeds, a very high statistical significant difference was found between breast milk feeding and formula feeding neonates in the number of 1-5 feeds/day, 6-10 feeds/day, and 11-15 feeds/day.

48% and 16% of 6-10 feeds/day and 11-15 feeds/day respectively were found among the breast milk feeding neonates, on the other hand 68% of 1-5 feeds/day were found among the formula feeding neonates.

Table (4) and Figure (2) clear that relationship between sound healing of neonates' wounds and their type of feeding during 7th and 14th day

The high statistical significant difference ($P < 0.004$) was found between occurrence of sound healing of neonate's wound and their type of feeding (breast milk feeding or formula feeding) and during the 7th day. It was found that, the percentage of occurrence of sound healing among the breast milk feeding neonates was more than one third (36%) while the percentage of occurrence of sound healing among the formula feeding neonates was 10% only.

Very high statistically significant difference ($P < 0.0001$) was found between occurrence of sound healing of neonates' wounds and their type of feeding (breast milk feeding or formula feeding) during the 14th day. It was found that the majority (78%) of breast milk feeding neonates wounds' had sound healing, while less than third (32%) of formula feeding neonates wounds had sound healing during the 14th day.

Table (5) and Figure (3) revealed that the relationship between inflammation of neonates' wounds and their type of feeding during 7th and 14th day

The high statistical significant difference ($P < 0.009$) was found between occurrence of inflammation of breast milk feeding and formula feeding neonates' wound during the 7th day. The majority (58%) of formula feeding neonates' wounds were inflamed, less than one third (30%) of breast milk feeding neonates' wounds were inflamed during the 7th day.

Very high statistical significant difference ($P < 0.000$) was found between occurrence of inflammation of wound and breast milk feeding and formula feeding neonates during the 14th day. About 38% of formula feeding neonates' wounds were inflamed, only 8% of breast milk feeding neonates' wounds were inflamed during the 14th day.

Table (6) Clear that the relationship between gapping of neonates' wounds and their type of feeding during 7th and 14th day.

There was no statistical significant difference ($P < 0.266$) was found between occurrence of gapping of breast milk feeding and formula feeding neonates' wounds during the 7th day. Less than one quadrant (22%) of breast milk feeding neonates' wounds were gapping, more than one-third (34%) of formula feeding neonates' wounds were gapping during the 7th day.

A statistical significant difference ($P < 0.035$) was found between type of feeding and occurrence of gapping of breast milk feeding and formula feeding neonates' wounds during the 14th day.

Less than one quadrant (14%) of breast milk feeding neonates' wounds was gapping, while more than one third (34%) of formula feeding neonates' wounds were gapping during the 14th day.

Table (7) revealed that the relationship between neonates with burst abdomen and their type of feeding during 7th and 14th day.

Only two percent of breast milk feeding neonates had burst abdomen, while twelve percent of formula feeding neonates had burst abdomen during the 7th day.

About one quadrant (14%) of formula feeding neonates have burst abdomen, on the other hand only 2% of breast milk feeding neonates have burst abdomen during the 14th day.

There was no statistical significant difference was found between occurrence of burst abdomen among the breast milk feeding and formula feeding neonates and their type of feeding during 7th and 14th day

Table (8) Clear that the relationship between neonates with wound discharge (presence of discharge) and their type of feeding during 7th and 14th day.

No statistical significant difference ($P < 0.057$) was found between type of neonates' feeding (breast milk

feeding or formula feeding) and occurrence of wound discharge during the 7th day.

About 44% of wound discharge was found among the formula feeding neonates and 59% of them were purulent discharge compared to those with wound discharge (24%) and 50% of them were purulent discharge among the breast milk feeding neonates during the 7th day.

Statistical significant difference ($P < 0.025$) was found between type of neonates' feeding (breast milk feeding or formula feeding) and occurrence of wound discharge during the 14th day.

Small percentage of wound discharge (6%) was found among the breast milk feeding neonates compared to those with wound discharge (24%) was found among the formula feeding neonates during the 14th day.

Table (9) Revealed that 20% of formula feeding neonates had discharge in this site of wound, while only 4% of breast milk feeding neonates had discharge in this place of the wound during the 7th day.

No statistical significant difference ($P < 0.057$) was found between place of neonates' wound discharge and their type of feeding (breast milk feeding or formula feeding) during the 7th day.

Statistical significant difference ($P < 0.025$) was found between place of neonates' wounds discharge and their type of feeding (breast milk feeding or formula feeding) during the 14th day.

Regarding the presence of wound discharge in suture only it was found that 8% of formula feeding neonates had discharge in this place of wound, while no one of breast milk feeding neonates had discharge in this place of the wound during the 14th day.

Discussion:

Nutrition plays a key role in the prevention and treatment of children's wounds and especially in newborns. Breast-feeding is such an amazing advantage for both a mother and child. It has long been established that both parties benefit from the antibodies and nutrients in breast milk (Center for Public Health Nutrition, 2010).

Majority of the cells in breast milk are macrophages, cells that kill bacteria, fungi and viruses. Breast milk feeding neonates are protected, in varying degrees, from a number of infectious cases as well as wound infection. Therefore, it promotes the process of healing and help in repairing of damaged tissues. Furthermore, mothers produce antibodies to whatever disease is present in their environment, making their milk custom-designed to fight the diseases their babies are exposed to as well (Rumel, 2009).

In this study, it was observed that a very high statistically significant difference was found between breast milk feeding and formula feeding neonates in the number of feeds/day. The highest numbers of feeds were found among breast milk feeding neonates preoperatively. These results could be explained by one of the following; **Firstly**, increasing of neonate's pleasure sensation during sucking of the breast and emotional bonding between mother and neonate during breast-feeding more than bottle feeding. **Secondly**, because formula milk digested slower than breast milk, formula-fed babies usually need to eat less often than do breast milk feeding babies.

Results of the present study were in agreement with those obtained by the study of Labbok (2010) reported that the breast milk feeding babies under the age of six months have more frequency of feeding times than formula feed babies.

These results were in accordance with what mentioned by Bar-Yam (2008) added that the exclusively bottle-fed neonates showed fewer number of feeding and shorter duration of sucking and compared to breast milk feeding neonates.

These data showed that the healing process occurred rapidly and with correct manner and the wound infection occurred less in wounds of neonates who were receiving breast milk feeding than that

occurred in wounds of neonates who were receiving formula milk feeding and this may be related to antibodies that reach naturally to neonates from the mother during the breast-feeding and these antibodies are not found in formula milk.

In this study, it was observed that the highest percentage of maximum numbers of postoperative feeds reached by breast milk feeding neonates compared to formula feeding neonates.

Schack-Nielsen and Michaelsen (2006) mentioned that the most wounds will typically have less discharge with less blood in it until there is no discharge whatsoever and the wound has completely closed. The amount, smell and color of purulent discharge (pus) can determine the type of wound infection.

These results in agreement with the result of Reilly (2007) stated that the number of feeding times/day among the neonates with bottle-feeding was shorter in number and duration of feeding than breast milk feeding neonates post-surgery.

Stevens and Franck (2005) added that the poor nutrition makes it easier for wounds to develop, however good nutritional status is essential to promote effective growth and repair of body tissues. Nutrients play vital roles in the constitution of a well-balanced diet and any depletion in a person's nutritional intake, can lead to malnutrition and

protein-energy malnutrition, conditions that are known to have considerable impact on health and well-being and on the wound healing process.

The finding of the present study showed that the high and very high statistically significant difference was found between occurrence of sound healing of neonates' wounds and their type of feeding during the 7th and 14th postoperative days respectively. On other hands, the majority of occurrence of sound healing from total healing was found among breast milk feeding neonates while about one third of occurrence of sound healing was found among formula feeding neonates during the 7th and 14th postoperative days respectively. These results could be attributed to the fact that breast milk contains enough concentrations of all nutritional elements essential for healing.

Langer (2006) mentioned that the presence of infected fluid and microorganisms in the subcutaneous space leads to invasion of tissues by bacteria that would otherwise be directed towards the tissue repair and can cause burst abdomen. They also release enzymes that break down protein, which is an important component in wound repair.

High and very high statistically significant difference was found between occurrence of inflammation of breast milk feeding and formula feeding neonates' wounds during the 7th and 14th postoperative days respectively. The majority of total inflamed cases numbers were in the formula feeding neonates' wounds, while about third from total inflamed cases number was breast milk feeding neonates during the 7th and 14th postoperative days respectively. These results could be due to including the breast milk of antibodies that enable the neonate body to overcome microorganism included at the neonates' wounds.

The results of the present study was consistent with Szeszycki and Benjamin (2005) reported that the breast milk has more lactose, which in the gut stimulates growth of microorganisms, which synthesize some B vitamins and produce organic acids that may retard growth of harmful bacteria and has more monounsaturated fatty acids, which enhance absorption of fat and calcium.

Chantry et al. (2006) mentioned that the infection-fighting antibodies passed from a nursing mother to her neonate could help to lower the occurrence of many infected conditions.

Pierro, (2006) reported that the breast milk help to protect breast milk feeding neonates from wound infection by enforcing neonates' immune system by increasing the barriers to infection and decreasing the growth of organisms like bacteria and viruses.

Goulet, (2009) reported that breast-feeding is particularly beneficial for premature babies and may also protect children against many diseases. As a group, formula-fed neonates have more infections and more hospitalizations than do breast milk feeding babies.

Puligandla et. al (2008) mentioned that none of the important antibodies found in breast milk is found in manufactured formula milk which means that formula milk doesn't provide the neonate with the added protection against wounds infection and illness that breast milk does.

According to the American Academy of Pediatrics (AAP, 2007), human breast milk is preferred for all neonates. This includes even premature and sick babies, with rare exceptions. It is the food least likely to cause allergic reactions; it is inexpensive; it is readily available at any time of the day or night; babies accept the taste readily; and the antibodies in breast milk can help a neonate to resist infections and help to rapid wound healing.

Schlatter et al. (2006) stated that more than three quadrants of the cells that make up breast milk contain antibodies. It has long been established that both parties benefit from the antibodies and nutrients in breast milk promote the repairing of wound tissues.

Conclusions:

Based on the results of the current study it was concluded that the breast milk feeding neonates were received more frequency of feeding numbers daily than formula feeding neonates.

The breast milk feeding neonates have rapid sound healing of their wounds more than formula feeding neonates and wound inflammation or redness, wound discharge, gapping of wound, and burst abdomen occurred more in formula feeding neonates than in breast milk feeding neonates.

Recommendations:

Based on the findings of the current study, the following recommends were proposed:

- Stress on the mother to start exclusive breast milk feeding immediately after birth until six months from her neonate's age due to the advantage of breast milk feeding on her neonate's health and wound healing.
- Health educational classrooms must be giving to encourage mothers of surgical neonates during admission period at hospitals to maintain exclusive breast milk feeding until six months of neonate's age.
- Educational program should be introduced to the nurses about right techniques, advantage, and role

of breast-feeding on increasing immunity, growth, and wound healing of infants.

- Educational program should be introduced to the nurses about right techniques, advantage, and role of breast milk feeding on increasing immunity, and wound healing of neonates.
- Encouraging the nurses to improve and update their knowledge about the effect of breastfeeding on wound healing by reading. This can be achieved by establishing a small nursing library in hospital departments supplied with recent Arabic textbooks, nursing periodicals and procedure manuals.
- Follow-up health educational sessions at out patient clinics during the follow up for wound care to stress on the previous knowledge.

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